Telecom Regulatory Authority of India

Recommendations On
Promoting Networking and Telecom Equipment Manufacturing (NATEM) in India

New Delhi, India

22 September 2023

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Chapter-I

Introduction

1.1. India is one of the fastest growing economies and represents the largest number of faces on the planet - with median age of only 28 years[1]. Given the large size of relatively younger population *i.e.* population taking birth after Internet was publicly introduced in the year 1997, the country has been a trend-setter in terms of telecom infrastructure growth and roll out of various services in the last two decades. India is not only ranked as 2nd largest[2] telecom market in the world, but also uses its telecom infrastructure and services for inclusive delivery of many socio-economic services/facilitations. There have been considerable developments in the digital communications technology and its adoption, which is clearly reflected in exponential growth in subscriber base, coupled with increased service usage per capita. The unprecedented growth and rapid digitization in the sector have become the key factors to drive growth of the Networking and Telecom Equipment (NATE) market.

1.2. India is taking part in adoption of 5G, Cloud Computing, Data centres/ Edge Data centres, Internet of Things (IoT), Artificial Intelligence (AI), High Performance Computing (HPC), Geo-navigation techniques, Spatial mapping, Payment Systems/Block Chain etc. Most of the future services/solutions would ride on advanced telecom networks which further requires robust domestic telecom manufacturing ecosystem. This has acquired higher significance after experiencing global supply chain disruptions owing to Covid-19, geo-political constraints etc. Hence, domestic electronics manufacturing of NATE along with management of resilient global value chains has become imperative for delivering socio-economic development. Availability of

[1] https://www.unfpa.org/sites/default/files/swop23/SWOP2023-ENGLISH-230329-web.pdf
[2] https://www.statista.com/statistics/258797/market-share-of-the-mobile-telecom-industry-in-india-by-company/

locally manufactured NATE is likely to further help in bridging Digital Divide.

1.3. 'Digital India', a flagship program of Government of India[3], was launched on 1 July 2015, focusses on three key areas:

(i) Digital Infrastructure as utility for citizen
(ii) On-demand delivery of Government Services & support
(iii) Digital Empowerment of citizens

Apart from universal telephony & broadband access and adoption of advanced communications technologies, Digital India program focuses on Electronics Manufacturing as one of the identified nine thrust areas.

1.4. The telecom industry's contribution to Gross Domestic Product (GDP) has been estimated to be 6.5% at present[4] and would further increase as the focus shifts to 5G deployments. Programmes like Digital India, Smart Cities, Digital Saksharta Abhiyan (DISHA), National Broadband Mission, Industry 4.0 etc. are expected to multiply the demand for telecom products and in turn NATE. It is believed that India's digital economy has the potential to reach USD 1 trillion[5] by the year 2025 driven by increased proliferation of smart phones, improved internet penetration, growth of mobile broadband, uptake of data usage, and further penetration of social media. As the Government makes concerted efforts to digitize the economy, the demand for affordable NATE is expected to grow considerably. It is therefore important to promote domestic manufacturing sector to meet the growing equipment demand. This in turn will contribute handsomely to the GDP and employment in the country. It will also promote exports and allow India to become important player in international value chain.

[3] https://pib.gov.in/newsite/printrelease.aspx?relid=161724
[4] https://www.investindia.gov.in/sector/telecom
[5] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=15656691

1.5. The growth of the domestic Networking and Telecom Equipment Manufacturing (hereinafter referred as NATEM) would create various forward and backward linkages and expand demand for other electronic components. It would also develop the technical know-how and skills of people in the country, lower the import requirement for telecom end products, and enable the sector to align with Government of India's vision of an Atmanirbhar-Bharat. Robust NATEM sector is also a prerequisite in view of growing security concerns regarding data privacy and overarching geopolitical concerns surrounding personal data protection. It becomes necessary for a country to have an agile manufacturing setup for NATE so that value addition to the economy can be maximized.

1.6. Growth in demand for telecommunications services will result in an increase in demand for NATE as Telecom Service Providers (TSPs) and enterprises will strive for modernizing their networks and improving coverage and service quality. The relevant factors and demand projections relating to different categories of equipment have been discussed at length in Chapter 2.

1.7. In these recommendations, use of term 'NATE' (Networking and Telecom Equipment) has been broadly used for all such equipment/ components which are being used in networking and telecom product domains. In a more specific sense, the term indicates the equipment/ components covered under DoT's Statistical list of 52 HS-Codes for FY 20221-22 plus other products/ equipment for which the Authority has made recommendation to include in HS-code list, as per para 4.301 of these recommendations. For ready references, this list has been compiled and placed as **Annexure-I**.

Overview of Export-Import of NATE in India

1.8. Department of Telecommunications (DoT) has published data on Indian export as well as import and re-export by favourite NATE/

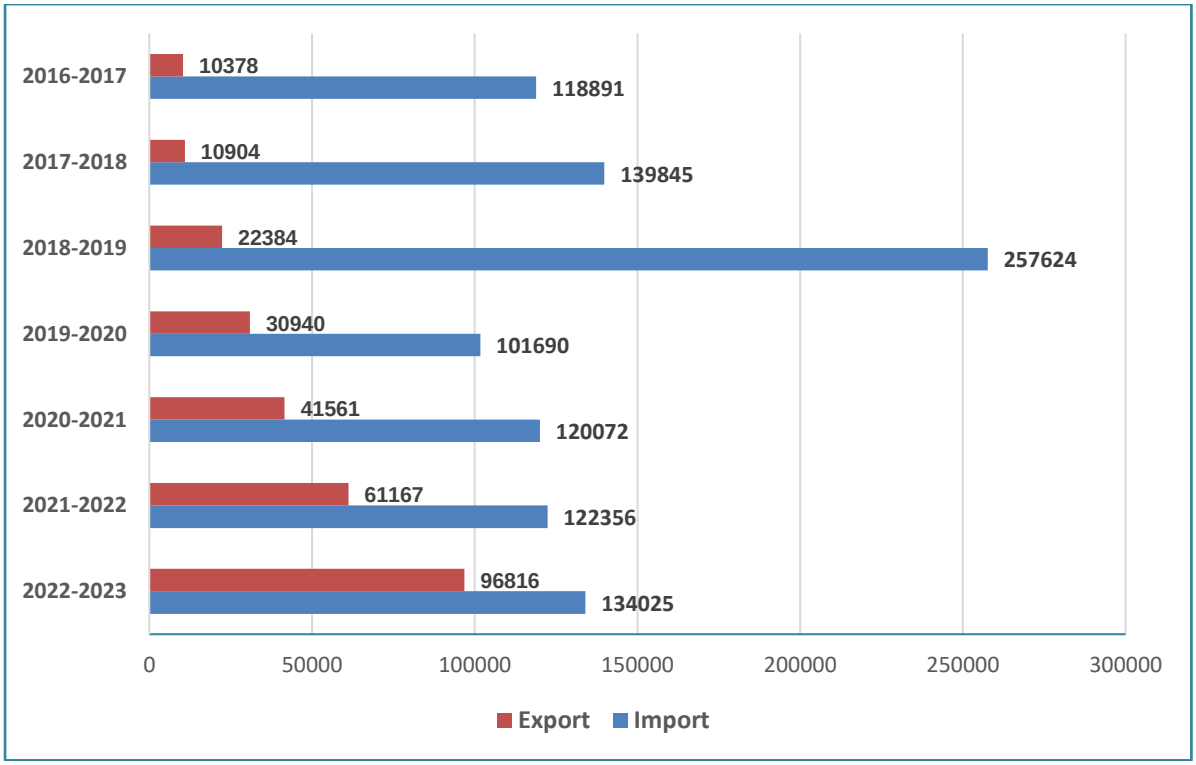
telecom products for FY 2021-22. The same has been provided at **Annexure-I**. This data listed 52 Harmonized System (HS) Codes against NATE products categorised into 4 main types. Subsequently, in the year 2022-23, a few HS codes has been modified. As a result of such modifications, the relevant HS codes are listed below:

Table 1.1– Recent modifications in HS-Codes, related to NATE

Sr	Old HS Code	Old Description	Modified HS Code	Modified Description
1	85171211	Mobile phones, other than push button type	85171300	Smartphones
2	85171219	Mobile phones, push button type	85171300	Smartphones
3	85171290	Other	85171400	Other telephones for cellular networks or for other wireless networks
4	85177090	Other parts of Telephonic/ Telegraphic Apparatus	85177100, 85177990	• Aerials and aerial reflectors of all kinds / parts • Other (~ Mobile Phone Display Assembly)
5	85177010	Populated, loaded or Stuffed Printed Circuit Boards	85177910	Populated, loaded or stuffed printed circuit boards
6	85195000	Telephone Answering Machines	85198100	Transcribing Machines

1.9. To understand the overall imports and exports position of NATE in India, the Authority has tried to analyse the trade data for these 52 HS Codes (taking into consideration the recent modifications as well). The data has been analysed on trend for imports and exports of NATE in India from FY 2016-17 to FY 2022-23 and the same is depicted in the Figure 1.1 below:

Figure 1.1 - Exports & Imports of NATE in India (in Rs. Crore)



Source: Compiled by TRAI as per data sourced from Ministry of Commerce - Trade Statistics

1.10. To further understand the import and export of NATE on the basis of type of equipment, the different products have been further classified into 4 types. Under each type, there are several products which are mapped to HS Codes. However, this mapping of product description and HS Code is indicative i.e. non-exhaustive.

Type-1

Main products under "Type-1" include (in order of trade volume)

(a) 'Other parts of telephonic / Telegraphic Apparatus', Indicative HS Code: 85177090 (mainly includes Mobile phones components such as Camera Module, Display, Connector etc.).

(b) 'Other' Indicative HS Code: 85176290 (mainly includes Smart watches, Optical Transport Equipment, Combination of one of more of Packet /Optical Transport Product or Switch (POTP/POTS), OTN products, IP Radios.

(c) 'Other Parts for Other Use' Indicative HS Code: 85176290 (includes Led BNC Connector, Mobile Data Cable, USB Hub, Touch Panel, USB Cable, Bluetooth, HDMI Converter etc.)

(d) Populated, Loaded or Stuffed Printed Circuit Boards (also termed as PCB Assembly) Indicative HS Code: 85177010 (mainly includes Printed Circuit Boards Assembled with components)

Type-2

Main products under 'Type-2" includes

(a) Modem/ Router: Indicative HS code: 85176230
(b) Base Stations: Indicative HS Code: 85176100
(c) SDH Equipment: Indicative HS Code :85176260
(d) PLCC (Power Line Carrier Communication) Equipment: HS Code 85176210
(e) DLC (Digital Loop Carrier) & Set Top box (OTT STB): HS Code: 85176960

Type-3

Type-3 mainly includes Cables including Optic-Fiber Cables.

Type-4

Mainly Includes Mobile Phones – Smartphones & other mobile phones.

The type-wise analysis of import and export trend for the period FY 2016-17 to FY 2022-23 for these 4 types of products is graphically represented in the following figures:

Figure 1.2 (a) Exports & Imports - Type 1 NATE Products

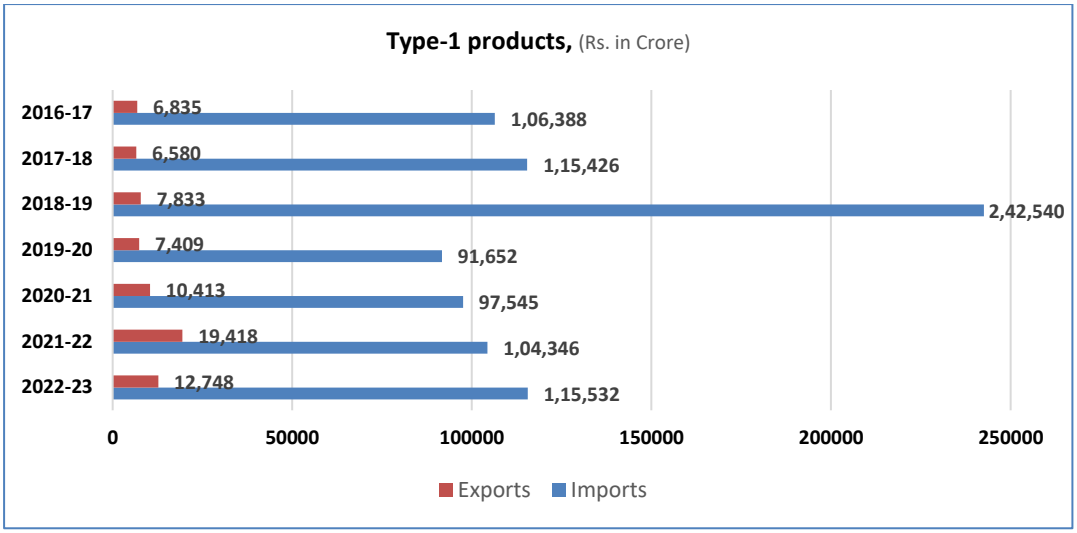


Figure 1.2 (b) Exports & Imports - Type 2 NATE Products

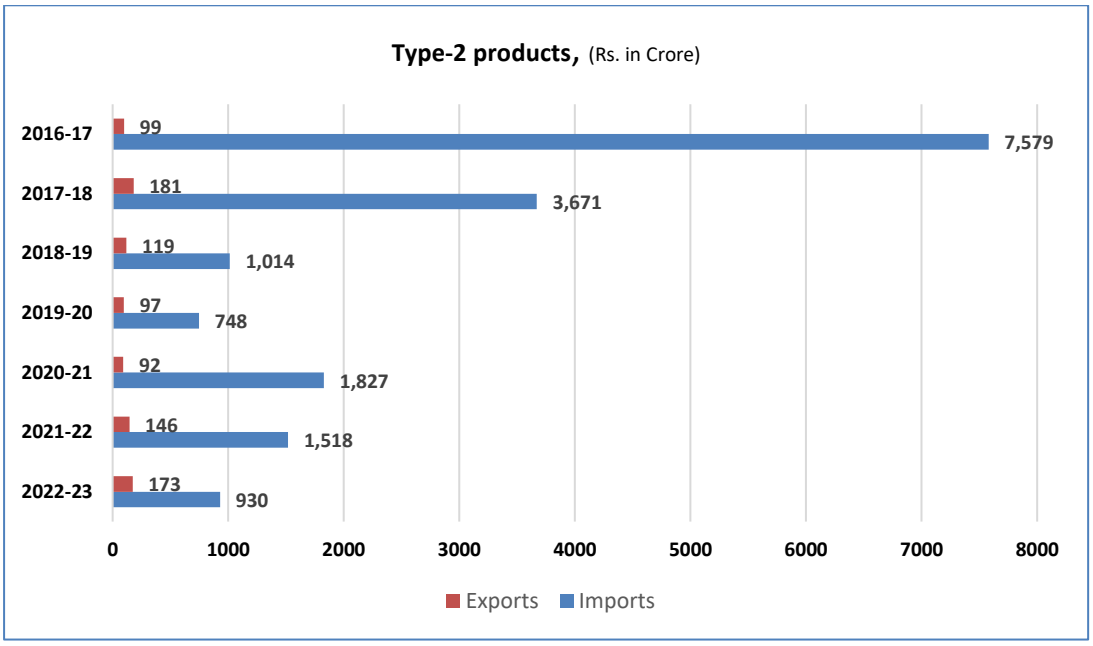


Figure 1.2 (c) Exports & Imports - Type 3 NATE Products

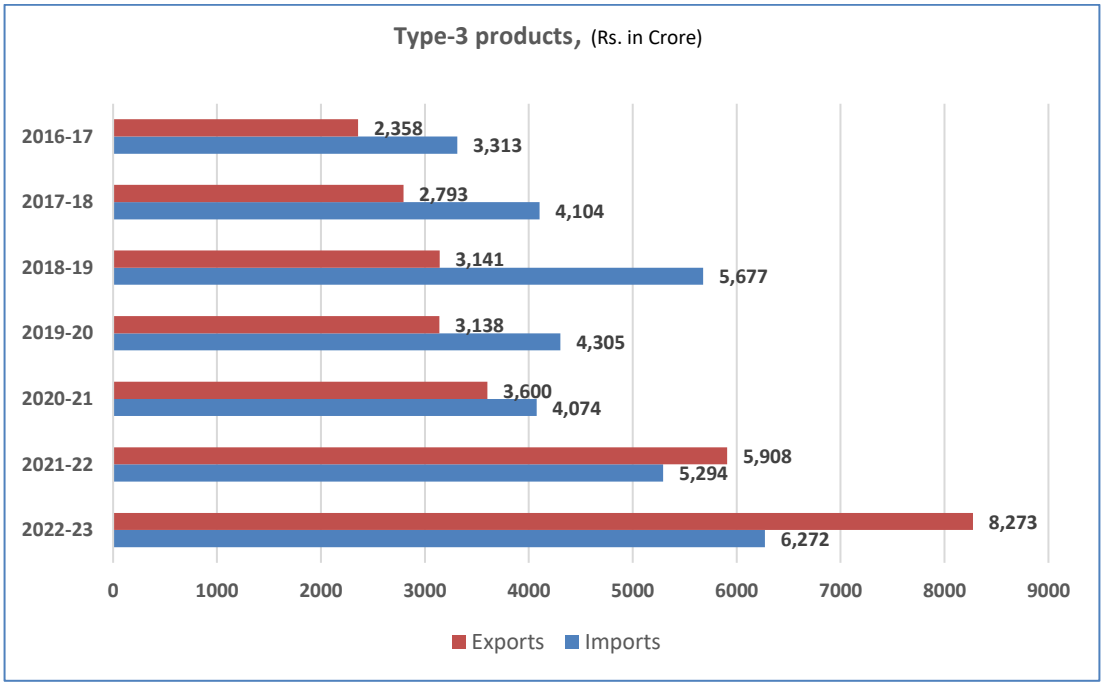
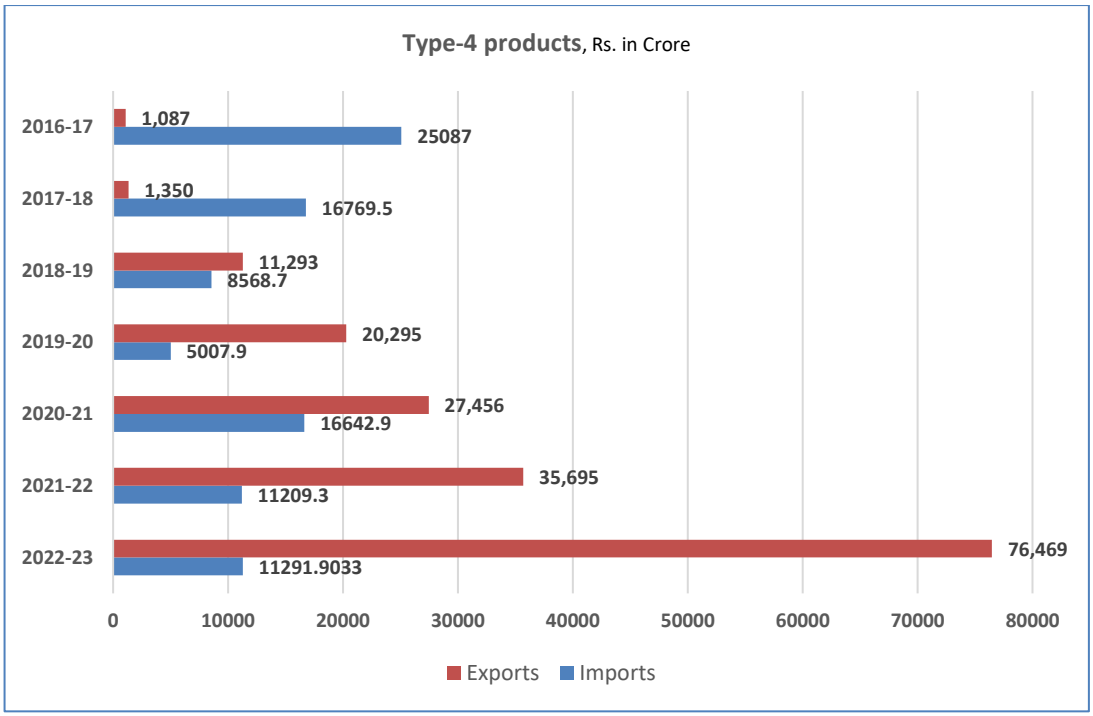


Figure 1.2 (d) Exports & Imports - Type 4 NATE Products



1.11. The above figure clearly indicates that the trade deficit as far as imports and export of NATE in India is concerned, has decreased over period of time. This can be attributed to several policy initiatives that

have been taken by the Government and some of which were explained in detail in the Consultation Paper (CP). The trend gives a positive indication that right set of policy intervention can soon give us the trade balance in favour of India where the exports of NATE from India can far exceed its imports.

1.12. It is reported that about 31 Crore mobile phone units[6] have been produced during first 10 months of FY 2022-23 of which around 3.8 Crore[7] units (smartphones) have been exported in the corresponding period. The aggregate value of core-imports (about Rs. 57825 Crore) & Lithium-ion battery (Rs. 20,650 Crore) for such devices during April 2022 to February 2023 is at least around Rs. 78,500 Crore. Apart from domestic consumption, about 4.69 Crore smartphone units have been exported by March 2023, valued at about Rs. 88,725 Crore. Thus, average export price per smartphone unit comes around Rs. 18,918. As component ecosystem within the country is still to gain traction, domestic value addition relating to manufacturing of mobile phones is estimated to be around 25% as per joint report by ICEA-ICRIER[8]. Recently, Department of Department for Promotion of Industry and Internal Trade (DPIIT) has stated that the value addition[9] in mobile manufacturing in India is about 20 %.

1.13. Above datasets also suggest that there are certain product-types upon which the telecom industry has higher dependence on global suppliers. In the recent years, a few products such as cables, base stations, mobile phones are in more competitive position due to inception of domestic manufacturing. The data also suggests higher degree of dependence *on continued basis* for the equipment having control plane (feature in context of telecom networks) such as routers, packet switch, optical transport controllers, IP radios which remain as

[6] https://timesofindia.indiatimes.com/gadgets-news/mobile-manufacturing-in-india-crossed-31-crore-units-in-2022-23-fm-during-union-budget/articleshow/97519283.cms

[7] https://tradestat.commerce.gov.in/meidb

[8] https://icrier.org/pdf/Globalise_to_Localise.pdf
https://www.tpci.in/indiabusinesstrade/blogs/indian-smartphone-industry-the-journey-from-scale-to-depth/

[9] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1932051

elementary blocks for building-up telecom networks. In summary, ubiquitous-affordable-safe telecom networks all over the country still requires many challenges to be tackled upon.

1.14. In addition to the issue of higher degree of dependence for the crucial NATE on foreign countries, another issue is that the dependence is concentrated in hands of few countries. Fig. 1.3 below provides the breakdown of India's import and export of telecommunications equipment for the periods 2020-21, 2021-2022 and 2022-23 respectively from geographical perspective. It can be inferred from the figures that, more than 67% of India's import of telecom equipment originates from a few East Asian countries.

Fig. 1.3(a) Distribution of India's imports in 2020- 2021 by country of origin

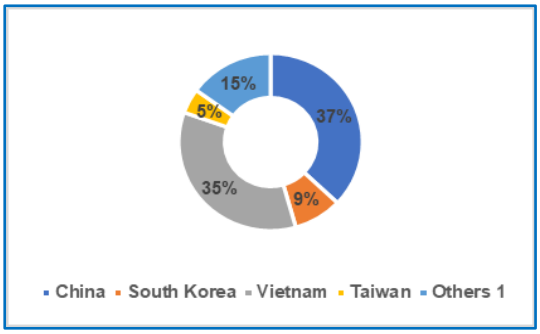


Fig 1.3(b)– Distribution of India exports in 2020-2021 by destination

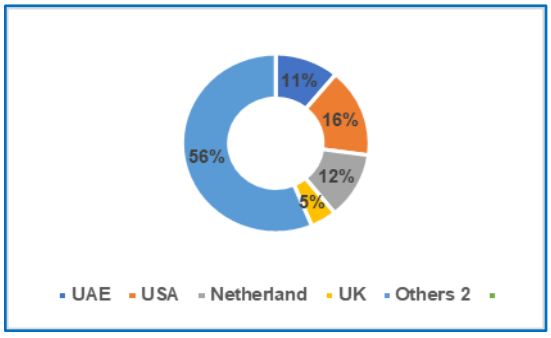


Fig 1.3(c) Distribution of India's imports in 2021-2022 by country of origin

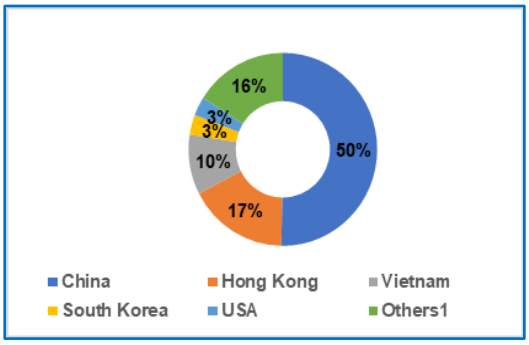
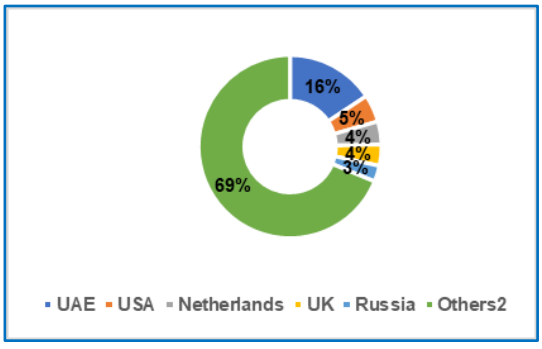


Fig 1.3(d) Distribution of India's exports in 2021-2022 by destination



Source: Exim Analytics (http://www.eximanalytics.dgciskol.gov.in/dgcis/EXIM-Analytics)
Others1 include Mexico, Ireland, Malaysia etc
Others2 include France, Spain, South Africa, Austria etc

Note: The yearly export and import data has been compiled based on data published in the Export Import Data Bank, Department of Commerce, Govt of India. relevant HS codes were identified from the Export/Import data for FY21-22 published by DoT.

Fig 1.3(e) – Distribution of India's imports in 2022-23 by country of origin

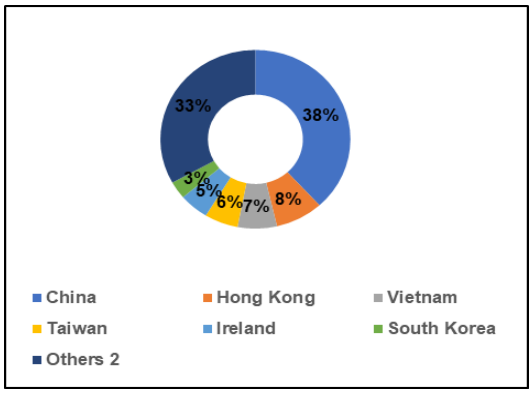
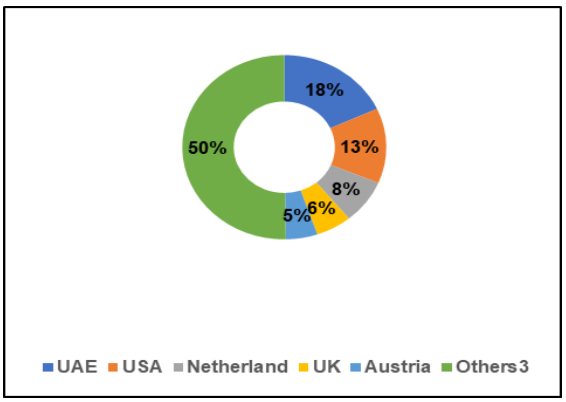


Fig 1.3(f) – Distribution of India's exports in 2022-2023 by destination



Source: Exim Analytics (http://www.eximanalytics.dgciskol.gov.in/dgcis/EXIM-Analytics)
Others2 include Mexico, Germany, Malaysia etc.
Others3 include France, Spain, South Africa etc.
Note: The yearly export and import data have been compiled based on data published in the Export Import Data Bank, Department of Commerce, Govt of India. relevant HS codes were identified from the Export/Import data for FY21-22 published by DoT. 2022-2023 data consist of data till Jan'23 only.

1.15. India's contribution[10] to the global telecom equipment market is only 1.4%-1.5%. The USA, UAE, and Netherlands are the top 3 export markets for India, contributing around 25% to India's exports of telecom and network equipment. Exports[11] of telecom equipment from India primarily consist of Optical Fibre Cables (OFC), Printed Circuit Boards (PCB), Telephonic/Telegraphic apparatus, Multiplexers, SDH (Synchronous Digital Hierarchy) and ISDN (Integrated Services Digital Network) equipment. The share of equipment for radio access networks, IP networks, core networks and optical networks to support 4G and 5G technologies is currently minimal in overall exports from India.

1.16. Thus, it is crucial for the country to have an agile manufacturing setup for NATE so that the market created can be fully exploited and value addition to the economy can be maximized. Rising security concerns,

[10] India's contribution to the global telecom equipment market has been calculated using data on global demand and export by Indian manufacturers
[11] https://dot.gov.in/reportsstatistics/import-export-statistics-FY-2021-22

demand for data localization and global value chains interruptions reflect that domestic equipment manufacturers would find a huge market within the domestic telecom service providers in near future as long as they can provide high quality, technologically advanced equipment at competitive prices to the telecom market. For NATE manufacturing ability to grow, these market opportunities need to be capitalized by the manufacturers on priority.

1.17. The growth of the domestic Networking and Telecom Equipment Manufacturing (hereinafter referred to as NATEM) is especially desirable from the standpoint of self-sufficiency which is a prerequisite of fulfilling India's aim of 1 trillion-dollar digital economy. NATEM ecosystem would create various forward and backward linkages, create employment opportunities, expand demand for other electronic components in the country, promote the technical know-how and skills of people in the country through increased Research & Development (R&D) expenditure and lower the import requirement for telecom end products thereby reducing fiscal deficits. Decline in dependency upon Global Value Chains by strengthening domestic NATEM ecosystem is mandatory to align the sector with the Government of India's vision of an Atmanirbhar-Bharat.

Challenges before indigenous manufacturing

1.18. The persistent import dependence of the country which stems from the private TSPs preferring products from established global vendors/Original Equipment Manufacturers (OEMs), results in a very restricted market for domestic manufacturers. Demand for equipment manufactured by such vendors has been historically high in the country. It is because they come with an established reputation and their products are often viewed to be of superior quality due to the brand value they have built over years. Such vendors/OEMs, get credit finance support in their countries and thus garner higher global volume by enjoying economies of scale. Local manufacturers within

the limited eco-system find themselves out of competition at least in terms of prices.

1.19. Indian manufacturing Industry is unable to capture the domestic market due to numerous reasons. Manufacturing needs the support of other components of the value chain to flourish. For the equipment ecosystem to flourish, assembly and sub-assembly together with semiconductor-based fabrication needs to be encouraged on priority. This would not only reduce the input cost but also enable the same infrastructure to be commonly used across the entire electronics sector.

1.20. Assurance of business in the domestic market is a primary requirement. However, besides lack of market access and assurance of business, higher manufacturing costs is another concern. Indian NATEM players face significant cost disabilities when compared to ecosystem working in other countries. In India, the local manufacturers face cost disadvantage that streams from sources like poor infrastructure, high cost of testing and certification, restricted market access, and reluctance by private players to favour domestic products over cheaper imports. Smaller domestic players do not have economies of scale and access to cheap sources or avenues of raising finances. Further, domestic industries, given their nascent stage, lack the ability to continually invest in R&D. Such challenges have been detailed in Chapter 3.

1.21. Introduction of recent measures like Production-Linked-Incentive (PLI) scheme, Remission of Duties or Taxes on Export Products (RoDTEP), Digital Communication Innovation Square (DCIS) under Champion Services Sector Scheme (CSSS), Roll-out of 5G Test Bed etc. has partially mitigated cost-disabilities. However, current challenges are still to be mitigated on higher footing.

1.22. Earlier, the Authority has issued Recommendations on Telecom Equipment Manufacturing policy on 12 April 2011 and again on 3

August 2018 wherein various concerns of telecom manufacturing in areas of Standardization, promotion of research, funding opportunities, export, incentivisation etc. have already been exhaustively covered. Issues like preferential market access to domestic players, Telecom Product Development Clusters (TPDCs), Telecom Research & Development Fund, Common Portal for Standard Essential Patent (SEP) were also addressed in these recommendations.

1.23. Consequently, Department of Telecom (DoT) in reference vide OM 18-09/2018-IP of 8 October 2020 **(Annexure-II)** has informed TRAI that many recommendations of TRAI are already under implementation and has sought further details on a few Recommendations under-consideration such as

(i) establishment of Telecommunication Equipment Development Board (TEDB)- Recommendation 3.1 (d),

(ii) development of common portal for Standard Essential Patents (SEP) certain financing options for indigenous telecom equipment manufacturers – Recommendation 3.4(c),

(iii) financing options to indigenous manufacturers – Recommendation 3.6 (h) and,

(iv) incentives to telecom service providers for deploying quantities beyond mandated one in Preferential Manufacturing Access (PMA)-Recommendation 3.7(e).

1.24. The Authority with the objective of realistically assessing true-potential in domestic equipment manufacturing in NATE category and to arrive at the recommendations to the Government for enabling transition of highly import-dependent sector to an important hub of indigenous production, issued a Consultation Paper on "*Promoting Networking and Telecom Equipment Manufacturing in India*" on 11 February 2022 (hereinafter referred to as 'CP'). Written comments on

the issues posed in CP were invited from the stakeholders. Open-House Discussions (OHD) was conducted on 4 July 2022. Extensive data gathering on the subject has followed thereafter. Publicly available data from trusted sources has been used for data analysis. Both quantitative and qualitative assessments have been used by combining primary and secondary research methods. Workshops with leading TSPs & OEMs have been conducted to seek stakeholders' views, the challenges faced and understand their perspectives for the way forward to achieve the aforesaid objective.

1.25. While formulating the recommendations, prevailing Government policies such as Production Linked Incentive (PLI), Design Linked incentive (DLI) and Preferential Market Access (PMA), and measures taken to address funding, infrastructural development, financial incentives, and incorporation of global best practices have been referred as well. It has helped the Authority to take a holistic view of the different perspectives to arrive at the recommendations.

1.26. The objective of these recommendations is to move forward from the concept of 'increasing domestic production' and to focus on '**local value addition in global value chains'**. Also, realizing the technological developments and softwarization of network elements in new generation networks, the Authority has given emphasis on "**Telecom software**" by considering it as a separate product line. The recommendations also place due importance upon **facilitating exports from India** as well as **nurturing entrepreneurship by promoting Micro, Small and Medium Enterprises (MSMEs) and Start-ups.** The Authority has also tried to address issues arising in entire manufacturing value chain and to **promote a robust component eco system** in India. A detailed analysis of various stakeholders' opinions, and the recommendations of the Authority on the related issues has been presented in Chapter 4.

1.27. TRAI has recognised semiconductor fabrication as one of the key-manufacturing activity in context of indigenous manufacturing of electronics products including NATE. TRAI in its Recommendations of 2011 had already recommended establishment of cutting-edge fabrication facility by providing Government's fund support up to 75 %, where equity is capped at 49% and rest as debt. Another fabrication facility for production of general-purpose Integrated Circuits was also recommended with 50 % Government support with similar equity-debt mix. Telecom R&D fund with a corpus of Rs. Ten Thousand Crore was recommended as well for telecom sector. The above Recommendations have been pending for a long time. Coming to contemporary requirements, TRAI acknowledges the high priority attention of the Government to catalyse establishment of domestic Semiconductor fabs. Since Government is already making lot of efforts in this direction, therefore, the Authority is not making any specific recommendations in this regard.

1.28. The Authority has also issued recommendations on *Promoting Local Manufacturing in the Television Broadcasting Sector* on 31 March 2023 relating to indigenous manufacturing pertaining to broadcasting sector.

1.29. The Authority has also noted the concerns expressed regarding lack of Access to Trials/ Validation / testing etc. which ultimately hampers the commercialization process of new age telecom products. A Consultation Paper on '*Encouraging Innovative Technologies, Services, Use Cases, and Business Models through Regulatory Sandbox in Digital Communication Sector*' has been issued on 19 June 2023.

1.30. On the issues related to Research & Development essential to indigenous manufacturing for telecom as well as broadcasting sector, the Authority is initiating a separate consultation process for '*Encouraging Research & Development in Telecom & Broadcasting sector*' wherein consultation with the stakeholders would be initiated

on key aspects such as Standards, Research & Development, Patents, Testing & Certification. Recommendations shall be issued accordingly.

Chapter -2

Networking And Telecom Equipment (NATE) Market study & Demand projections

2.1 Growth in demand for telecommunications services will result in an increase in demand for telecommunications equipment, as TSPs and enterprises will strive for modernizing their networks and improving coverage and service quality. Some of the major factors that are responsible for significant increase in the demand for NATE are as follows:

a) There is rise in demand for telecom services from both consumer and enterprise segments

b) The inclination of Indian consumers towards adopting next-generation technology and better smartphone devices is further driving the demand for better service quality and for new digital services

c) Technological advancements like 5G, IoT (Internet of Things), 'Anything as a Service' (XaaS), Artificial Intelligence (AI), and machine learning are fuelling the rapid digital transformation of enterprises and enabling the introduction of new services and business models

d) Increase in the uptake of private mobile networks

e) Proliferation of Data Centres & Edge Data Centres and delivery of content through telecom networks

f) Spread of Satellite Communications

g) Commitment to modernizing urban infrastructure (smart cities)

h) Rise in number of use cases and their adoption for industry 4.0

i) Adoption of digital technologies for Government to Government (G2G), Government to Business (G2B) and Government to Citizen (G2C) service delivery.

2.2 To understand the overall demand for NATE products in India in coming year, it is imperative to understand as to how some of these factors will affect this demand. The following paras discuss the same.

A) Subscriber Growth - Global

2.3 Globally by the end of 2022, the total **mobile subscriptions** are estimated to reach 8.4 billion and this figure is projected to increase to around 9.2 billion[12] by the end of 2028. During this time, the total number of unique mobile subscribers is projected to reach 6.8 billion from 6.1 billion, and the share of mobile broadband subscriptions will increase from 85 percent to 93 percent. Currently, 4G remains the connectivity technology experiencing the maximum growth. 4G subscriptions are projected to peak at 5.2 billion by the end of 2022, but by the end of 2028, 5G will become the dominant mobile access technology with 5 billion subscriptions globally.

Table 2.1 – Growth forecast for the global telecom market

S. No.	Key performance indicators	2022	2028	CAGR (2022-2028)
1	Mobile subscriptions (millions)	8,390	9,230	2%
2	Smartphone subscriptions (millions)	6,600	7,790	3%
3	Data traffic per smartphone (GB/month)	15	46	21%
4	Mobile data traffic (EB/month)	90	324	24%
5	Fixed wireless access connections (millions)	107	300	19%
6	Fixed broadband connections (millions)	1,450	1,800	4%
7	Mobile subscriptions by technology (millions)			
(i)	5G	1,050	4,970	30%

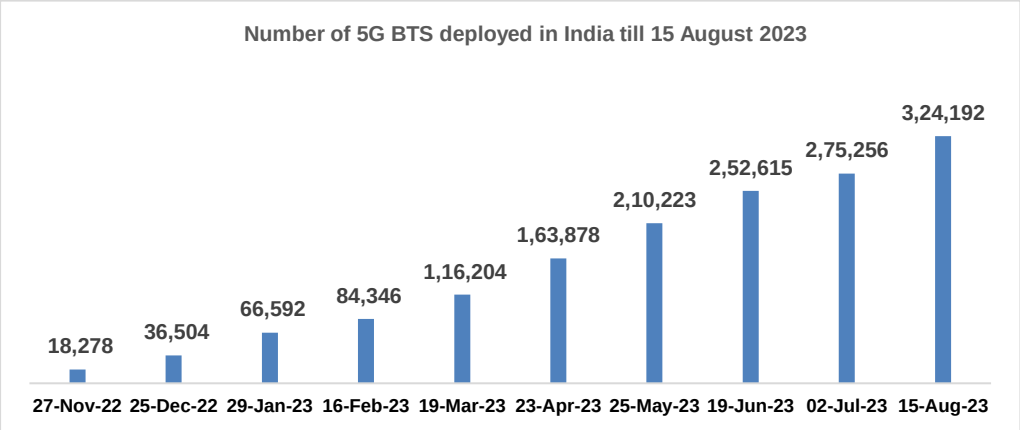
[12] Ericsson Mobility Report, November 2022

(ii)	LTE	5,160	3,580	-6%
(iii)	WCDMA/HSPA	1,040	180	-25%
(iv)	GSM/EDGE-only	1,130	470	-14%
8	Internet of Things (IoT) connections (billions)	13.2	34.7	18%

2.4 In 2021, mobile technologies and services generated USD 4500 billion of economic value added, or 5% of GDP, globally[13]. This figure will grow by more than USD 400 billion by 2025 to nearly USD 5000 billion as countries increasingly benefit from the improvements in productivity and efficiency brought about by the increased adoption of mobile services. During this period, 5G is expected to benefit the global economy by facilitating the deployment of several enterprise-specific use cases that enables digital transformation, improve operational efficiency, and support the development of new service offerings.

2.5 **5G services** were launched in India in October 2022 and 5G is expected to serve as a transformational force for Indian society by accelerating digital transformation, innovation, and development across various sectors. Fig. 2.1 shows the cumulative number of 5G BTSs deployed from November 2022 till 15 August 2023. As on 15 August 2023, India has deployed[14] around 3,24,192 BTS for 5G services.

Figure 2.1 Status of 5G BTS deployment



[13] The Mobile Economy 2022, GSMA

[14] https://dot.gov.in/5g-bts-deployed

2.6 Given the fast-paced roll-out of 5G services in the country, average mobile speed on the Speed-test Global Index[15] has shown an improvement of 63 places i.e. from 118th in September 2022 to 55th in June 2023. Service-metrics for mobile subscriber base of about 1143.93 million[16] (in April 2023), indicate access download/ upload speed *on average basis* as 42.75 Mbps/ 7.51 Mbps with latency of 30 milli-sec. It runs close to global average of 42.92 Mbps/ 10.21 Mbps with latency of 28 milli-sec respectively. Similarly, total broadband subscribers' base (with access speed 2 Mbps or more) in April 2023 has grown to about 856.81 million[17] with distinction of 10th most affordable[18] market in terms of average package cost per month - as per Worldwide Broadband Price Research 2023 and 5th most affordable[19] in terms of price/GB in 2022. Fig 2.2 illustrates the fast adoption of Smartphones and sharp decline in per GB costs of network-data for end-subscribers on average basis during recent years in India.

Figure 2.2 – Adoption of Smartphones and decline in per GB costs[20]

[15] https://www.speedtest.net/global-index/india

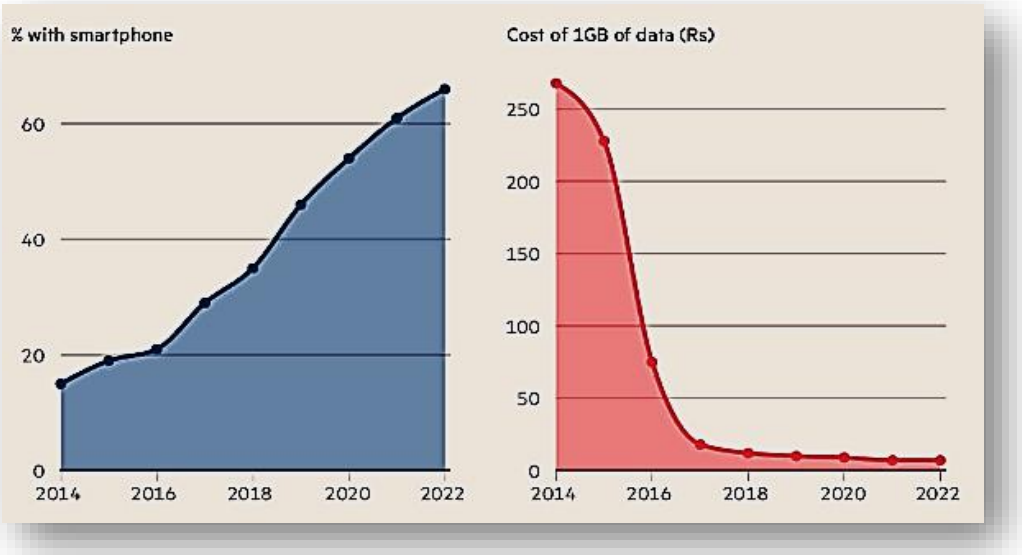
[16] https://trai.gov.in/sites/default/files/PR_No.58 of 2023.pdf

[17] https://trai.gov.in/sites/default/files/PR_No.66 of 2023.pdf

[18] https://www.cable.co.uk/broadband/pricing/worldwide-comparison/

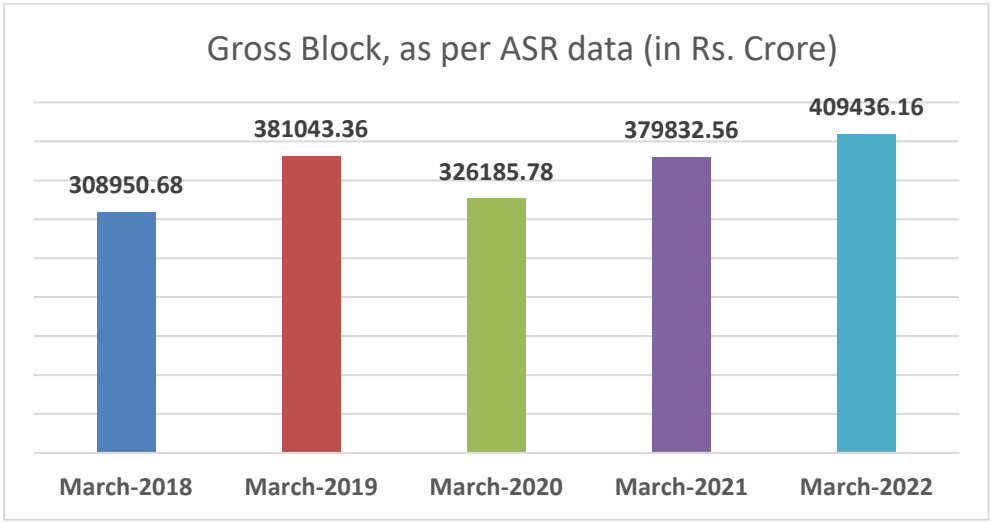
[19] https://www.cable.co.uk/mobiles/worldwide-data-pricing/

[20] The Financial Times (UK) - https://biusnews.s3.amazonaws.com/CLIPMAST/Image/APR2023/APR/APR21/A212870768.pdf



2.7 Per capita average-data consumption[21] of around 17.11 GB per month in the country is testimony to demand-densification per user on successive basis over the last 10 years. Increased demand-usage coupled with large subscriber base has been resulting in strong revenue growth. The Gross Revenue[22] of the telecom sector was about Rs. 85,356 crores for quarter ending March 2023. The sectoral Service Revenues-trend for the past five years (based on Audited Results for the Service Providers) is illustrated in Fig. 2.3.

Figure 2.3 – Gross Block (Telecom Service Revenues)



Source- TRAI Compilation

[21] https://trai.gov.in/sites/default/files/QPIR_31052023_0.pdf
[22] TRAI Compilation

2.8 Thus, the need for coverage and capacity expansion of the existing network and deployment of 5G is driving up the demand for base stations and Customer Premises Equipment (CPE). The transmission network and core networks will require augmentation and modernization to meet the increasing capacity and latency requirements and to deploy 5G services. Three core attributes giving foundational support to indigenous manufacturing in NATE product-portfolio include: large/ growing subscriber base, demand densification per subscriber and rapid adoption of advanced communication technologies/ paradigms. Table 2.2 below provides an overview of key performance indicators that show growth of the telecom market in India-region (for India, Nepal, and Bhutan markets)[23].

Table 2.2– Growth forecast for India-region telecom market

Sr.	Key performance indicators	2022	2028	CAGR (2022-2028)
1	Mobile subscriptions (millions)	1,160	1,290	2%
2	Smartphone subscriptions (millions)	800	1,210	5%
3	Data traffic per smartphone (GB/month)	25	54	14%
4	Mobile data traffic (EB/month)	18	53	19%
5	Mobile subscriptions by technology (millions)			
	CDMA	0.2	0.2	2%
	GSM/EDGE	257.1	23.3	-33%
	WCDMA/HSPA	33.7	16.3	-11%
	LTE	841.6	565.1	-6%
	5G	31.4	685.5	67%

Source: Ericsson Mobility Report, November 2022. Figures includes data for India, Nepal, and Bhutan markets

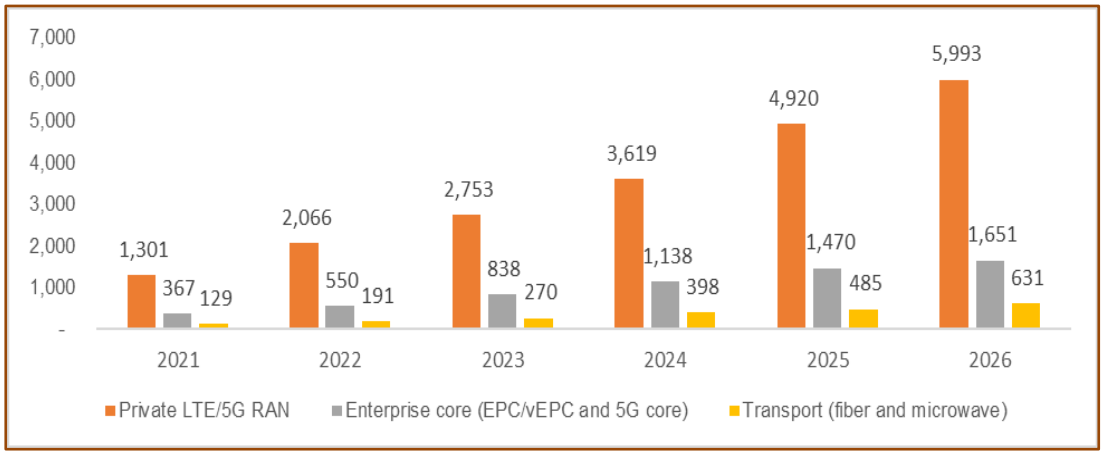
2.9 As more and more aspects of our lives become digitalized, the demand for high-quality, low-priced, consistent telecommunication services is expanding. The low-cost availability of telecom services is in turn hugely dependent on the plentiful availability of telecom and network equipment. The consistent effort of the Government to ensure that the availability of ubiquitous and uniform digital services, on affordable

[23] Prepared using the report 'The Mobile Economy Asia Pacific 2022' published by GSMA (Groupe Speciale Mobile Association).

basis, throughout the country is further driving the demand for core telecom and network equipment.

2.10 Demand from the enterprise segment will also increase as enterprises seek to leverage the advancements in technologies such as 5G, Private Captive Networks and Network-as-a-Service (NaaS) to modernize their existing infrastructure and deploy new enterprise use cases. The global **Private Mobile Network (PMN)** market is experiencing an exponential growth, driven primarily by the adoption of Industrial Internet of Things (IIoT) and the advent of 5G. The global market is primarily driven by the growing need for secure and ultra-reliable low-latency connectivity for IIoT applications, including collaborative robots, industrial cameras, and industrial sensors. Private LTE/5G is increasingly seen as an ideal alternative to traditional Land Mobile Radio–based networking for mission-critical organizations. IDC[24] estimates that global spending on private LTE/5G wireless infrastructure will grow at a positive rate from 2022 to 2026. Figure 2.4 provides a forecast of network supplier revenue (hardware and software) sold to enterprise customers *via* direct and indirect channels from 2022 to 2026.

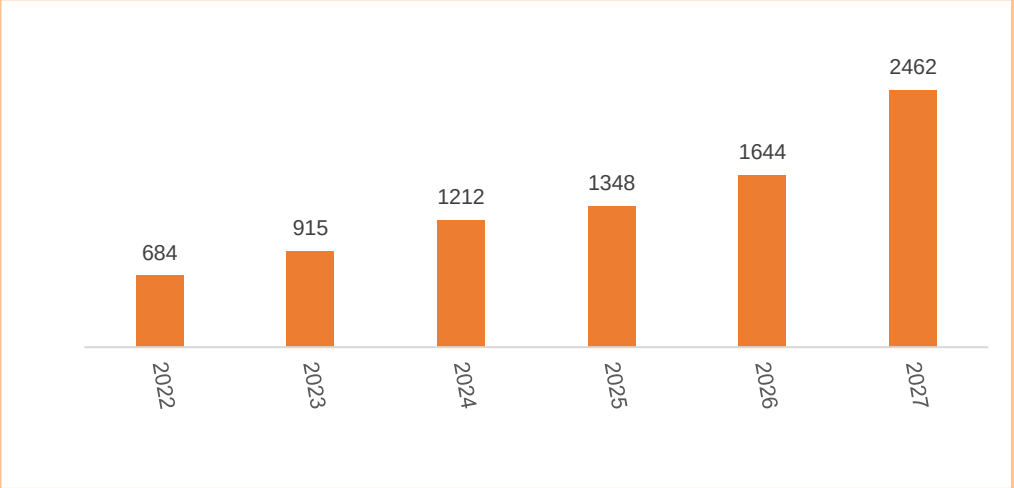
Figure 2.4 Worldwide Private LTE/5G Wireless Infrastructure Revenue by Components, 2022–2026 (USD million)



[24] IDC: International Data Corporation, a leading global market intelligence firm

2.11 In India, significant growth is expected in mobile private networks from 2022 to 2027 due to increasing demand from sectors such as Transport, Manufacturing, Utilities and Healthcare. India's total spending[25] on private wireless networks is expected to reach USD 0.24 billion by 2027. India's private wireless network site rollout is projected to be approximately 6% of the global deployments. Figure 2.5 provides the forecast of the number of private wireless network sites and base stations till 2027.

Figure2.5 India: Expected number of private wireless network base stations



Source: India Mobile Broadband Index 2023, Nokia India

2.12 Over the next few years, TSPs will need to accelerate their deployment of 5G and invest in capacity and coverage expansion in the 4G network as well to address the growing demand for telecom services both from Business to Consumer (B2C) and Business to Business (B2B) segments. This will lead to significant growth in the demand for telecommunications equipment in the country.

2.13 **Internet of things (IoT)** - The Massive IoT technologies such as NB-IoT[26] (Narrowband IOT) and Cat-M[27] continue to be rolled out around the world. The number of IoT connections is expected to reach 34.7

[25] India Mobile Broadband Index 2023, Nokia India

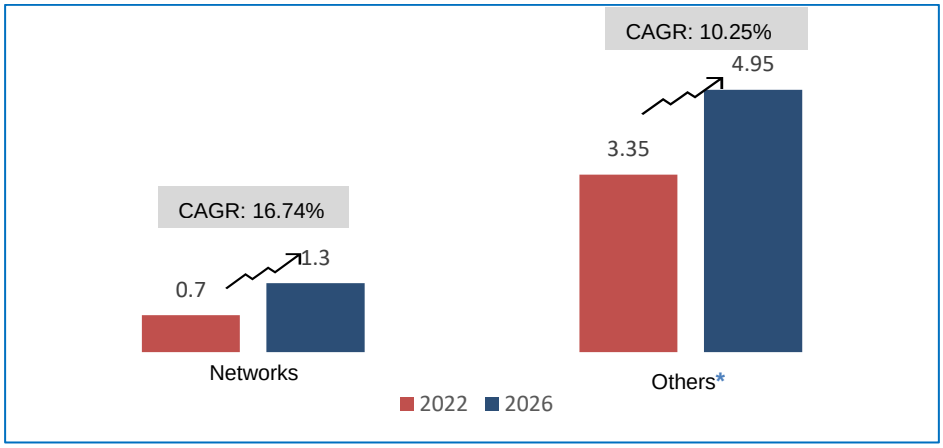
[26] Narrowband Internet of things (NB-IoT) is a low-power wide-area network (LPWAN) radio technology standard developed by 3GPP.

[27] Cat M is cellular connectivity for "massive IoT", whose specification was frozen in 3GPP Release 13

billion by 2028 from 13.2 billion in 2022 driven by an increase in the adoption in both consumer IoT and Enterprise IoT segments.

2.14 **Datacentres and Edge Datacentre** are also expected to contribute significantly to the demand for telecommunications equipment in the enterprise segment. In India, the Co-location Service market is expected to grow[28] at a CAGR of 12.84% from 2020 to 2026**.**

Figure 2.6 Investment in Data Centre infrastructure (USD billion)



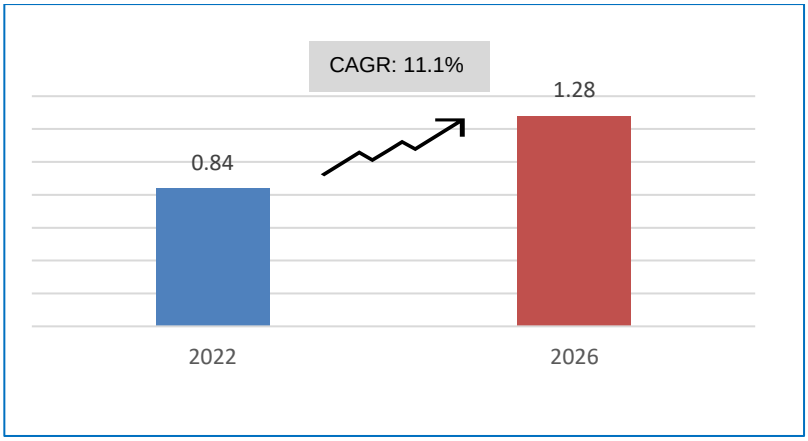
* Others include investment in servers and storage

2.15 The growing demand for **Co-location data centre[29]** services will result in significant capital investments in the data centre industry. The overall investment is expected to reach USD 8.43 Billion by 2026, out of which USD 1.3 Billion will be spent on procuring network infrastructure.

Figure 2.7 Revenue from co-location services (USD billion)

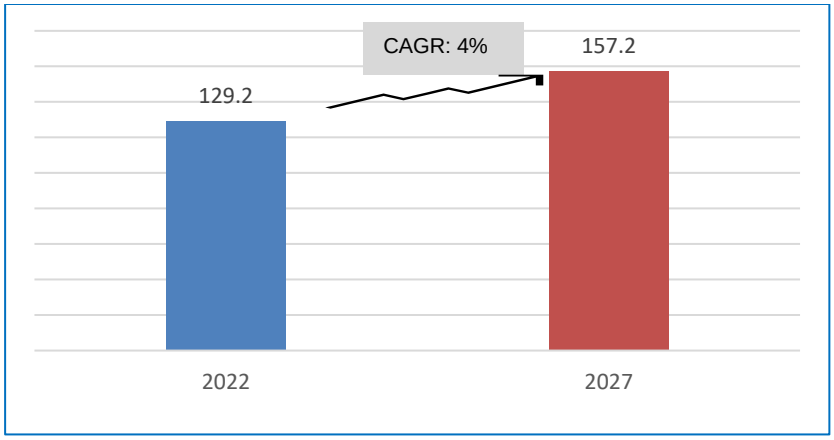
[28] Source: India Data Centre Market – Investment Analysis and Growth Opportunities 2021-2026, Arizton

[29] Colocation Data Center: A colocation facility, is a data center facility in which a business can rent space for servers and other computing hardware.



2.16 **Satellite Communications** - The satellite phone sector is also expected to see tremendous growth as its popularity has been rising globally[30]. One of the primary factors significantly boosting the demand for this technology is the fact that it also works in rural areas or remote locations where traditional telecommunications infrastructure is not present.

Figure 2.8 Global Satellite Phone Market (USD million)



2.17 The mobility sector in satellite communications mainly contributed by media, entertainment and customer premises equipment is estimated to be worth USD 12.57 billion in 2022 and USD 24.38 billion by 2028. The sectors are anticipated to see the greatest CAGR, 12.92%, during the anticipated timeframe (2023-2028). Global Mobile Personal Communications by Satellite (**GMPCS**) Services were first introduced

[30] https://www.marketdecipher.com/report/satellite-phone-market

in India through the National Telecom Policy, of 1999. However, the demand for satellite-based communications services is yet to pick up in India. Recently, six companies in India have applied for GMPCS authorization to launch satellite communications services, which indicates that the sector is expected to witness considerable growth in the future.

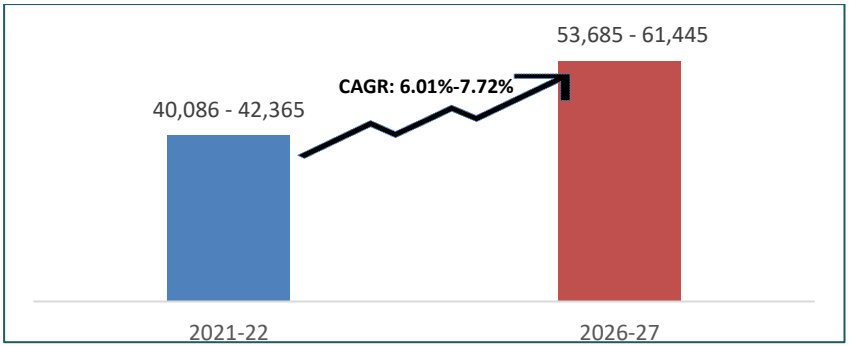
2.18 **Enterprise VSAT** (Very small aperture terminal) will also continue to expand consistently due to a range of service offerings, including retail, consumer goods, healthcare, media and entertainment, etc. Also, enterprise VSAT will contribute significantly to enhancing remote area connectivity. By the end of 2033, the global market for enterprise VSAT is anticipated to have increased to USD 8.1 billion from its estimated value of USD 4.32 billion in 2022. In 2023, the global market for enterprise VSAT is anticipated to be worth USD 4.51 billion to expand[31] at a CAGR of 6% from 2023 to 2033.

2.19 Apart from public and private telecommunication networks, significant demand for NATE products is also expected from Smart cities and support infrastructures like data centres and optical fibre networks.

2.20 Figure 2.9 depicts the demand forecast for the global telecom equipment market from 2022-2023 to 2027-2028. The global telecom equipment market size was valued at Rs. 44,450 billion in 2022 and it's projected to reach Rs. 58,058 billion by 2027, growing at a CAGR of 6.9% from 2022 to 2027.

Figure 2.9 Global Telecom Equipment Market Size (in INR billion)

[31] https://www.persistencemarketresearch.com/market-research/enterprise-vsat-market.asp



Note: The growth forecast for global telecom equipment varies between each source. Hence the forecast for the global equipment market is provided as numeric ranges. The following sources were considered to prepare the forecast of the global telecom equipment market.

1. Acumen Research and Consulting[32]
2. Verified Market Research[33]
3. Research and Market[34]
4. Data in the source reports were provided in USD, which were converted to Indian Rupees using average exchange rates for the assessment periods. The following assumptions were made regarding the exchange rates.
   I. For FY 2021-2022, the average exchange rate considered is 1 USD = INR 78.6
   II. For FY 2026-2027, the exchange rate as on Feb 15, 2023, has been considered the average exchange rate for the entire period.

2.21 Globally, telecom equipment manufacturing is dominated by a handful of OEMs. Figure 2.10 provides the trends in market shares for global NATEM players from 2018 to 2022. It may be observed that their market shares have remained largely unchanged between 2018 and H1 2022, with the top telecom and networking equipment manufacturers driving around 80% of the overall market. The dominant positions of the incumbent players and the maturity and competitiveness of their product and service portfolios make it extremely challenging for Indian NATEM players to enter the global markets.

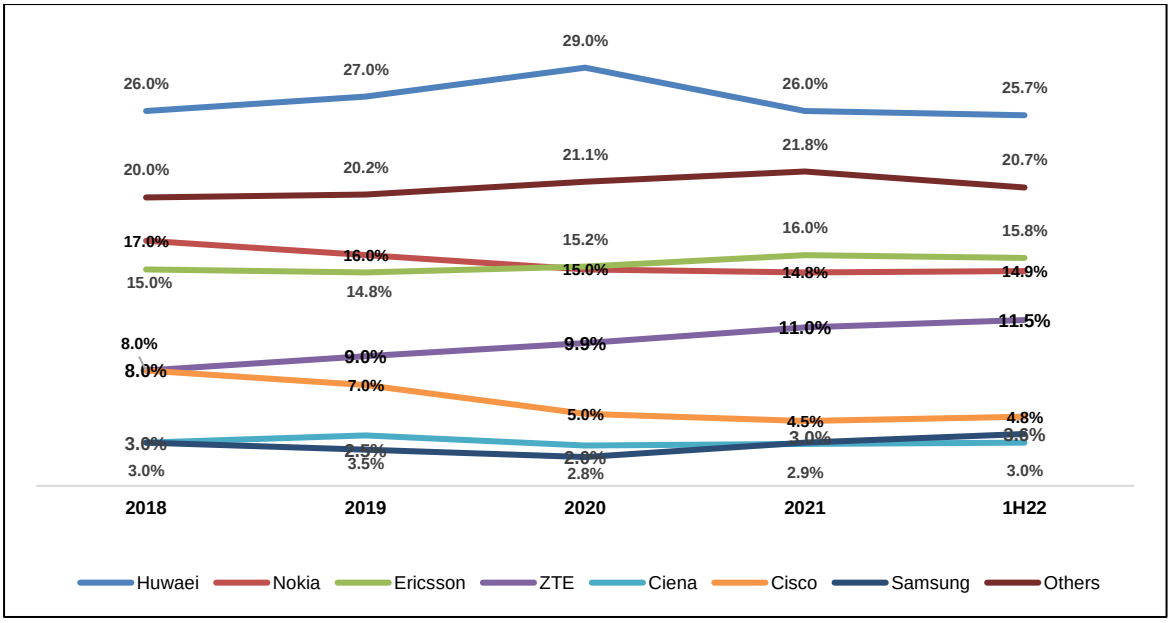
Figure 2.10 – Worldwide Telecom Equipment Manufacturer Revenue Share[35]

[32] https://www.acumenresearchandconsulting.com/telecom-equipment-market#:~:text=The%20Global%20Telecom%20Equipment%20Market,timeframe%20of%202022%20to%202030.

[33] https://www.verifiedmarketresearch.com/product/telecom-equipment-market/

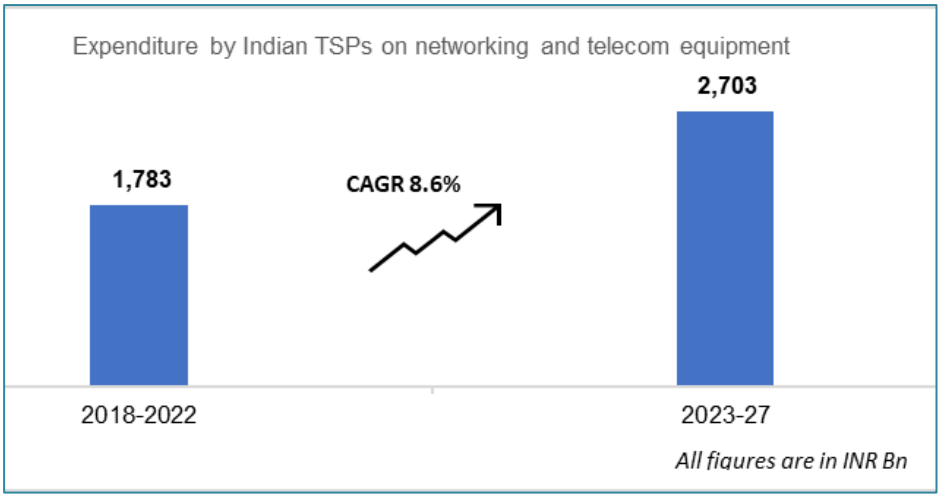
[34] https://www.researchandmarkets.com/reports/5301492/global-telecom-equipment-market-size-by-type-by

[35] Source: https://www.delloro.com/key-takeaways-2021-total-telecom-equipment-market/
Others includes Juniper Networks, CommScope, Tejas Networks etc.



2.22 In the Indian market, the TSPs will account for most of the demand for networking and telecommunications equipment. In addition to TSPs, significant demand for telecom equipment is also expected from other players such as ISPs, Over The Top (OTT) players, Data Centre providers, and Enterprises who intend to build and operate private networks by themselves. However, the capital expenditure of Indian operators is highly cyclical in nature with mobile rollout leading to investments in line with the operators' revenue growth. Fig 2.11 depicts that, Capital investments between 2018 and 2022, were primarily driven by the modernization of the legacy networks and the deployment of new hardware to support the rollout of 4G services. The demand for telecom equipment from 2023-2027 will be governed by the pace and intensity of 5G rollout and uptake in 5G-enabled enterprise services.

Figure 2.11 Expenditures on networking and telecom equipment in India



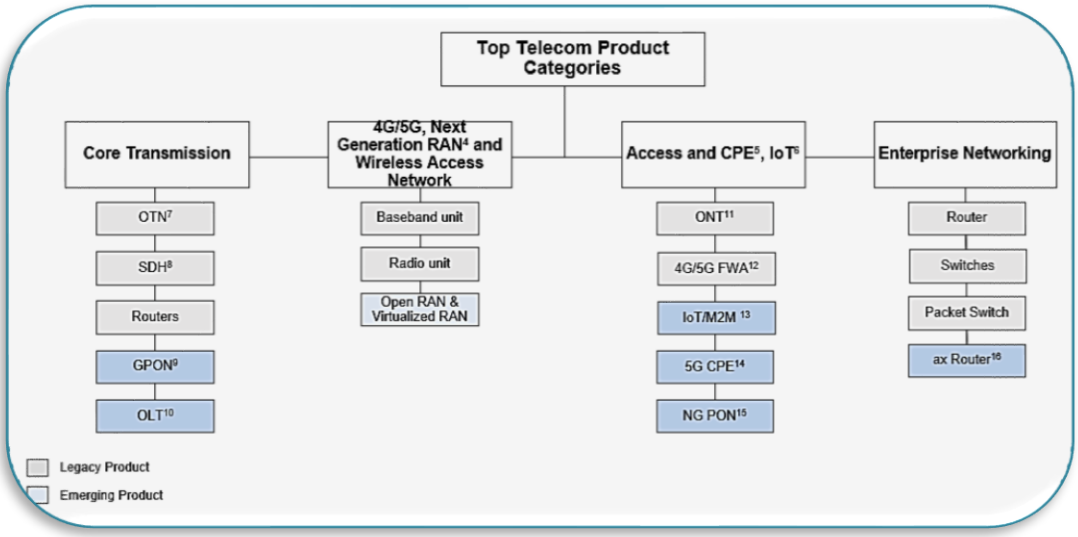
Source: Historical and forecasted data for capex expenditures of TSPs, ISPs & OEMs shared by TRAI.

1. Procurement by TSPS and ISPs include both domestic and international procurement.
2. The forecast for the 2023-2027 period has been prepared by factoring in the demand from new segments such as OTT players, start-ups, enterprises, smart cities, and data centres in addition to demand from existing TSPs and ISPs. It is assumed that the consolidated demand from the new segments is approximately 10% of the demand from TSPs and ISPs for the forecast period.
3. Some of the TSPs have provided only partial data, and investments will vary depending on their ability to raise the required capital, and their technology and rollout strategies.

B. Top telecom Product categories

2.23 Having analysed the factors that will give rise to the requirement of NATE and the expected projections for demand thereof, it is also important to understand which equipment will be more in demand so that local manufacturing of such equipment is promoted. Figure 2.12 depicts the major product categories for which demand is expected to rise in immediate future.

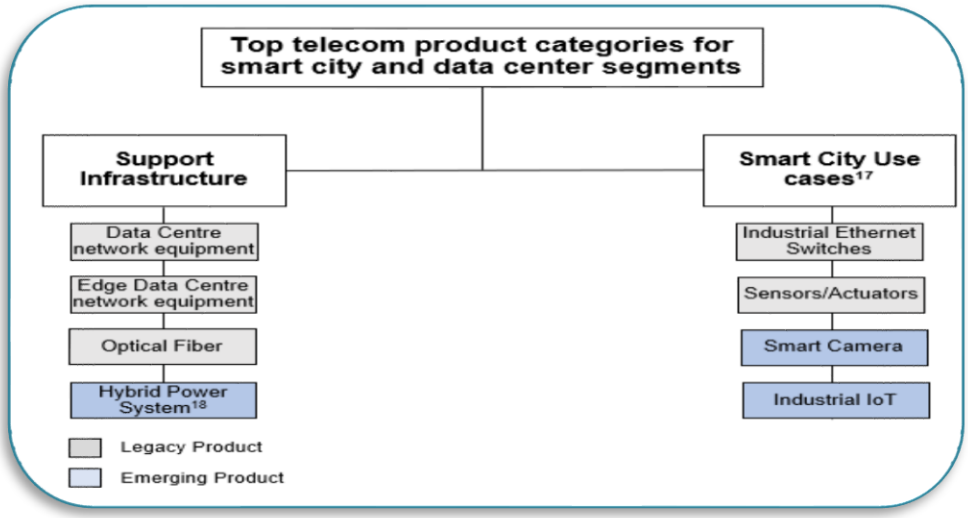
Figure 2.12 – Top telecom Product categories



Source: Top product categories by demand were identified based on discussions with 20+ OEMs and TSPs/ISPs;[4]RAN: Radio Access Network, [5]CPE: Customer Premises Equipment, [6] IoT: Internet of Things, [7]OTN: Optical Transport Network, [8]SDH: Synchronous Digital Hierarchy,[9]GPON: Gigabit Passive Optical Network, [10]OLT: Optical Line Terminal.[11]ONT: Optical Network Terminal, [12]FWA: Fixed Wireless Access, [13]IoT/M2M: Internet of Things/Machine to Machine,[14]CPE: Customer Premises Equipment. [15]NG-PON: Next Generation Passive Optical Network [16]ax Router: Wi-Fi 6, also known as 802.11ax, supported by ax Router, is the latest generation and standard for wireless networking that replaces the 802.11ac, or Wi-Fi 5, standard.

2.24 Apart from public and private telecommunications networks, significant demand for NATE products is also expected from National Broadband Mission (NBM), Digital Saksharta Abhiyan (DISHA), Industry 4.0, Smart cities and support infrastructures like data centres and optical fibre networks. Smart cities use a variety of user interfaces and communications networks alongside the Internet of Things (IoT) to deliver connected solutions for the public. Of these, the IoT is the most important. The IoT is a network of connected devices that communicate, and exchange data and supported by the data centre, optical fibre etc. Fig. 2.13 depicts the product categories for Smart city and Support Infrastructure comprising of Data Centre/ Edge Data Centre Network equipment, Optical Fiber etc.

Figure 2.13 – Top telecom Product categories for Smart City & Data Centre



Source:

[17] https://www.cisco.com/c/en/us/solutions/design-zone/industries/smart-cities-connected communities.html#~validated-designs

[18] A hybrid power system combines multiple types of energy generation and/or storage or uses two or more kinds of fuel to power a generator.

2.25 The product-lines as illustrated above are functional in nature (i.e. each product-line has compatible combination of hardware and software elements). While the legacy telecom products have been designed/ manufactured by combining function-specific physical hardware with integrated software (*one box, one product*), contemporary telecom products tend to utilise generic hardware together with modular software components (*one box, multiple products*). This shift is supported by emerging capabilities in Network Function Virtualisation (NFV) where physical hardware is not required to be solely dedicated to specific functionality rather it could be used to fulfil multiple functionalities depending upon network architecture. Thus, market for core hardware components tends to aggregate towards more-generic product-lines. It gets boosted by inducting Software Defined Networking (SDN) in modern networks where software modules co-ordinate and dynamically interact with various hardware components to organise different kinds of concurrent services with one-unified digital platform. These shifts in the network architecture provide more room for different product-lines *as standard*

modules and thus broaden the demand-side of telecom products (*where such modules could stack-up*).

2.26 As has been discussed in previous chapter, the demand for Network and Telecom equipment (NATE) is expected to rise in tandem with the overall demand for telecommunication services. It would however be imprudent to believe that this growth can be sustained without credible domestic manufacturing capabilities. Growth of the Indian telecom network provides a strong motivation for building matching manufacturing capabilities that would drive future technological innovations. Given the dynamic nature of the sector, strong technical expertise is required to produce best-in-class network equipment for the country. It also requires specialised R&D expertise and building human resource capabilities.

2.27 The Authority had discussed various elements of promoting Networking and Telecom Equipment Manufacturing (NATEM) within the country in its CP. The foremost was the requirement of putting in place institutional mechanisms to decide policy interventions, monitor its implementation, and take course corrective measures. The next was the requirement of technical know-how. This needs to be supported by availability of finances and various fiscal incentives. Availability of technical know-how and capital is also required to be aided by manufacturing facilities/ infrastructure which normally come in the form of manufacturing parks, where several manufacturing entities are located. Accordingly, questions were raised in the CP on various issues related to NATEM including effectiveness of PLI scheme for NATE, effectiveness of Preferential Market Access (PMA), need for further Fiscal and Non-Fiscal Incentives, required financial assistance to Medium and Small-Scale Enterprises (MSMEs), promoting Start-ups, Financing options like Venture capital in the form of equity and soft loans, Project finance, Contract financing and Credit default insurance options, Relative cost disabilities, Incentives to domestic manufactured products, and several Other relevant issues affecting

competitiveness of local manufacturers. The stakeholders have shared detailed views on the issues raised in CP.

2.28 Based on stakeholders' responses during the consultation process and further interactions with the Authority, the challenges faced by indigenous manufacturing sector has been compiled and described in Chapter 3. It is followed by analysis & recommendations on the related issues mentioned in Chapter 4.

Chapter -3

Challenges faced by NATE manufacturers

3.1 The various challenges are faced by the indigenous NATE manufacturers. Some of the main challenges include higher cost of indigenous production, relative cost disability with global peers, supply chain disruptions, limited access to markets, infrastructural support. This description is based on stakeholders' responses during the consultation process, a few representations received from the industry, and interactive sessions held by TRAI with the stakeholders.

Higher Unit-Cost of manufacturing

3.2 Given multi-step manufacturing process, there are multiple costs involved leading to per unit-cost of manufacturing. As mentioned in Chapter 1 above, significant amount of costs is borne for importing raw materials, components, machines, speciality chemicals etc. to be used as factors of production. Upfront payments for imports coupled with the customs duty gets regularly added to other costs such as freight, insurance, consumption of utilities, managing inventory, acquiring IPRs especially related to internationally accepted Standards, testing & certification, exploring markets, costs of financing manufacturing activities (equity, lending, grant) etc. The domestic unit-cost of production suffers from relative competitiveness when several countries have introduced respective incentivisation programs or relief measures in their respective jurisdictions. A few leading countries provide better access to capital, continued investments on R&D and advanced infrastructure for undertaking high precision industrial activities.

3.3 **Relative cost disadvantages**

Domestic manufacturing sector suffers from relatively high cost differentials while comparing their overall position with such

manufacturers that are based in other Asian countries such as China, Vietnam etc. A few countries in Asia have been building-up their ecosystem for many years and attained certain degree of proficiency in manufacturing activities. Apart from early start, their production system and infrastructure facilities has gained robustness on the basis of significant private & public investments. Targeted incentives and credit facilities have proved useful in such countries. Further details with respect to relative cost disadvantage have been presented in Chapter 4.

Supply chain issues

3.4 The manufacturing of NATE products is essentially based on collaborative production chains, where production cluster tends to specialise in different activities at geographically diverse locations. With such interdependence, disruptions in one part can cause supply interruptions in far-off production centres as well. A few stakeholders have reported high lead time i.e. the time to make supplies on-demand in case of silicon based components. It is reportedly as high as 50 weeks in case of micro-controllers essential for equipment deployed in telecom networks. Any attempt to mitigate it through inventory hold results in further increase in cost of production. These interruptions tend to become severe when several countries known for supply of raw materials, supply of plant & machinery are raising non-cost barriers by means of Export control measures.

This in turn aggravates challenge for domestic manufacturing eco-system as global suppliers cannot be switched easily. Domestic ecosystem for NATEM is still not integrated in terms of end-to-end collaborative manufacturing capabilities such as

(a) design of chip (fabless)

(b) fabrication (foundry, Integrated Device Manufacturer-IDM[36]), and

[36] IDM is often used to refer to a company which handles semiconductor manufacturing in-house, compared to a fabless semiconductor company, which outsources production to a third-party semiconductor fabrication plant

(c) Assembly Testing manufacturing (ATM)

(d) Outsourced Semiconductor Assembly and Test (OSAT) operations.

Market Access

3.5 Some existing Trade arrangements where India is a party, such as Information Technology Agreement 1996 (ITA-1), and a few Free Trade Agreements (FTAs) are seen to be enhancing challenges before the indigenous manufacturers. Several such arrangements either allow a range of finished NATE to be imported at nil rate of customs duty or at relatively lower rate of duties, thus limiting the market access for indigenous manufacturers. Besides, major TSPs / ISPs in India have been relying upon overseas OEMs for past many years and switching suppliers is often seen as business continuity risk. For domestic players, getting access to telecom networks for technology trials continues to be difficult. Introduction of Preferential Market Access (PMA) policy has remained limited to public sector players who serve only about 10% of the entire subscriber-size. At times, the industry has also raised instances of dumping of certain products as well as non-adherence to PMA norms leading to curtailed market opportunities.

Infrastructure related issues

3.6 There are a few other challenges faced by NATE manufacturers at infrastructural level that may affect market competition. Some of the key ones include:

(i) availability of un-interrupted utilities such as electricity & water supply;

(ii) effective multi modal transit & logistics support to enable faster overseas movements, and inter-working between domestic entities;

(iii) continued skill upgradation for workforce engaged in high precision manufacturing activities and safe handling of speciality chemicals;

(iv) better risk management facilities towards early realisation of sales proceeds against overseas exports that could also aid cash-flow buoyancy;

(v) adoption of lending criteria relating to intangible assets e.g. credit against IPRs registered in India is not available as it is in case of tangible assets (land, plant & machinery);

(vi) rationalised customs duties (where incidental rate is relatively lower for production inputs as compared to that on import of finished products);

(vii) check on mis-declaration of HS codes during import of NATE products into the country. It would impart necessary predictability and transparency within demand-supply chains;

(viii) adoption of appropriate mechanism to keep a check on mere assembled product or commodity trading so that it does not assume status of indigenous manufactured products & seek unjustified support from the Government/ other stakeholders;

(ix) collaboration between industry, academia and recognised R&D institutions needs to be raised to the level of co-working. It would tend to avoid duplication, fill gaps and set common objectives;

(x) extended incubation & accelerator support required, for harnessing intellectual potential through Start-ups. As NATE sector is capital & IPR intensive, domestic Start-ups need multitude of support to continue innovation through indigenous design & integration efforts;

(xi) extend resource support for handling e-waste generated by entities during domestic manufacturing while avoiding its dumping. Adopting sustainable development path through reduction of waste generation, its possible re-use or re-cycling is essential;

(xii) While promoting NATE manufacturing, State-wise disparity in terms of infrastructure availability needs to be resolved for realising inclusive development/ local aspirations;

3.7 The challenges as described above have been kept in mind by the Authority while undertaking issue-wise analysis and recommendations thereof in Chapter 4.

Chapter -4

Suggested Measures for Promoting NATE Manufacturing

4.1 The responses of the stakeholders and analysis has shown that the issue of cost disadvantage experienced by domestic NATE manufactures *as compared* to the global counterparts is of central significance. Several of the discussions are centred around the cost disability and some of the recommendations of the TRAI attempt to resolve these disabilities. Therefore, the sequence followed in the Consultation Paper (CP) has been slightly tweaked to take it up in the beginning. The discussions on other issues have been taken-up in the succeeding Sections.

I. Relative Cost Disabilities affecting domestic manufacturing

4.2 Indian manufacturers reportedly have a local cost disadvantage compared to other countries, especially in East Asia. Given the limited profit margins of domestic manufacturers of NATE, cost disabilities on the relative scale impact the overall business viability. These disabilities may relate to the following:

(a) *Cost of capital* – cost of finances or commercial borrowing in the domestic economy is distinctively high as compared to other exporting countries, by margin of at least 3%. Manufacturers in major export economies have the advantage of availability of finance at concessionary or lenient terms and have attractive finance packages to support domestic manufacturing. Stakeholders have indicated that countries like China, USA, and Japan reportedly offer credits to local manufacturers at 3-4 % interest rates;

(b) *Cost of infrastructure* – Apart from the cost of raw materials, manufacturing activities largely depends upon effective cost of essential supplies such as land, construction, logistics, utilities

such as electricity, water etc. and other infrastructure resources. To make NATEM ecosystem competitive enough for participation across domestic & global value chains, such higher costs on recurring basis needs to be scaled down;

(c) *Compliance cost* – The cost of compliance with respect to granting of permits, enforcing contracts, registering property, starting business, imports at concessional duty rates, adherence to Import Export Codes, direct & indirect taxes has remained relatively high in India. While it discourages indigenous manufacturing, it tends to contribute to higher imports. This vicious circle could be mitigated to some extent by promoting ease of doing business but can only be tackled by facilitating overall manufacturing ecosystem;

(d) *Cost of testing & certification*- Additional cost of testing & certification, multiple standardization agencies and lack of timely testing is another impediment for domestic NATEM. Standards contribute predictability, broaden the market and lower risks for both producers and consumers. It is essential to streamline the standardization practices within the local ecosystem so that the costs & time involved in necessary testing and certification gets reduced in favour of rapidly evolving industry;

(e) *Incentives to manufacturing in some countries*- The cost differential aspect may get further aggravated when many a countries implemented various incentive schemes for promoting manufacturing within their respective jurisdictions.

Hence, the Authority sought the opinions of stakeholders on various causes and extent of cost disadvantage, if any. Following issues were raised–

Q9. Whether any cost disadvantage is experienced by domestic NATE manufacturers as compared to global counterparts due to various limitations discussed above? If yes, what is percentage cost

disadvantage to domestic NATE manufacturers vis a vis other country? The details of calculations and methodology adopted for the same may be provided

4.3 In response to this issue, very few stakeholders have provided detailed calculations of the cost disabilities. The stakeholders involved in manufacturing have submitted that domestic manufacturers have to face approximately 10-15% higher cost-difference as compared to the Global OEMs. The break-up as suggested by one of the stakeholders include differentials appearing through following ways:

(a) *Additional tax exemptions in other countries:* 1-2% tax rebates, tax holidays, etc. provided in various stages, example: for export, R&D, etc.

(b) *Cost of power:* 0.2-0.5% against cost of domestic industrial power

(c) *Logistics cost:* 0.5-1% against inefficient logistics infrastructure

(d) *Labour subsidy:* 0.5-1% against lack of skilled labour and relatively stringent labour laws

(e) *Interest subvention on working capital:* 1.5-3.0% against interest subvention provided to domestic NATE companies by Government

(f) *R&D subsidy:* 0.5-1.5% against grants, tax exemptions, etc. for R&D expenditure incurred

(g) *Ease of doing business:* 0.5-1.5% Country specific testing standard requirements, increased time to go to market, etc.

4.4 In addition, reference has been made by the stakeholder to an independent study by few firms such as Ernst & Young[37] where it was shown that Indian companies making generic NATE equipment face up to 26% fiscal disability compared to their global peers in high value-added telecom manufacturing. Further, the disability rises to 29% for those product categories where buyer's credit is available against imports for a long period.

[37] https://xn--m1bdba5a7gresc7dsa.xn--11b7cb3a6a.xn--h2brj9c/writereaddata/files/Janu_2014.pdf (Page 8)

4.5 Table 4.1 provides another estimation of cost disability that has been submitted by a stakeholder in response to CP under discussions.

Table 4.1– Factors that lead to cost reduction in Network and Telecom Equipment manufacturing as estimated by a leading Indian TSP

S. No	Factor resulting in cost reduction inleading NATEM countries	Description	% of cost reduction
1	Additional tax exemption in other countries	Tax rebates, tax holidays, etc. provided in various stages, ex: for export, etc.	1-2%
2	R&D subsidy	Grants, tax exemptions, etc. for R&D expenditure incurred	0.5-1.5%
3	Labor subsidy	Lack of skilled labor and relatively stringent labor laws	0.5-1%
4	Cost of power	Cost of domestic industrial power	0.2-0.5%
5	Interest subvention on working capital	Interest subvention provided to domestic NATE companies by Government	1.5-3%
6	Logistics cost	Disability due to inefficient logistics infrastructure	0.5-1%
7	Ease of doing business	Country specific testing standard requirements, increased time to go to market, etc.	0.5-1.5%
Total cost disability			**4.7-10.5%**

Source: Responses to the TRAI Consultation Paper on Promoting Networking and Telecom Equipment Manufacturing in India.

According to this stakeholder, labour subsidies, electricity costs, interest subsidization, and ease of doing business are the main cost-disabling factors when compared to other leading NATEM countries. The Stakeholder has concluded that the Indian NATEM players still face a residual cost disability of 4.7% to 10.5% when compared to other countries.

4.6 Some stakeholders also added that partial cost-disability comes from dependence on global value chain for various components etc. Moreover, availability of certain components such as micro-controllers may take up to 50 weeks for overseas delivery to the country' manufacturers thereby adding to higher holding cost against rest of inventories. It has therefore been suggested that direct and tangible benefit should be provided to domestic telecom manufacturing

company making investments in capacity-expansion, building, plant, machinery among others.

4.7 Some stakeholders have claimed that domestic manufacturers are costlier in production than global OEMs because of higher value addition cost, in-sufficient availability of highly skilled manpower, lack of automated manufacturing facilities, additional cost due to foreign exchange hedging arrangements & cross-border duties on imported components, higher operational expenditure due to lacking economies of scale, and higher energy costs. Therefore, achieving cost-equality at desirable levels remains practically challenging. They have mentioned that interest cost in India is higher by about 5% compared to the international standards. Competing countries provide fiscal and non-fiscal incentives to cover the cost differentials and promote their manufacturing sector. Therefore, stakeholders have opined that incentivization schemes for equipment manufacturers coupled with initial funding and infrastructural support can help to offset the relatively higher end-cost for the products.

Analysis of the issue and the Authority's view

4.8 Indian NATEM players face significant cost disabilities when compared to their Chinese and Vietnamese counterparts. Table 4.2 given below provides a comparison of cost disabilities between India, China and Vietnam prepared based on the report published by India Cellular & Electronics Association (ICEA) titled *"$300 billion Sustainable Electronics Manufacturing & Exports by 2026*". The cost disability captured in this Table has been prepared in context of manufacturing of mobile devices. Considering NATE products also primarily consist of electronic components similar to mobile phones and challenges present in their current supply chains and manufacturing are comparable, it can be safely construed that similar cost disabilities would apply to other NATE as well. In fact, NATE products other than

mobile phones are produced in less quantities, therefore, it is likely that the incidental margins & over-heads may even be on higher side.

Table 4.2 – Factors that lead to cost reduction for NATEM

S. No.	Factors resulting in cost reduction	India	Vietnam	China
1	Fiscal incentives based on incremental production (PLI) *	4% -7%*	0%	1%-2%
2	Corporate income tax exemption/reductions	0.73% - 0.95%	1.5% - 2%	2%
3	State subsidies in India for capital investments	0.6%-1.2%	NA	NA
4	R&D subsidy	0.15%	0.4% - 1%	2%
5	Industrial land development support	0.40%	0.50%	0.60%
6	Infrastructure development cost (Building etc.)	Negligible	0.30%	1%
7	Labour subsidy	Negligible	0.50%	2%
8	Cost of power	Negligible	1%	1%
9	Subsidy for machinery and equipment	0%	0.20%	3%
10	Exemption/reduction of the land rental costs	0%	0.50%	0.60%
11	Interest subvention on working capital	0%	1.5% - 2%	3%-3.5%
12	Logistics	0%	0.50%	1%
13	Other factors improving the "Ease of doing Business"	-	1.5%-2.5%	2%-3%
14	Duty-free imports for creating fixed assets, and inputs not available domestically	0%	0.50%	-
Total		**5.88% - 9.7%**	**8.9%-11.5%**	**19.2%-21.7%**
Cost disability differential for India vs. Vietnam and China		**-**	**1.8%-3.22%**	**12%-13.32%**

* PLI Incentive is considered under manufacturing subsidies.

Source:
https://static.pib.gov.in/WriteReadData/specificdocs/documents/2022/jan/doc20221247801.pdf
State incentives are additional to the Central Government's provision of the aforementioned incentives.

4.9 As shown in Table 4.2 above, Indian NATEM companies face up relative cost disability up to 13.32% in comparison to the companies operating in China and up to 3.22% in comparison to the companies operating in Vietnam. This assessment includes fiscal incentives based on incremental production i.e. Production-Linked Incentive (PLI) for NATEM in India. In case PLI benefits are not considered, the relative cost disability goes further up by at least 4%. Part of cost-differential structure may be attributed to (i) availability of better financial incentives such as subsidies, exemptions & interest subvention and, (ii) improved infrastructure facilitations in these countries, as compared to India.

4.10 The Authority has also studied the policy initiatives in some of the countries that are leading exporters of NATE. It is noted that new incentives applicable to NATE manufacturing in Vietnam have been introduced vide Decree No. 13/2019/ND-CP[38]. A brief is given below:

(a) *Corporate Taxes:* Income generated from the development or sale of products derived from research and development (R&D) conducted by NATE manufacturing firms, will get corporate tax reduction and exemption, like new investment projects engaged in R&D. Companies will be exempted from corporate tax for four years and get a reduction of 50% for the following nine years. However, businesses must make sure that their scientific and technology projects contribute to at least 30% of the total revenue in order to be eligible for tax benefits for the fiscal year.

(b) *Credit Incentives:* Such projects that utilise the outcome of Company based scientific R&D for undertaking local product manufacturing are provided with state investment credit. It results in availability of preferential loans with 50% effective interest rate to such entities in Scientific/ Technology sector including the ones in telecom equipment manufacturing sector.

(c) *Import Duty:* As per Vietnam's import duty regulations, many goods are exempt from import tax, some of them include:

i) Products imported for re-export
ii) Materials and equipment used for the production of export goods.
iii) Raw materials and components that cannot be produced domestically.

[38] https://www.vietnam-briefing.com/news/vietnam-new-incentives-for-science-and-technology-firms.html/#:~:text=The%20Vietnamese%20government%20issued%20Decree,effect%20on%20March%2020%2C%202019.

4.11 Programs such as *High- and New-Technology Enterprise* (HNTE[39]) and *Made in China 2025* extend multiple benefits to entities participating in the technological field such as electronics production. A brief on these programs is given below:

(a) *HNTE* program offers qualified company locations a 15 percent corporate income tax rate (versus the standard 25 percent tax rate), regardless of the company's investment type and where the company is headquartered. HNTE status is granted by provincial tax authorities for company facilities located within those provinces. However, to qualify their facilities for HNTE status, companies are required to own the proprietary IP rights of the core technology used in their products and services in China, or they must give their Chinese subsidiaries a global exclusive license for that IP for at least five years. Generally, HNTE certificate is valid for three years once it has been approved and can be renewed every three years. To qualify for HNTE status, a company must:

i) Be established for over one year in China;
ii) Continuously conduct R&D activities and transform intellectual property (IP) developed into products or services;
iii) Obtain proprietary intellectual property rights of core technology of its main product (service) in the last three years through self-research and development, transfer/purchase, donation, merger and acquisition, etc., or through an exclusive license with a term of more than five years;
iv) Conduct business in a qualified high- and new-technology sector (such as aviation and aerospace, biological and medical, electronic information, new-energy and energy conservation, new-materials, high-tech services, or resources and environmental technology, as well as high and new technologies that transform traditional sectors);

[39] https://www.uschina.org/sites/default/files/2013%20HNTE%20Backgrounder.pdf

v) Engage 10 percent of employees in R&D work, with 30 percent or more having at least an associate degree;

vi) Invest 3-6 percent of total revenue on R&D and make 60 percent of R&D expenses in mainland China; and earn more than 60 percent of total revenue from high- and new-technology products and services.

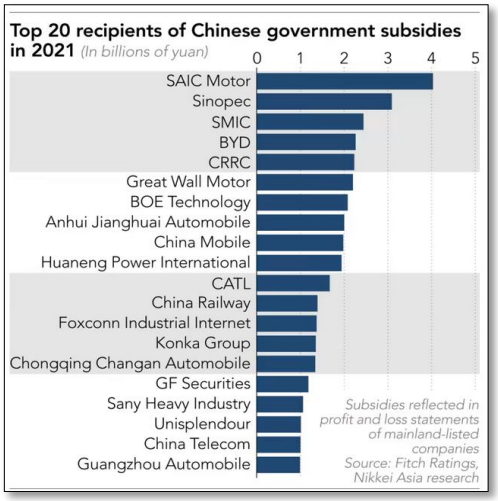
Recently, one-time pre-tax deduction on 100% basis has been allowed to HNTEs against purchase of new equipment and instruments (fixed assets other than houses and buildings) during the period from 1 October to 31 December 2022.

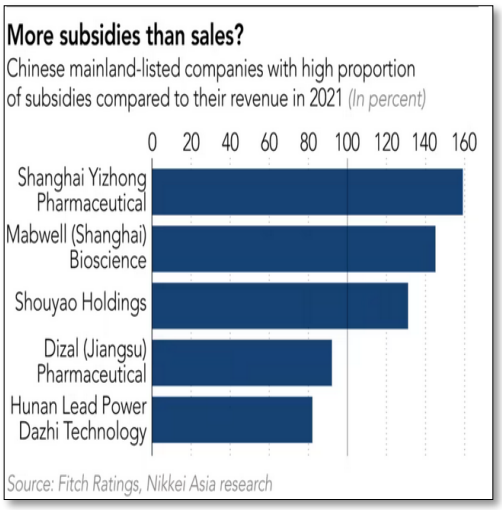
(b) Under *Made in China 2025*, a 10-year strategic plan to develop the country from being a low-end manufacturer to becoming a high-end producer of goods particularly in high technology fields has been formulated[40]. Industry analysts such as Nikkei Asia, Fitch ratings have been reporting high volume set of subsidies sourced from the Government towards State Owned enterprises (SoE), electric vehicle makers and chip manufacturers. Fig. 4.1 illustrates the level of subsidy extended to Top-20 firms and relative scale of subsidies as compared to industry's revenues in 2021.

Figure 4.1 Level of subsidies extended in China under Made in China, 2025

(in billions of Yuan, year 2021) (proportion of subsidies compared to industry's revenue in 2021)

[40] https://asia.nikkei.com/Business/Business-Spotlight/Made-in-China-2025-thrives-with-subsidies-for-tech-EV-makers





Source: Fitch Ratings, Nikkei Asia Research

4.12 Some other countries/ territories have been also extending support to their industries. Some of notable one includes: US FABS Act (2021), US Chips & Science Act (2022), "Chip 4" Alliance, EU Chips Act (2023), Japan's NEDO Act, Germany's Industry 4.0 etc.

4.13 The Authority agrees with the Stakeholders' view that Indian manufacturers continue to face certain cost disadvantage as compared to global manufacturers. PLI Scheme, as notified by DoT, covers a very limited number of NATE manufacturers. Most of the industry faces wider cost disabilities for undertaking domestic manufacturing *as compared* to other locations in East Asia. The Authority has kept these cost-disadvantages in mind and has tried to address the issue through various recommendations made in the following sections on –

Table 4.3 – Arrangement of Sections in respect of Issues posed during Consultation

	Recommendations related to	Section
a)	Effectiveness of PLI Scheme	Section II
b)	Effectiveness of Preferential Market Access (PMA) / Preference to Make in India (PMI)	Section III
c)	Range of financial and fiscal incentives needed beyond PLI	Section IV
d)	Financial assistance for MSMEs	Section V

e)	Promoting Start-up ecosystem	Section VI
f)	Incentive structure for Telecom Product Development Clusters Financing Instruments	Section VII
g)	Support required for exporters of indigenous equipment	Section VIII
h)	Trade facilitation measures affecting sectoral competitiveness	Section IX
i)	Incentives/policies required for growth of telecom software products	Section X
j)	Other issues	Section XI

4.14 The following sections take up the discussions based on stakeholders' responses to various other questions raised in the CP. After issue-wise analysis, the recommendations of the Authority have also been made in the corresponding order. As mentioned earlier, the issues relating to R&D for NATE is being dealt through a separate consultation process by the Authority.

II. Effectiveness of PLI Scheme

4.15 The PLI Scheme was launched by DoT to boost domestic NATEM through incentives on incremental investments and turnover (*i.e.* additional production in a year as compared to the base year) with a total outlay of Rs. 12,195 Crore for a tenure of five years i.e., from FY 2021-22 to FY 2025-26. The scheme was made effective from 1 April 2021 for products such as switches, routers, 4G/5G radio access network, wireless equipment, other IoT access devices. It aimed to offer manufacturing companies graded incentives on incremental sales from products manufactured in domestic units. Investment made by successful applicants in India from 1 April 2021 onwards and up to FY 2024-25 is eligible for getting benefits of the Scheme, subject to qualifying incremental annual thresholds. DoT has granted approvals to eligible applications each in MSME and non MSME categories.

4.16 To promote entire value chain in Telecom Manufacturing, DoT has recently announced the Design led manufacturing PLI scheme on 1 April 2022 as an extension to the existing PLI with the objective of addressing R&D related challenges in the sector as well as to promote design-based manufacturing and create IPR in the country. Design led PLI Scheme offers additional incentive of 1% over and above the existing incentives for products that are designed in India. The existing companies under PLI scheme for telecom and networking products have been allowed to add more products and apply under design led PLI scheme. Moreover, they have been also given the benefit of shifting their 5-year PLI Scheme period by one year. The incentivization structure as outlined in the PLI Scheme, is represented in the table below:

Table 4.4 – PLI Incentive scheme for Telecom and Networking Products

YEAR	PROPOSED INCENTIVE RATE ON INCREMENTAL SALES	CUMULATIVE INVESTMENT (OTHER THAN LAND AND BUILDING) {BASELINE FOR INVESTMENT – 31.03.2021}	MINIMUM ELIGIBLE INCREMENTAL NET SALES# OF MANUFACTURED GOODS OVER THE BASE YEAR (2019-20)	MAXIMUM ELIGIBLE INCREMENTAL NET SALES# OF MANUFACTURED GOODS OVER THE BASE YEAR (2019-20)
1	7% / 6%	> Or = 20% of X	3*(20% of X)	20*(20% of X)
2	7% / 6%	> Or = 40% of X	3*(40% of X)	20*(40% of X)
3	6% / 5%	> Or = 70% of X	3*(70% of X)	20*(70% of X)
4	5% / 5%	Greater than or equal to X	3*X	20*X
5	4% / 4%		3*X	20*X

Note - **X** = Committed Total Investment by the Company / entity over a period of four years starting from the year 2021- 22 . Minimum Threshold of Investment – For MSMEs - ₹ 10 Crores / Other than MSMEs - ₹ 100 Crores

As defined under Clause 2.2 of the Scheme Guidelines

4.17 PLI is widely accepted as an instrumental step in promoting the domestic equipment market. Though it provides much needed policy support to Indian manufacturers and encourage them to invest increasingly in the sector, just a single scheme might not be able to

comprehensively deal with all challenges of the nascent industry. Promoting NATEM wholistically will require addressing several issues simultaneously. TRAI's recommendations of 2011 and 2018 on the subject have dealt with such challenges in detail. TRAI letter no. R-14/(1)2021-BBPA-Part (1) dated 22 October 2021 (**Annexure- II**) to DoT also summarises some of these issues. It can therefore be argued that there is a need to go beyond just the PLI scheme, and a range of financial, fiscal and non-fiscal incentives needs to be put in place to promote NATEM in India.

4.18 The Consultation paper had therefore sought views of the stakeholders on whether the PLI in its current form sufficiently addresses various persistent issues of the sector. The following issues were raised in the consultation paper for comments of the stake holders:

Q1. Is the PLI scheme in its current form effective enough to address the needs of promoting NATEM in India? Are any amendments or extensions required to the current PLI scheme to make it more effective? Please provide details.

Q2. Whether going beyond PLI scheme, a range of financial and fiscal incentives needs to be put in place to promote NATEM in India? Please elaborate your response.

4.19 Majority of Stakeholders have opined that focus is required on "Design led manufacturing". They opined that creation of domestic designs requires huge capital expenditure on R&D and manpower expenses. Such manpower engaged should hence be considered as part of R&D expenditure. Additionally, they sought to remove the ceiling on R&D expenditure and link additional incentives to local content creation.

Limitations of Notified PLI Scheme for Telecom sector

4.20 Stakeholders in their submissions, have discussed various limitations of notified PLI scheme in telecom sector. Various suggestions mentioned by stakeholders include -

- **Local value addition clause** - The scheme has no riders regarding domestic value addition or development of downstream industry. The beneficiary can import 100% of the contents, assemble them and qualify for PLI. The stakeholders have suggested condition for local value addition should be included in the scheme. It would provide motivation for building-up of domestic industry downstream and giving boost to purchase from domestic manufacturers meeting 50 and more percentage domestic value addition. Additional incentives have been suggested to the companies who achieve higher local content value additions. The current scheme has no emphasis on core telecom equipment and networks to be designed and manufactured in India. It has been opined that additional incentives for manufacturing of NATE with Indian technology or IPR owned by domestic companies should be provisioned. According to the stakeholders the scheme should provide higher incentives if the entire design as well as manufacturing for that product is being done in India and the IPR is owned by the Indian company, that is local content creation should be a premise on which additional incentives are provided to help nurture the domestic ecosystem.
- **Incremental Incentive structure linked to value-addition -** One service provider has opined that the PLI scheme should be applicable to all companies including OEMs, Electronics Manufacturing Services (EMS), Fabrication vendors, and contract manufacturers having manufacturing setup in India and PLI incentive % should be fixed for both Domestic and Global OEMs having more than 10% local content / value add being done in India. This may be increased gradually over the next 5 years to provide an opportunity to all such existing manufacturers to increase their local value add. Few stakeholders are of the view that the PLI scheme should offer incremental incentive on progressive increase of domestic value addition and have suggested for

a. 1 % additional incentive if value addition is 40% or above,
b. 2 % additional incentive if value addition is 45% or above,
c. 3 % additional incentive if value addition is 50% or above,
d. 4 % additional incentive if value addition is 55% or above,
e. 5 % additional incentive if value addition is 60% or above.

- **Software not covered as a separate product** - The scheme only envisages manufacturing of goods. Software is not covered in the specified list of telecom and networking products. A separate focus for software solutions & products in the various schemes and incentives has been suggested.
- **Cap on R&D** - The cap of R&D investment at 15% of total committed investment may discourage companies who intend to invest in R&D for product development; no capping on R&D expenditure and salary of manpower, should be included against R&D investments.
- **Limitations due to uniform thresholds applicable *vis a vis* niche product -** Some stakeholders have stated that in case of products that come under niche/futuristic segment, there may be various manufacturers who will not be able to meet higher turnover or revenue criteria in the early years. In addition to the production-based incentive, manufacturing of upcoming products should be supported as current market may not be instantly ready. Therefore, as per stakeholders, PLI Scheme should provide additional incentives to upcoming startups or existing MSMEs in the market.
- **Need for PLI-supported Components Manufacturing Scheme -** Few stakeholders have stated that in addition to finished good manufacturing, a PLI scheme to develop diverse component manufacturing should be introduced in the country. A thriving component manufacturing would support finished good manufacturing especially in times when the supply chains are impacted like in recent past due to the pandemic.
- **Including Broadcasting Set Top Boxes/ Customer Premises Equipment within PLI-Scheme -** One service provider has opined that in the list of specified products under the current PLI Scheme,

linear Set Top Box (STB) for broadcasting is not included. STBs by nature are Customer Premises Equipment (CPE) only, thus fully eligible to be considered under the Scheme. It has been submitted that the major DTH operators have committed their full support in the Government's initiative to promote local manufacturing of STBs through assembly lines after importing components in the Semi Knock Down (SKD) form. Given the size of Indian DTH market and limited manufacturing and significant dependency of STBs on imports, STBs should be covered under PLI scheme either by notifying a separate PLI scheme for Broadcasting sector including new broadcasting sector players under the new PLI or by providing an option under the existing Telecom PLI scheme for companies to opt for it.

- **Graduating differential thresholds according to Category of Equipments: Core / Access / CPE / Enterprise -** A stakeholder has stated that at present, the eligibility thresholds for PLI are the same across all 4 categories viz. Core Transmission Equipment, Radio Access Network and Wireless Equipment, Access & Customer Premises Equipment and Enterprise equipment. One stakeholder has suggested that segmentation of base year global revenues and cumulative incremental investment should be different for different product segments, possibly in decreasing order for Core, Access, CPE and Enterprise.
- **Time-extension of current PLI Scheme beyond 5 years -** One of the service providers has stated that NATEM involves both generic capex in manufacturing, for instance production machines for PCB assembly (PCBA) and product specific capex like PCBA test, system integration, assembly, and test. Product specific capital expenses require high investment which is subject to high risk of demand variability. Hence, the amortization of product specific capital expenses needs scale and volumes, thus PLI period should be extended to 7-10 years, from current tenure of 5 years.
- **Need for MSME financing (without linkage to production) -** Stakeholders/equipment manufacturers have also suggested that

there is a need for MSME financing (without linkage to production) which should be included in the existing or forthcoming schemes.

- **Alignment of PMI and PLI Scheme *vis a vis* value-addition norm -** A few associations/stakeholders are of the opinion that an alignment between PLI and PMI policy will ensure a very enthusiastic response from companies to invest in India. They are of the view that PLI can be linked to the Preferential Market Access Scheme, liberalising the local market so that companies manufacturing in India can leverage the domestic markets. The current value addition norms stipulated by DoT policy expect 50% or more value addition in India. It does not seem to have taken into consideration the nascent component eco system in India and gives undue weightage to hardware & software. Therefore, PMI policy should grant OEMs "points" equivalent to the total value of exports made from the country. These OEMs can then utilize these "points" to qualify as a class 1 supplier for other products which may not be manufactured in India. These products that are not manufactured in India could be termed as 'Deemed Domestic'. A few stakeholders have however submitted a counterview stating that linking PLI export credit for getting preference in domestic telecom procurement (often for strategic/security projects) is not justified. They have argued that the domestic manufacturers will never be able to reach competitive footing if Central Government funded procurement is taken away from the industry at this stage of development. Such procurement schemes are predominant market for domestic manufacturers. If not price preference, at least purchase preference to domestic design led manufacturers is crucial as per the submissions.
- **Different norms to compute local content -** Some stakeholders have submitted that Ministry of Electronics and Information Technology (MEITY) norms for value addition consider full value of all components that go into a PCB *as long as* the PCB assembly is done in India. These stakeholders seek for universal recognition of MEITY norms for value addition towards Telecom products as well. This view has been countered by few other stakeholders stating that the products covered

under DOT PMI policy are very security sensitive products and by no means can be compared with MEITY policy. Additionally, the Indian OEMs are struggling and already have relative cost disability towards manufacturing activities to the tune of 8-10%.

- **Need to facilitate Product testing/ field-trials -** Majority of stakeholders have expressed that subjecting products to multiple testing frameworks hamper speedy commercialization of products. Beyond PLI, policy intervention is required to facilitate test system, design eco system, development of test modules, and fully equipped test labs at reasonable fee to promote NATEM. Apart from testing products in simulated environment, ecosystem is needed to conduct validation/ Proof of Concept testing/ field trials etc. Telecom Engineering Centre (TEC) or Accredited Test Laboratories may conduct the validation/ Proof of Concept testing of the developed products. The field trial may be supported by TSPs or else the company may be allowed to offer the field trial in uncovered area with the support of any TSP by providing connectivity of the equipment under test to their network. Requisite Frequency Spectrum may also be allocated for testing purposes.
- **PLI investment requirements should include specified R&D expenses already declared to Department of Scientific & Industrial Research** (**DSIR) -** Couple of Stakeholders have opinion that the existing indigenous production companies who had invested hefty amount in R&D over the past three-four decades will not get any benefit under new PLI scheme as the basic framework of PLI scheme envisages only incremental investment & incremental sales. To encourage existing domestic companies registered with DSIR to continue investments in R&D, the investment already made in R&D for developing the products (*i.e.* audited R&D investments as declared to DSIR), may be considered as the part of investment threshold. Only incremental sales portion may be the criteria for such companies to avail PLI benefits. Further stakeholders are of the view that all DSIR certified R&D organisations prior to 2015 were given a 200% weighted

R&D deduction for tax purposes, the same incentive should be reinstated for the next 5 years for encouraging domestic R&D in the telecom sector.

- **Permitting higher incentives for investment beyond thresholds -** Few stakeholders have opined that in the current PLI Policy, the Investment threshold for Year 1 is capped at 20% of the Total investment commitment during scheme-tenure. Hence, PLI Incentive Payout in the 1st year is capped at 20X of the 20% investment proposed. This disincentivizes the companies which work to exceed the production threshold of 20X of 20% of the investment. These stakeholders have therefore suggested that the PLI policy be amended to consider an incentive pay-out of 20X of the actual Investment made during the financial year and not the 1st Year threshold of 20% of the proposed investment.
- **Extending incentives for domestic companies, Start-ups and MSMEs** Stakeholders have submitted that the Design incentive should be extended for domestic companies, Start-ups and MSMEs. The definition of such companies has been suggested as follows:
  - Domestic companies are ones which are owned by resident Indian citizens as defined in the FDI Policy Circular of 2017 or extant norms. A company shall be considered as 'Owned' by resident Indian citizens if more than 50% of the capital in it is beneficially owned by resident Indian citizens and/or Indian companies, which are ultimately owned and controlled by resident Indian citizens.
  - MSMEs to be defined as per the Gazette Notification by Ministry of Micro, Small and Medium Enterprises, dated 1 June 2020 or extant norms.
  - Start-ups to be defined as per the DPIIT notification dated 19 February 2019 or extant norms.

Analysis of the issues and the views of the Authority

4.21 The Authority in the Consultation Paper has taken cognizance of the fact that one Scheme cannot pervasively deal with the multiple challenges of telecom sector. Within PLI itself, value addition within the country requires further focus in addition to design led manufacturing, R&D, and IPR creation. The Authority takes note that the Design led PLI scheme, launched in June 2022, has handled some of the concerns raised by the stakeholders. A few relevant amendments are discussed here:

- For all products satisfying the below conditions, 'an additional incentive of 1% over and above the applicable rates of incentive under Design led Manufacturing,' has been introduced-
  a) The system design and development, including hardware and software for the specific end products, shall be done using in- house and captive R&D or through technology transfer agreement executed with Government labs / academia or Centre for Development of Telematics (C-DOT) or DSIR registered R&D entities by the applicant company.
  b) The hardware design, source code and IPR (excluding any duly licensed IPR) should reside in India and should be owned by the applicant company; and
  c) Minimum 50% of the components (other than semiconductor components and Bare PCBs of more than 8 layers) by value terms, used in the manufacturing of the specific end products must be manufactured in India.
  d) The surface mounting of the components on the PCB as well as the final assembly, integration and testing of the specific end products shall be done in India.
- The capital expenditure incurred on R&D and product development related to Scheme Target segment for all stages in the entire value chain of the goods proposed to be manufactured including software integral to the functioning of the same have been made part of R&D expenditure. It shall also include test and measuring instruments, prototypes used for testing,

purchase of design tools, software cost (directly used for R&D) and license fee, expenditure on technology, IPR, Patents and Copyrights for R&D. Manpower expenses have also been included in the eligible R&D expenditure. The earlier cap of 15% on Expenditure incurred on R&D as percentage of the total committed investment has been removed.

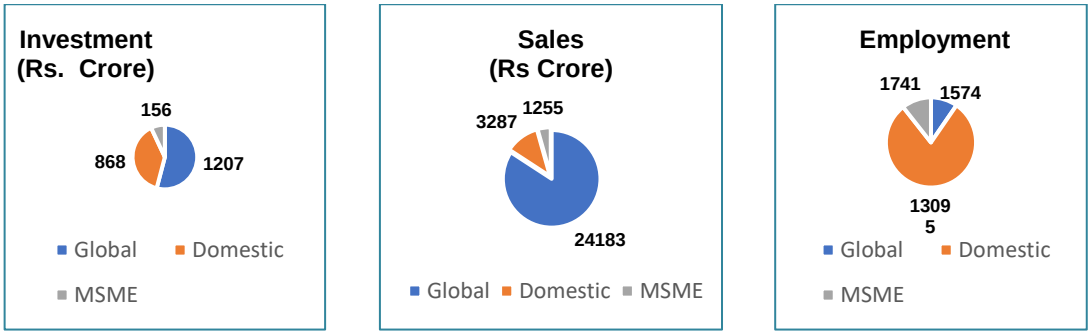
- The cap of 5% on expenditure incurred on Transfer of Technology as percentage of the total committed investment has also been removed.
- The Amended guidelines include additions to the existing list of equipment in the category of "Core Transmission Equipment", "4G/5G Next Generation Radio Access Network and wireless equipment", "Access and Customer Premises equipment (CPE), IoT Access devices and other wireless equipment".

4.22 The Authority also reviewed the initial performance metrics related to PLI-Scheme in terms of participation, investments drawn and resulting production-cum-sales. Presently there are total 42 companies approved under PLI scheme[41] with mix of Global, Domestic & MSME companies in different locations of the country. Out of 42 companies, 17 companies are with design-led manufacturing products. These 42 companies have committed investment of Rs. 4,115 crores, additional sales of Rs. 2.45 lakh crores and will create employment of more than 44,000 on aggregate basis over the scheme period. The number of applicants indicate a positive response from industry for making India a global manufacturing hub for telecom and networking products. During FY 2021-22, there was an additional investment of Rs. 420 crores, sales of Rs. 9,019 crores, and employment of 4,938 personnel on account of the Scheme implementation. As on 30 June 2023, Cumulative Investments of Rs. 2,231 Crore, Sales of Rs. 28,725 Crore and Employment to 16,410 personnel has been registered so far, as

[41] https://pli-admin.udyamimitra.in/Default/ViewFile?id=PIB1872271.pdf

illustrated in Fig. 4.2 below. Rs. 6,911 Crore worth of exports[42] have been made in the corresponding period.

Figure 4.2 PLI-Scheme Performance metrics



Source: https://pli-telecom.udyamimitra.in/

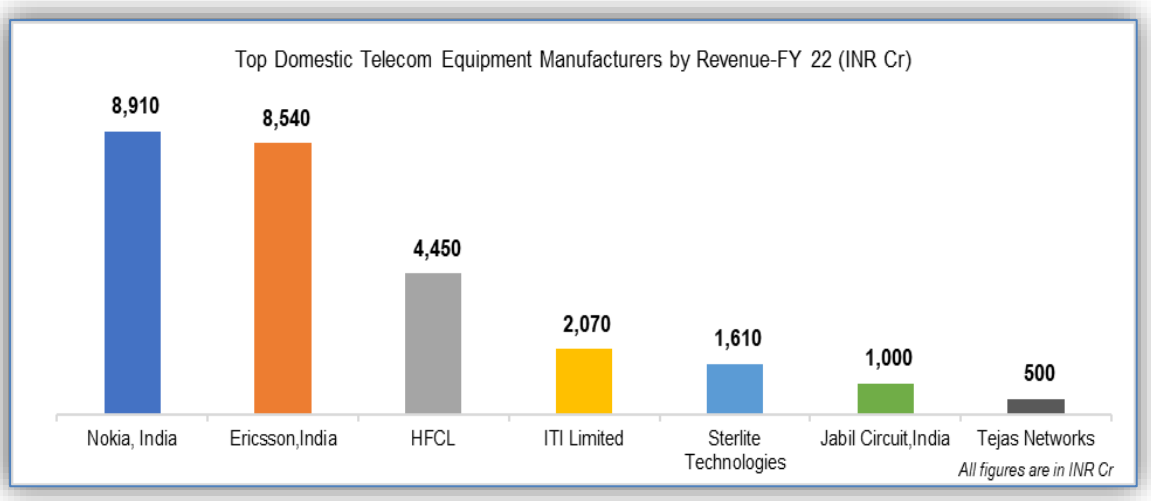
Table 4.5 PLI scheme-- Investment and Sales (till 30 June 2023)

PLI beneficiary type	Investment Amount (Rs. Crore)	Sales (Rs Crore)
Global Companies	1,207	24,183
Domestic Companies	868	3,287
MSME Companies	156	1,255

4.23 Fig. 4.3 given below provides revenues of top domestic manufacturers in NATEM sector at-a-glance. Currently, the domestic market is dominated by a few manufacturers, that includes leading global manufacturers of NATE products and a few established Indian NATEM players. The current contribution of new entrants and other existing MSMEs in domestic production volume & sales is limited.

Figure 4.3 Top domestic manufacturers by revenue

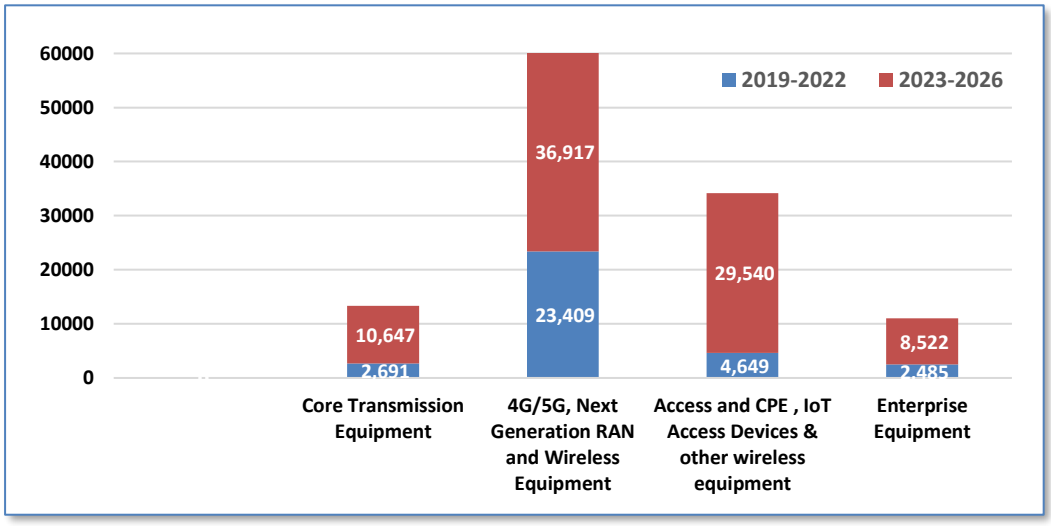
[42] https://www.communicationstoday.co.in/india-exported-telecom-gear-worth-rs-6911-crore-till-may-31/



Sources:
Nokia: https://www.nokia.com/system/files/2022-03/nokia-ar22-en.pdf
Ericsson: https://companiesmarketcap.com/ericsson/revenue/
Sterlite: https://www.stl.tech/pdf/Financial_Results_22.pdf
ITI Limited: https://www.itiltd.in/Investor%20information/2022/Annual_Report%20_2022.pdf
HFCL: https://www.bseindia.com/bseplus/AnnualReport/500183/76776500183.pdf
Jabil Circuit: FY21, annual sales in India considered from the data shared by TRAI
Tejas Networks: https://www.tejasnetworks.com/main-control/download/Annual-Report-2021-22.pdf

4.24 Fig. 4.4 below provides the sales figures for the period 2019-2022 and the sales forecasts for 2023-2026 for the 22 manufacturers who were approved for PLI scheme. Data has been prepared based on historical sales data and sales forecasts received from 22 out of 42 OEMs approved for the PLI scheme.

Figure 4.4 Sales (Rs. in Crore) from 2019-22 and forecast for 2023-26 for domestic OEMs approved for the PLI Scheme



4.25 As can be seen from the above figure, Radio Access Network (RAN), CPE and IoT devices will constitute most of the sales in 2023-2026, driven primarily by the deployment of 5G in both customer and enterprise segments and coverage and capacity expansion of the 4G network.

4.26 The Authority takes further note that the Design-led PLI Scheme has updated the equipment list to include Internet STBs among others, however broadcasting STBs are still not a part of the list as opined by a section of the stakeholders. In view of the dynamic nature and changing requirements of the telecom sector, the Authority feels that there is a need to regularly update the equipment under the purview of PLI. The Authority vide Recommendations '*Promoting Local Manufacturing in the Television Broadcasting Sector'* [43] of 31 March 2023 has already recommended to bring Linear Set Top boxes under PLI scheme. Since many of the Set Top boxes today support technological convergence by way of allowing both DTH and broadband inputs to be processed through the same Set Top box, it would be prudent to include hybrid as well as DTH set top boxes in PLI Scheme of DoT itself.

4.27 The concerns of stakeholders that PLI period should be increased to 7-10 years, from current tenure of 5 years is not found to be valid enough. The Authority is of the view that the PLI scheme has been implemented recently and a review/ analysis of the progressive outcomes during the given tenure will be required to take a decision on this issue. Further, any change in the benefits of those manufacturers who have already made a commitment under the scheme, will favor them at the cost of those who would have also applied if the new benefits would have been made part of initial scheme.

[43] https://trai.gov.in/sites/default/files/Recommendations_31032023_0.pdf

4.28 Under current PLI Scheme five product categories have been outlined in Annexure-I of Guidelines for PLI Scheme[44] dated 3 June 2021. These are -

(a) Core Transmission Equipment,

(b) 4G/5G, Next Generation Radio Access Network and Wireless Equipment,

(c) Access & Customer Premises Equipment (CPE), IoT Access Devices and Other Wireless Equipment,

(d) Enterprise equipment: Switches, Router and

(e) Any Other Product-as decided by the Empowered Group of Secretaries (EGOS).

4.29 Currently the minimum threshold investment requirement under all these categories has been kept the same. While the investment requirements for manufacturing core transmission equipment, 4G/5G radio access network and wireless equipment may be high, the investment requirements for manufacturing CPEs and IOT devices may not be that high. Keeping eligibility qualification criteria for the Global Revenue of more than Rs. 10,000 Crore in the base year and investment criterion of Rs 100 Crores for companies who are manufacturing IOT devices or STBs is far too much a requirement.

Existing Thresholds : Revenues during Base-year

Global Co. : Rs. 10,000 Crore

Domestic Co : Rs. 250 Crore

MSME Co : Rs. 10 Crore

Existing Thresholds : Cumulative Investments

Non-MSME Co : Rs. 100 Crore

MSME Co. : Rs. 10 Crore

Further the ranking criterion for selecting applications is also based

44 https://dot.gov.in/sites/default/files/2021_06_03%20PLI%20Scheme%20Guidelines%20for%20Telecom%20%26%20Networking%20Product.pdf

on committed investment. This helps only large-scale manufacturers. Given the niche and highly diversified supply chain ecosystem of NATEM, it is unlikely that large OEMs alone can provide a diversified product portfolio or competitive technology presence across the entire domain of NATEM. Smaller players have a role to play in manufacturing of NATE in CPE and enterprise segment market. The Authority therefore maintains that segmentation for the base year global revenues and cumulative incremental investment should be different for different product categories. This can be instrumental in drawing focus to those segments of NATEM that might not have sufficient domestic manufacturers at present and help build competition in the market.

4.30 **The Authority therefore recommends that the eligibility criteria of global revenues and cumulative incremental investment for the entities to qualify for availing PLI benefits should be modified as per following table-**

Table 4.6 PLI scheme: Recommended criteria

Product category	Global revenue criteria *(in Rs. Crore)*			Minimum cumulative investment threshold *(in Rs. Crore)*	
	Non-MSME		MSME	Non-MSME	MSME
	Global company	Domestic company			
Core network	10,000	250	10	100	10
Access network	10,000	250	10	100	10
Customer Premises Equipment	1,000	50	10	25	5
Enterprise Equipment	1000	50	10	25	5

4.31 The Authority has noted the concerns of stakeholders that lack of Access to Trials/Validation/ testing etc. hampers the commercialization process of new age telecom products. Apart from testing products in simulated environment, ecosystem is needed to conduct validation/ Proof of Concept testing/ field trials etc. Standardization, testing, and certification are integral parts of R&D related issues. The Authority is taking up the issue as part of a

separate consultation process and a Consultation Paper on '*Encouraging Innovative Technologies, Services, Use Cases, and Business Models through Regulatory Sandbox in Digital Communication Sector'* has been issued on 19 June 2023.

4.32 Regarding the submissions of stakeholders on incremental incentive structure in PLI scheme for higher local content/ value addition, DoT has partly addressed the issue in the Design-led manufacturing PLI. In this scheme a condition has been added wherein for the manufacturers to be eligible for 1% additional incentive, minimum 50% of the components (other than semiconductor components and Bare PCBs of more than 8 layers) by value terms, used in the manufacturing of the specific end products are required to be manufactured in India.

4.33 To that extent the Authority agrees with the views of the stakeholders that additional incentives may be given to the companies who achieve higher local content value addition. The stipulation will ensure gradual reduction in trade deficit. Earlier, TRAI's recommendations on "*Telecom Equipment Manufacturing Policy*" dated 12 April 2011 has envisaged a similar stipulation for giving Preferential Market Access (PMA). The Authority had recommended- "*Preferential market access should be provided to the domestic manufactured products (comprising both Indian Manufactured Products and Indian Products) in procurement by the Government and Government Licencees (service providers both public and private) as per Table 2.1 subject to the value additions proposed for the corresponding years. (Para 2.15)*

Table 2.1 Market access for domestic products

Year	***2012-13***	***2013-14***	***2016-17***	***2019-20***
Market Access for Domestic Manufactured Products	***30 %***	***45 %***	***60 %***	***80 %***
Value Addition	***25 %***	***35 %***	***50 %***	***65 %***

4.34 The Authority has also noted that as per DoT Notification[45] of 29 August 2018 outlining value addition criterion under PMA policy, various norms have been prescribed in terms of Table-B (*Main Inputs in BOM[46]/stages for manufacture of telecom product in PMA Policy*). The same are reproduced below -

TABLE-B (Main Inputs in BOM/stages for manufacture of telecom product in PMA Policy)

Main Inputs in BOM/stages for manufacture of telecom products *	**Conditions for the inputs to be classified as Domestic BOM**
(1) Design (a) Hardware design (b) Software Design & Development	**The maximum Local Content (LC) percentage for Design which can be claimed by a Local manufacturer for the telecom products based on in- house/in country R&D costs incurred/amortized to create IPR in India are as per Table-C subject to the condition that:** (a) The Intellectual Property Right (IPR) resides in India for Hardware Design, (b) The Copyright is in India for the software Design & Development.
(2) Components (a) Integrated chips (ICs) – Processor, Memory etc. (b) Active components – Transistors, Diodes etc. (c) Passive Components – Resistors, Capacitors, Inductors etc.	Manufactured in India
(3) PCBs (a) PCB Fabrication (b) PCB population using components	Manufactured in India
(4) Cables/Chassis etc. (a) Chassis (b) Cables (c) Racks (d) Heat sinks (e) Enclosures	Manufactured in India
5) RF Components/Subsystem (a) Duplexers/Filters (b) Antenna	Manufactured in India
(6) Assembly/Integration/Testing#	The upper ceiling limit of Domestic Local Content (LC) for Assembly/ Integration/ Testing in respect of the telecom products listed in **Table-C** would be 10% of the total product Bill of Material (except S. No. 25,26 and 36)

[45] https://dot.gov.in/dot-pmapmi-policy

[46] Bill of Material

(7) Any Other Input (Taxes and Duties paid, domestic Support, Repair and upgrade capability, Warranty Cost Freight Insurance and other handling costs royalty etc.)	As per applicable rules/taxes in force.

* The product may include some/all of the input/stage as mentioned in table A. The procurement agency shall include only those inputs/stages which are involved in the manufacturing of these telecom products.

In case a system of its subsystem is merely assembled / integrated / tested, then actual value addition subject to a maximum of 10% of the cost of system / subsystem shall be taken as domestic BOM.

4.35 For ready references, *Maximum Ceiling for Design as Local Content out of total LC for Telecom Equipment* (specified in TABLE-C) has been combined with *Maximum Local Content requirements*, (specified in TABLE-A). Such dispensation regarding Local Content (LC) under PMA policy is effective from 2019-20 onwards.

Table 4.7 Local Content Requirements under DoT PMA Policy (compiled)

Sl. No.	Telecom Products, Services and Works	PMI threshold	Minimum Total Local Content (LC) required	Maximum ceiling for Design as Local Content out of total LC
1	Encryption/UTM platforms (TDM and IP)	100	65	55
2	IP/MPLS Core routers/ Edge/ Enterprise Router	50	60	40
3	Managed Leased line Network equipment	50	60	40
4	Ethernet Switches (L2 and L3), Hubs	50	60	40
5	IP based Soft Switches, IMS, Unified Communication Systems	100	60	40
6	Wireless/Wireline PABXs / IP PBX & / Media Gateways	100	65	45
7	CPE (including Wi-Fi Access points and Routers, Media Converters), 2G/3G/4G/LTE Modems, Leased-line Modems, NFV/SDN CPE	100	50	30
8	Set-Top Boxes	50	55	35
9	SDH/Carrier-Ethernet/MPLS- TP/ Packet Optical Transport equipment/ PTN/ OTN systems	100	65	45
10	DWDM/CWDM systems	50	60	40
11	GPON / XGS-PON, NG-PON2 equipment (including ONT and OLT)	100	60	40
12	Optical/SDH/PDH Cross Connects/ OTN Cross-connects and optical MUX,OADM	100	60	40
13	Small size 2 G/3 G GSM based Base Station Systems, with its various derivatives including rural & disaster response, Macro & Micro BTS, Small Cells, NIB, C-RAN	100	60	40

	BBU and RRH			
14	2 G/3 G GSM based Base Station Systems, with its various derivatives including rural & disaster response, Macro & Micro BTS, Small Cells, NIB, C-RAN BBU and RRH	50	60	40
15	Small Size LTE/LTE-R Based Mobile Systems, with its various derivatives including rural & disaster communications, Macro & Micro eNode B, Small Cells, EPC, NIB C- RAN BBU and RRH, LTE/LTE-R/4.5 G/ 5 G based broadband wireless access systems (eNodeB, gNB, EPC, etc.)	50	60	40
16	LTE/LTE-R Based Mobile Systems, with its various derivatives including rural & disaster communications, Macro & Micro eNode B, Small Cells, EPC, NIB C-RAN BBU and RRH, LTE/LTE-R/4.5 G/ 5 G based broadband wireless access systems (eNodeB, gNB, EPC, etc.)	50	50	35
17	Wi-Fi based broadband wireless access systems (Including Access Point, Aggregation Block, Core Block), Integrated Broadband system	50	55	35
18	Microwave Radio systems (IP/Hybrid), Mobile Front haul BBU and RRH (CPRI, eCPRI, FlexE, RoE, NGFI)	100	55	35
19	Software Defined Radio, Cognitive Radio systems	50	55	35
20	Repeaters (RF/RF-over-Optical), IBS, and Distributed Antenna system	100	60	40
21	Satellite based systems –Hubs, VSAT Disaster Communication Systems etc.	50	40	25
22	Copper access systems (DSL/DSLAM), high-speed xDSL (G.fast)	50	55	35
23	Network Management systems (NMS) with its various derivatives	100	65	50
24	Security and Surveillance Communication Systems (video and sensors based) including Perimeter Security Systems	100	40	30
25	Optical Fiber	50	50	NIL
26	Optical Fiber Cable	75	55	NIL
27	Telecom Power System (Including Solar Power)	50	55	30
28	Telecom Batteries (Lead Acid & Li-ion)	50	55	30
29	IP audio phones / IP video Phones / Analog adaptor	50	40	15
30	SDN Software Controllers, NVF and CNF software	50	55	15
31	Cloud infrastructure, Data centers	50	40	20
32	2 way Analog/Digital radio including Walkie-Talkie & Mobile Radio	50	55	30
33	Batteries of 2 way Analog/Digital radio including Walkie-Talkie	50	45	30
34	Fiber Monitoring System	50	55	35
35	M2M/IOT Subsystems	50	55	35
36	Telecom Services/Works	100	70	NIL

For example, overall Local Content Requirement (LCR) in case of Base Station systems for 4G/ 5G systems (eNodeB/gNodeB) is 50 % of cost as per Bill of material. By virtue of indigenous design, LCR contribution can be maximum 35 % by value. In case, the same is assembled & tested domestically, another 10 % towards LCR is added-up. Further, enhancement may appear from associated software, and service-cost of commissioning the Base Station. In this way, the overall LCR looks more achievable.

4.36 The Authority is of the opinion that the way local value addition has been defined and is calculated under PMA policy, a similar methodology can also be defined under PLI policy and those product-lines yielding minimum local value-addition of certain percentage can be further incentivized under PLI. A criterion of 50% local value addition exists in Component Champion Incentive Scheme[47] under PLI Scheme for Automobile and Auto Component Industry that provides financial incentives to boost domestic manufacturing of Advanced Automotive Technology (AAT) products and attract investments in the automotive manufacturing value chain. Even the design led PLI scheme of DoT has introduced a clause for eligibility whereby minimum 50% of the components (other than semiconductor components and Bare PCBs of more than 8 layers) by value terms, used in the manufacturing of the specific end products must be manufactured in India. The Authority is of the view that this clause should be introduced in all future PLI schemes of DoT. This way the country can move from focusing just on assembling in India to the next stage of local value addition within the country. This will also encourage some of the global manufacturers to establish their component ecosystem within the country. This way the investment coming to the country will produce more jobs and likely to stick longer. This will also eliminate fly-by-night kind of manufacturers who

[47] https://pib.gov.in/PressReleasePage.aspx?PRID=1806077

establish assembly units to avail policy benefit and then flee once the policy benefits are withdrawn.

4.37 **The Authority therefore recommends that further announcement of PLI schemes, by DoT should have -**

(i) an inbuilt local value addition criterion for any entity to avail the benefits of PLI. For availing any benefits under PLI scheme, DoT should prescribe that minimum 50% of the components (other than semiconductor components and bare PCBs of more than 8 layers) by value terms, used in the manufacturing of the specific end products must be manufactured in India.

(ii) two incentive slabs under the Design-led PLI Scheme. In addition to already announced 1% additional benefit, another slab of additional 2% benefit be introduced for such product lines that yield minimum local value-addition of 75% wherein the components (other than semiconductor components and Bare PCBs of more than 8 layers) by value terms, used in the manufacturing of the specific end products must be manufactured in India.

4.38 Currently, DoT Dashboard related to PLI provides monthly update on aggregate investments, sales and employment generated, each tri-furcated as per entities involved- Domestic, Global & MSMEs. As it progresses, it is felt that publication of certain additional information may be periodically updated in stakeholders' interest. This may include volume of exports by PLI-beneficiaries, incremental sales on account of telecom software and exports thereof. This may facilitate in underlining the significance of PLI scheme within overall NATE manufacturing ecosystem. Therefore, **the Authority also recommends that the online publication of data on PLI-performance dashboard for PLI beneficiaries i.e. pli-telecom.udyamimitra.in should further include**

(a) Exports realized by PLI-beneficiaries

(b) Incremental sales on account of Software products

(c) Incremental Exports on account of Software products

4.39 The Authority noted that stakeholders have differing opinions in terms of linking PLI to Public Procurement (Preference to Make in India) policy (PPP-MII policy). On one hand linking PLI to PPP-MII would be an additional incentive for foreign players to invest in the Indian market because they would have procurement guarantee, on the other, it would increase competition for domestic manufacturers. Given the larger capital base and competitive strength of foreign players arising out of economies of scale, it might be detrimental to Indian domestic manufacturing. Authority is of the view that the PLI and the PPP-MII are policies with different intents and objectives and at this stage the Authority does not feel a need to create linkages between the two schemes.

4.40 Some stakeholders have submitted that PLI Scheme should be more inclusive and should also focus on development, design and manufacturing of NATE components and component based sub-assemblies. Some possible examples can be IOT Sensor controls for connected Cars, wearable & hearable telecom gadgets, Connectors, high-speed data cables, battery & battery packings, glass, Fabless design linked to independently acquired IPR, etc. The Authority is of the view that introduction of concurrent PLI Scheme focusing on NATE components and component based sub-assemblies would enrich the domestic manufacturing eco-system in high-potential demand areas. This would also speed up industrial integration and finished product development. This introduction would also increase opportunities for MSME & Start Ups to effectively participate in the Scheme.

4.41 The Authority has noted that there already a precedence where concurrent PLI Scheme focusing on components was launched in

Automobile sector. Component Champion Incentive Scheme[48] under PLI Scheme for Automobile and Auto Component Industry in India provides for financial incentives to boost domestic manufacturing of Advanced Automotive Technology (AAT) products and attract investments in the automotive manufacturing value chain. Its prime objectives include overcoming cost disabilities, creating economies of scale and building a robust supply chain in areas of AAT products. The basic eligibility and minimum new domestic investment criteria adopted for this scheme is far relaxed than that adopted for PLI scheme for Champion OEM in the automotive manufacturing industry. However, the incentive-structure is also less than that offered in PLI scheme for Champion OEM. The eligibility criteria and the incentive-structure adopted in both the schemes is illustrated below:

Table 4.8 PLI scheme-- Advanced Automotive Technology (AAT) products

Basic Eligibility Criteria

Eligibility Factors	Champion OEM Incentive Scheme	Component Champion Incentive Scheme
Global Group Revenue	Rs. 10,000 Crore	Rs. 500 Crore
Global Group Investments (i.e. Gross Block)	Rs. 3,000 Crore	Rs. 150 Crore

Incentive- structure

Champion OEM Incentive Scheme		Component Champion Incentive Scheme	
Sales Value	Incentive	Sales Value	Incentive
Up to Rs. 2000 Crore	13 %	Up to Rs. 250 Crore	8 %
Rs. 2000 to 3000 Crore	14 %	Rs. 250 to 500 Crore	9 %
Rs. 3000 to 4000 Crore	15 %	Rs. 500 to 750 Crore	10 %
Over Rs. 4000 Crore	16 %	Over Rs. 750 Crore	11 %

Minimum New Domestic Investment (cumulative)

Cumulative Investment by	Champion OEM (Except 2 Wheeler & 3 Wheeler)	Champion OEM (2 Wheeler & 3 Wheeler)	Component Champion
	(in Rs Crore)		
31 March 2023 (1st year)	300	150	40
31 March 2024 (2nd year)	800	400	100

[48] https://pib.gov.in/PressReleasePage.aspx?PRID=1806077

31 March 2025 (3rd year)	1400	700	175
31 March 2026 (4th year)	1750	875	220
31 March 2027 (5th year)	2000	1000	250

The Scheme requires compliance to the following norms:

(a) minimum 50 % domestic value addition,
(b) year-on-year growth threshold at minimum 10% of Sales Value in the first year, and
(c) product incentivisation permitted only once *either* at Component-level *or* at Vehicle-level.
(d) additional incentive of 2% possible for high growth achievers (if Sales Turnover in a year goes above Rs. 10,000 Crore in OEM Scheme and Rs. 1,250 Crore in the Component Scheme)

4.42 Component production and integration into end-product is inherent to overall NATE manufacturing. Introduction of incentive scheme for boosting domestic component manufacturing would strengthen the growth of overall NATE products as well as achieve higher value-addition and substantial transformation competency in the collaborative eco-system. Besides, opportunities of collaboration between MSE and non-MSE segment of industry would increase. Based on techno-commercial trends and market statistics, the following can be considered for inclusion:

(a) Passive components (such as capacitors, sensors, inductors, resistors, transformers, diodes-photo/laser diodes, crystals, oscillators, connectors/ cable assemblies, fuses, splitters)
(b) Active Components – (such as transistor/ logic based controller or regulator, amplifier, discrete circuits, switches, Transistor outline Can- TO Can), in electrical/optical domains
(c) RF Antennae (including Wi Fi/ Cellular access in permitted Spectral bands)
(d) Printed Circuit Boards (may include compatible with IoT compatible integration/ flexible PCBs for ultra-portable use/ re-cyclable PCBs)

(e) Sensors compatible with IoT / M2M integration

(f) Wearables & Hearables

(g) Fabless Designs with IP Core (qualifying under Designs Act,2000)

(h) Spatial Navigation / Telemetry aids clocked to Indian Standard Time Reference

(i) High Speed Data cables

(j) Battery Chargers* / battery for portable devices & broadband access

(k) Hybrid power modules

(l) Speciality chemicals used in different stages of electronic device manufacturing.

*Bureau of Indian Standards (BIS) may adopt USB Type-C as the standard charging port for electronic products by March 2025.

4.43 In all kinds of electronics manufacturing including NATEM, different kinds of components are integrated together to make functional equipment. Usually, components used in NATEM are sourced regularly from different manufacturing entities which specialize in various segments. Non-availability of a few components sometimes may delay the overall assembly to produce NATE. In order to provide sufficient supply of necessary component for the industry, presence of specialized component manufacturing entities within the indigenous ecosystem is crucial. It will facilitate both costs & time management. Component manufacturing requires lower capital expenses as compared to full-fledged NATE producing entity and can be established near major NATE units.

4.44 In view of above discussions, **the Authority recommends that on the lines of Component Champion Incentive Scheme to boost domestic manufacturing of Advanced Automotive Technology (AAT) products, a concurrent PLI Scheme focusing on development, design and manufacturing of NATE components and**

components based sub-assemblies should be introduced. This concurrent PLI Scheme should, inter-alia, include the following:

- **Passive components (such as sensors, transformers, diodes-photo/laser diodes, crystals, oscillators, connectors/ cable assemblies, fuses, splitters)**
- **Active Components – (such as transistor/ logic-based controller or regulator, amplifier, discrete circuits, switches, Transistor outline Can) in electrical/optical domains**
- **RF Antennae for in-building use (including Wi Fi/ Cellular access in permitted Spectral bands)**
- **Printed Circuit Boards (may include compatible with IoT compatible integration/ flexible PCBs for ultra-portable use/ re-cyclable PCBs)**
- **Sensors compatible with IoT / M2M integration**
- **Wearables & Hearables**
- **Fabless Designs with IP Core (qualifying under Designs Act,2000)**
- **Spatial Navigation / Telemetry aids clocked to Indian Standard Time Reference**
- **High Speed Data cables**
- **Battery Chargers / battery for portable devices & broadband access**
- **Hybrid power modules**
- **Speciality chemicals used in different stages of electronic device manufacturing.**

4.45 As far as the basic eligibility and minimum new domestic investment criteria for this parallel PLI scheme for components is concern, the Authority is of the view that the component manufacturers in general do not operate at scales at which a finished good manufacturer will operate. There are many small and medium sized players in component manufacturing ecosystem and therefore the eligibility

criterion for Global Manufacturing Revenue during Base year and minimum new domestic investment should be little lenient than those for regular PLI scheme. As far as the incentive structure is concerned, the Authority is of the opinion that the cost disadvantage to manufacturers of components is same as those for manufacturers of finished products and therefore the incentive structure[49] for the concurrent PLI Scheme for component manufacturing vis-a-vis the regular PLI scheme should be same.

4.46 **The Authority also recommends that basic eligibility, minimum new domestic investment criteria and the incentive-structure adopted for concurrent PLI Scheme for NATE component manufacturing should be as follows:**

Table 4.9 Proposed PLI scheme for components- Criteria

Eligibility Criteria	PLI Scheme proposed for components	
	For non-MSMEs	For MSMEs
Global Manufacturing Revenue during Base year	Global Company - Rs. 1500 Crore Domestic Company - Rs. 100 Crore	Rs. 5 Crore
Minimum Cumulative Domestic Investment	Rs. 15 Crore	Rs. 5 Crore
Incentive structure	6 % (Year 1 &2) 5 % (Year 3 & 4) 4 % (Year 5)	7 % (Year 1 &2) 6 % (Year 3) 5 % (Year 4) 4 % (Year 5)

4.47 In its recommendations on "*Regulatory Framework for Promoting Data Economy Through Establishment of Data Centres, Content Delivery Networks, and Interconnect Exchanges in India*" dated 18 November 2022, the Authority has already done an analysis of Internet Exchange

[49] https://dot.gov.in/sites/default/files/2021_02_25%20PLI%20IP_0.pdf

Point (IXP) and Content Distribution Network (CDNs) related equipment that is currently not explicitly covered as part of the PLI & PMA Schemes (Refer Annexure-IX of the said recommendations). Basis this analysis the Authority has recommended that

"….. in view of expanding markets and emerging demands for newer equipment, the government should extend the existing list of products under PLI and PPP-PMI schemes and explicitly include their classifications to prevent ambiguity as far as equipment related to CDN and IXP are concerned. Given the highly dynamic nature of digital communication sector, it is also recommended that, the lists should be updated from time to time as per market requirements so that the Schemes remain relevant and help nurture the domestic manufacturing segment." [Para 4.81]

4.48 **The Authority reiterates its above recommendations and also recommends for an early implementation of its entire recommendations on "*Regulatory Framework for Promoting Data Economy Through Establishment of Data Centres, Content Delivery Networks, and Interconnect Exchanges in India*" dated 18 November 2022**.

III. Effectiveness of Preferential Market Access (PMA)/ Preference to Make in India (PMI) Scheme

4.49 The issue of Market Access for domestically manufactured products under NATE has been dealt vide TRAI's Recommendations of year 2011 where it has been emphasized that *Preferential Market Access (PMA) should be provided to the domestic manufactured products (comprising both Indian Manufactured Products and Indian Products) in procurement by the Government and Government Licensees (service providers both public and private) subject to the value additions proposed for the corresponding years and Government or Government licensee (service providers- both public and private) were made to be*

responsible for meeting the market access criterion even if the installation, maintenance and operations are outsourced. Consequently, PMA policy has been notified by Department of Electronics and Information Technology (DEITY) on 10 February 2012. As per Notification No. 8(78)/2010-IPHW dated 10 February 2012, eligible telecom products would be subject to further notification by DoT. It has been notified by DoT vide Notification No 18-07/2010-IP dated 5 October 2012. Consequently, value addition criterion for eligible products under PMA policy have been notified vide Notification No 18-07/2010-IP dated 11 January 2017 & revised on 29 August 2018.

4.50 The issue of Market Access for telecom products under PMA policy has been re-emphasized in TRAI Recommendations of year 2018 where the following have been recommended –

(a) *A Nodal Officer should be appointed in DoT/TEC to look into the cases related to lack of implementation of Preferential Market Access (PMA) policy issued by DoT.*

(b) *Value addition claims of each product, specified under the PMA policy, should be verified independently and this information should be made available at a central repository/ the Government portal.*

(c) *DoT should immediately review its PMA policy, issued in October 2012, so that the products specified under the Policy as well as the norms of the value addition specified in the Policy can be aligned with the present day's local market realities.*

(d) *PMA policy should be made applicable for all public telecom networks to address the national security concerns.*

(e) *Telecom Service Providers should be incentivized for deploying indigenous telecom products, beyond the quantities to be mandated under the PMA, by giving them graded incentives.*

4.51 In pursuance of 'Make in India' policy for promoting manufacturing and production of goods, services and works in India, Department for Promotion of Industry and Internal Trade (DPIIT) has notified Public Procurement -Preference to Make in India Order 2017 (PPP-MII) relating to public procurement by the Central Government Ministry / Department / Attached / Sub-ordinate offices, or Autonomous Body and Government companies as defined in the Companies Act 2013. Thereafter, DoT issued Public Procurement (Preference to Make in India) Order in August 2018 including Local Content (LC) criterion for given list of Telecom products, Services and Works.

4.52 Keeping in view various challenges faced by the stakeholders regarding implementation of PMA and feedback to the Authority during interactive sessions, following issues were raised in the Consultation Paper:

Q11. Is the PMA/PMI scheme in its current form comprehensive for promoting NATEM? Are there any suggestions for modifications? How can the challenges associated with implementation of PMA/PMI be addressed? Please elaborate.

Q12. Whether the incentives to Telecom Service Providers to deploy indigenous manufactured products in their network will be helpful in promoting NATEM in India? Please justify with reasons. What incentivization model is suggested?

4.53 The stakeholders have opined that comprehensive PPP MII policy designed to give preference to domestic manufacturers in public procurement is an excellent policy for encouraging domestic manufacturing, Start-ups and new design companies. However, concerns have been expressed regarding instances of non-adherence to the Order & circumvention of the policy on grounds of impracticability in turnkey projects. The stakeholders have mentioned that Department of Expenditure is not in agreement of making PPP MII

applicable on such projects and there is a need to bring about clarity on methodology of policy implementation in turnkey projects. The scope of the policy needs to be enhanced to include purchases by State Governments, Telecom operators, World bank funded projects for the listed products, and Indian projects undertaken in other countries against LOC or Grant in Aid etc. It has been stated that rather than creating new policies to boost procurement from domestic companies, ensuring proper implementation in the desired spirit and prevent large scale policy violation by large buyers would be more effective. According to them, circumvention of PPP MII policy is largely because large buyers tend to interpret various clauses of the policy differently. Hence industry has been requesting for issue of an FAQ (Frequently Asked Questions) to clarify on interpretation of various phrases used in the policy.

4.54 Some stakeholders have pointed out that in certain public procurements e.g. in USOF tenders, element-wise compliance of local content requirements, as notified by DOT, is not monitored. Rather low value addition non-NATE elements like tower erection, civil work, installation charges, Annual Maintenance Charges (AMC) etc. are construed as local value- addition to take benefits under PPP-MII Order 2017. Therefore, the actual benefit of the PMI scheme for domestic equipment manufacturing is not getting extended. On the contrary, some of the stakeholders also mentioned that present calculation methodology doesn't capture the local value addition at the Project level. The cost incurred for local sourcing of material for network rollout, spares cost, warranty, AMC etc. are not captured. Main inputs/ stages cost incurred on assembly/ testing/ integration and other necessary requirements for deploying the equipment in the network are not being considered as well.

4.55 Some Stakeholders have submitted that many a times buyers have ignored the directions of the Standing Committee for implementation

of PPP MII Order. Implementation agencies should be made responsible for policy compliance and ensuring strict compliance, both at buyer's end *as well as* seller's end to check wrong declarations. Prompt action should be taken against the defaulters. Many a times, the procuring agencies have not followed the protocol to get a waiver/exemption from the Standing committee as per DPIIT guidelines. It has been observed that foreign make and models have been sought *even if* equivalent domestic products were available. Therefore, strict enforcement of PMI in all Government tenders needs to be ensured and use of restrictive tender conditions should be avoided.

4.56 A few equipment manufacturers have stated that Government's PMI policy in telecom is defined at the product level and not at the manufacturer's level. Given economies of scale for certain technological & capital-intensive products, some products are produced globally at a few locations and supplied worldwide. All products are not expected to be produced within one territory. However, tenders tend to insist on sourcing of all related products from the qualifying OEM/vendor. Therefore, PMI Order's linkage to products rather than entities make participation by Indian Small & Medium enterprises quite challenging.

4.57 A group of stakeholders have insisted that the PMI Policy should be made mandatory for all TSPs functioning in the country to give the much-needed thrust to the NATEM ecosystem, instead of it being restricted to just government projects. This is because over 75% of the domestic spend on telecom equipment is done by private sector TSPs. As long as they do not accept a favourable approach towards domestic equipment, the market would remain largely stunted. This submission has been strongly countered by a few stakeholders and TSPs stating that telecom is a global industry in nature and TSPs compete globally with the best, hence there should not be any mandate for the telecom

service providers in India to procure equipment from domestic manufacturers. PMA policy should be in the form of a nudge intervention that ensures positive reinforcement and influences the behavior by way of incentivizing through preferential market access. There should be a bottom-up approach of encouraging and developing world class R&D centers, skilled talent leading to domestic patents, designing, certifications and manufacturing. It is important that the policies encourage domestic manufactured products to be of robust quality, safe & secure, interoperable, and commercially viable so that they are able to compete equally in global as well as Indian markets. The Service Providers have stated that there should neither be any policy/provision mandating TSPs to purchase product or equipment manufactured/made in India nor there should be any penalty for non-procurement of any defined value/quantity. TSPs may be encouraged through graded incentives of reduction in license fees, for procurement of domestically manufactured products.

4.58 To promote PMA for domestic manufacturers by TSPs, following have been suggested by the stakeholders:

(a) Incentives without limitation of PMA to TSPs to deploy indigenously manufactured products (example: Deployment linked incentives)

(b) Incentive to manufacturers to get local supplies and make domestic investment will be helpful (as in PLI) for manufacturer to achieve scale in domestic market.

(c) Incentive to Technology and engineering partners for development of indigenous technology.

(d) Telecom operators should be encouraged through graded incentives of reduction in license fees, for procurement of domestically manufactured products.

(e) Telecom Operator should be incentivized to purchase from domestic manufactures, in the form of rebates in AGR dues,

easy access to capex/loans for deploying networks using domestic equipment.

(f) TSPs should be given incentives in the form of R&D funds for collaborating with domestic manufactures/startups for conducting Proof of Concept and carrying out research and development.

4.59 One stakeholder has opined that the Government of India should undertake an independent study to assess the manufacturing capacity and competitiveness of domestic ICT products, focus the PMA policy on building the capacity and ecosystem around low-technology, high-volume products. It would give India a competitive edge and enable large-scale employment. In the case of high-technology, low volume products, Indian players must be permitted to support global OEMs by allowing them to collaborate. Stakeholders have submitted that given the nascent stage of the industry, it is not possible for companies to meet the local value addition requirements currently mandated under the PPP – MII order. This view has been contested by most of domestic OEMs on grounds that the whole objective of "Make in India" policy is to revive domestic manufacturing in India. Since this policy applies to procurement under Central Government umbrella, only 5 to 7 % of total sectoral procurement goes through PMA. They added that the manufacturing of telecom products worldwide is done by specialised EMS partners and many domestic EMS companies are capable enough to meet all Indian telecom equipment requirements. It is not the capacity that restricts competitive participation, but restrictive tender conditions or turnkey tender that allows foreign OEMs to participate in the tender.

4.60 In context of PMA, most stakeholders agree that focus should be towards encouraging design-based manufacturing in the country instead of low value addition components like tower erection, civil

work, etc. Incentivizing design-based manufacturing would drive development of manufacturing technology by domestic companies.

4.61 A few stakeholders have also submitted that the issue of limited market for the products needs to be addressed through stricter implementation of PPP MII order by providing more opportunities to participate in deployment of private 5G networks, Drone technologies, Robotics, M2M/IOT etc. Though it may look marginal but should provide an elbow space for domestic companies to flourish rather solely depending upon overseas suppliers. They added that compliance to qualifying standards & certifications such as Type Approval Certificate (TAC)/ Type Specification Evaluation Certificate (TSEC), TEC Generic Requirements etc. should be mandated for Active network elements.

4.62 Some Stakeholders have further submitted that in case sufficient competition and capacity of local suppliers lacks, educational orders may be placed on local suppliers, to the extent of 20% of the total value of the tender in PMA Scheme. Placement of such educational orders would develop the local vendors and help in curtailing the imports. There is need for appropriate policy to not only award the "challenge" but also allow them and other domestic manufacturers access to market, as was done in the case of M/s BSNL's 4G network.

4.63 Some stakeholders acknowledged the efforts made during regular meetings of Grievance Redressal Committee for ensuring policy compliance. They suggest that these should be continued under Nodal Department. The stakeholders have further submitted that each violation of PPP MII order must be taken to a logical conclusion, and not closed by merely forwarding the grievances to the buyer organisation responsible for policy violation. This becomes a problem as seller (domestic industry) is victimised by the buyer organisation and buyer department invariably closes the complaint giving some

fuzzy logic or by making some commitments regarding setting up a committee that never happens. Innumerable such cases are known to DPIIT. An acknowledgement has also been made regarding issuance of DoT's Standard Operating Procedure (SOP) of June 2022 which aims to handle complaints regarding non implementation/ selective implementation of DoT PPP MII notification dated 2018, in a time bound manner.

Analysis of the Issue and views of the Authority

4.64 To increase the market access of domestic manufacturers, the Preferential Market Access[50] (PMA) policy was introduced for providing preference to domestically manufactured electronic products[51]. PMA policy was driven by two broad objectives:

(a) mitigate India's national security concerns; and

(b) safeguard and promote domestic manufacturing, especially in the information and communication technology (ICT) sector.

As per notification[52] dated 5 October 2012, it has been provided that the list of products as well as value addition for each product would be reviewed and notified by DoT on periodic basis, keeping in view the availability of domestic products each year.

4.65 Later, PMA policy was revamped to preference to Make in India (PMI) policy, issued by the Department for Promotion of Industry and Internal Trade (DPIIT) in 2017 and last amended in 2020. The PMA policy in its current form can provide assurance of business to domestic NATEM players only to a limited extent.

4.66 As per Public Procurement (Preference to Make in India), Order 2017-

[50] https://dot.gov.in/sites/default/files/2018_11_02%20DOT%20PMA_1.pdf?download=1

[51] https://www.meity.gov.in/writereaddata/files/PMA%20Guidelines_DGS%26D.pdf

[52] https://dot.gov.in/sites/default/files/policy_for_preference_to_domestically_managed_telecom_products_in_government_procurement.PDF

revised vide Order[53] dated 16 September 2020, DPIIT has introduced concept of *Price Preference* under Para 3A. This empowers the Nodal Ministry to prescribe the maximum extent to which the price quoted by Class-I local supplier may be above the price quoted by the lowest bidder i.e. L-1. The difference between these two price quotes is called *Margin of Price Preference*. In effect, Class-I local supplier is to be considered for award of work or service, if the available price quote is bound within the authorised price margin (as compared to L-1 price). In case, the former one agrees to make the 'same' supply at L-1 price, award of work/ service shall be made in its favour to supply 50% of the order quantity. The Class-I local supplier who quotes closest to L-1 price (within margin) is given right of first refusal. If not agreed, opportunity shifts to next competitive Class-I local supplier. In cases where work/service order cannot be divided, the most competitive Class-I local supplier shall get the whole award provided it agrees to make supply at L-1 price.

4.67 Assurance of business in the domestic market is a primary requirement for promoting NATEM players in India. The Authority has noted the views of the stakeholders and agree that PMA policy has several limitations. Some of these issues in PMA policy that need to be addressed to improve market access for Indian NATEM players have been discussed below.

(a) DoT has specified varying local content norms to be realised under PMA policy according to the type of products/ service/works. However, it may be seen from the following extract sourced from DoT PMA Notification of 29 August 2018 wherein main inputs/ stages for manufacture of telecom products insist on "Manufactured in India". It includes ICs, Active Components, PCB Fabrication as well as illustrated below:

[53] https://www.meity.gov.in/writereaddata/files/PPP_MII_Order_dated_16_09_2020.pdf

TABLE-B (Main Inputs in BOM/stages for manufacture of telecom product in PMA Policy)

Main Inputs in BOM/stages for manufacture of telecom products *	Conditions for the inputs to be classified as Domestic BOM
(2) Components (d) Integrated chips (ICs) – Processor, Memory etc. (e) Active components – Transistors, Diodes etc. (f) Passive Components – Resistors, Capacitors, Inductors etc.	Manufactured in India
(3) PCBs (c) PCB Fabrication (d) PCB population using components	Manufactured in India
(4) Cables/Chassis etc. (f) Chassis (g) Cables (h) Racks (i) Heat sinks (j) Enclosures	Manufactured in India
(4) Cables/Chassis etc. (k) **Chassis** (l) **Cables** (m) **Racks** (n) **Heat sinks** (o) **Enclosures**	Manufactured in India
5) RF Components/Subsystem (c) **Duplexers/Filters** (d) **Antenna**	Manufactured in India
(6) Assembly/Integration/Testing#	The upper ceiling limit of Domestic Local Content (LC) for Assembly/ Integration/ Testing in respect of the telecom products listed in Table-C would be 10% of the total product Bill of Material (except S. No. 25,26 and 36)
(7) Any Other Input (Taxes and Duties paid, domestic Support, Repair and upgrade capability, Warranty Cost Freight Insurance and other handling costs royalty etc.)	As per applicable rules/taxes in force.

* The product may include some/all of the input/stage as mentioned in table A. The procurement agency shall include only those inputs/stages which are involved in the manufacturing of these telecom products.

In case a system of its subsystem is merely assembled / integrated / tested, then actual value addition subject to a maximum of 10% of the cost of system / subsystem shall be taken as domestic BOM.

Components such as Integrated Circuits, Active & Passive components, PCBs etc. are required to be manufactured in India.

As compared to DoT, MEITY follows more liberal approach towards valuation of local content under PMA. As per MEITY Notification[54] dated 7 September 2020, the mechanism for calculation of Local Content provides that the value of semiconductors and CPU/GPU shall be included in Bill of Materials *even if* these are not domestically manufactured in India. The following extract in case of Desktop PC (as example) is given below:

(B) Mechanism for calculation of local content:

The domestic Bill of Material (BOM) of Desktop PC would be the sum of the cost of main inputs as specified in Column 1 of the following table, provided the inputs individually satisfy the value addition requirement specified in Column 2 of the table:

Main inputs in BOM/stages for manufacture of Desktop PC	**Value addition/local content required for the input to be classified as domestic BOM**
1	**2**
Main Board / Motherboard and CPU / GPU	Domestic PCB Assembly* and testing from imported/ domestically manufactured parts and components, including the value of Semiconductors** and CPU/ GPU** and excluding the value of bare PCB. However, the weightage of total value of CPU shall not exceed 30% of the total BOM of the Desktop PC.
Memory Module	Domestic PCB Assembly* and testing from imported / domestically manufactured memory chips** and parts / components on imported/ domestically manufactured bare

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[54]https://www.meity.gov.in/writereaddata/files/electronic_products_notification_dated_07092020.pdf

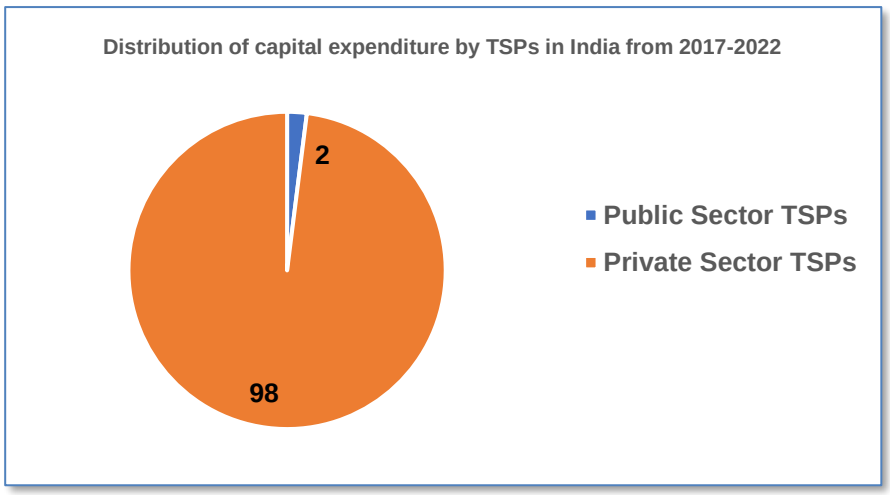
** It is essential that the Printed Circuit Board Assembly (PCBA) of the CPU(s)/ GPU/ processor(s) parts/ components on the bare PCB using the SMT process should mandatorily be done in India.*

*** This shall be reviewed when the Semiconductor FAB in India is operational.*

Thus, computation of Local Content requirements under PMA Notifications by DoT and MEITY provide different dispensation. DoT norms are more stringent.

(b) Currently, the PMA policy applies only to procurement by the Central Government and CPSUs. However, the Indian telecom market is dominated by private players and, hence most of the demand for telecom equipment will also be from the private sector.

Figure 4.5 : Capex expenditure by TSPs in India



Source: Based on historical data and forecasts of the capital expenditures, as shared by TSPs

As evident in Figure 4.5 above, the PSU operators contributed only 2% of the domestic NATE demand over the past five years, which indicates that the current PMA policy, even when effectively implemented, can help the domestic NATEM players access only a very small part of overall domestic demand.

(c) It is also observed that in the case of many large-scale projects that are turnkey projects, the policy is not strictly adhered to as the methodology of policy implementation in turnkey projects is not clearly defined. Currently, it computes local content percentage on the basis of aggregate project cost.

(d) High-technology procurement in India is driven by a few large international companies, and Indian NATEM players face intense cost-competition from existing global players in the market. DoT Notifications under PMA Order have not provided any '*Purchase Preference'* so far, as permitted vide DPIIT Order[55] dated 16 September 2020. Upon analysis, it is noted that the same has been implemented in the case of Electronics sector[56] (by MEITY), Power sector[57] (by M/o Power) etc.

4.68 As per DoT Notifications under PMA Order, *Telecom Services/ Works* are included in the list of items identified for public procurement. It also mandates *the local supplier has to manufacture equipment from component level in India and also develop local vendors for procurement of raw materials, components and parts for increasing local content*. Accordingly, the thresholds stipulated in the Notification for *Telecom Services/ Works* permit 100% award wherein local content required is 70 % of total Bill of Material (cost of production). Several stakeholders have mentioned that EPC contracts/ infrastructure project / turnkey project as a whole include several cost components including

(i) power infrastructure
(ii) cost of passive materials (poles, ducts, cables, cable trays etc.
(iii) services (digging, trenching, backfilling, carriage etc.)

which are not in-line with stipulations under NATE manufacturing. In case of sufficiently large award, such passive/ infrastructural supplies

[55] https://sps.iitd.ac.in/Notifications/P-45021.pdf
[56] revised_ppp-mii_order.pdf (meity.gov.in)
[57] https://powermin.gov.in/sites/default/files/uploads/Orders/C.2.2.pdf

tend to qualify for 70 % of overall bill on aggregate basis. The remaining 30 % bracket under the same award may provide ample leeway for making use of imported equipment (of active nature). Therefore, inclusion of earthworks, supply of passive infrastructure etc. in Bill of Material for computation of Local Content norms should be avoided in all cases. It shall ensure that supply of goods/works/services in relation to NATE remains realistically close to Local Content norms specified in DoT's PMA Order.

4.69 Several countries have adopted price preference policies as an instrument to increase procurement from domestic manufacturers, which in the long-term have helped significantly to boost their manufacturing sectors. For example, in the USA as part of the "Buy America" strategy, provisions were included in the American Recovery and Reinvestment Act of 2009 to mandate that locally produced goods must be purchased with a 25% price preference for all iron, steel, and manufactured materials used in the construction, modification, upkeep, or repair of public buildings and public works[58].

4.70 In case of MSMEs, the Purchase Preference applies to MSMEs under Public Procurement Policy for MSEs Order (PPP-MSE) by Ministry of MSME, dated 9 November 2018. On 1 June 2020, MSME has further notified the classification criteria for an entity:

Classification	Micro Enterprises	Small Enterprises	Medium Enterprises
Manufacturing Enterprises and Services Enterprises	Investment in Plant and Machinery or Equipment: Not more than Rs. 1 Crore & Turnover: Not more than Rs. 5 Crore	Investment in Plant and Machinery or Equipment: Not more than Rs.10 crore & Turnover: Not more than Rs. 50 Crore	Investment in Plant and Machinery or Equipment: Not more than Rs.50 Crore & Turnover: Not more than Rs. 250 Crore

58 "The Buy American and Buy America Acts". Department of Foreign Affairs and International Trade, Canada. 2009-05-22. Archived from the original on 2010-05-13. Retrieved 2009-11-21
https://icrier.org/ICRIER_Wadhwani/Index_files/Policy_Report_1.pdf
Indian Council for Research on International Economic Relation

As per amended PPP-MSE policy in 2018, MSME notification requires that a minimum 25 per cent share[59] out of the total annual procurement by Central Government Ministries / Departments / Public Sector Undertakings are to be made from MSEs.

4.71 Department of Expenditure vide O.M.[60] dated 18 May 2023 has recently clarified regarding *Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 (PPP-MSE) and Public Procurement (Preference to Make in India) Order, 2017 (PPP-MII).* It has resolved the reported confusion regarding precedence of one Order over the other in certain circumstances. The key-issue relates to determination of priority order for Price Preference if PPP-MSE and PPP-MII Order is applied concurrently for non-reserved products (358 items are reserved[61] for MSEs). The following order of precedence has been specified in above said O.M.

Table 4.10 : Award of Public Procurement under different scenarios

Sr.	Scenario where L-1 bidder is	Priority order for award under Public Procurement
1	Supplier is both MSE and Class-I local supplier;	Award goes to L-1
2	Supplier is not MSE but a Class-I local supplier;	Price Preference is to be offered to lowest quoting MSE (but not beyond 15 % of L-1 value) to match L-1 rates. Otherwise award goes to L-1
3	Supplier is MSE but not a Class-I local supplier;	Award goes to L-1
4	Supplier is neither MSE nor Class-I local supplier;	Step1: Price Preference to be offered to MSE as per PPP-MSE, failing which go to Step 2 Step 2: Price Preference to be Class-I local supplier under PPP-MII, failing which go to Step 3 Step 3: Award goes to L-1

MSE : Micro & Small Enterprise

Class -I local supplier : supplier maintaining minimum local content as 50%

L-1 : lowest quote by an eligible bidder

[59] https://www.dcmsme.gov.in/FAQs-PPP_25032022.pdf

[60] https://www.doe.gov.in/sites/default/files/Concurrent%20application%20of%20Public%20Procurement%20Policy%20for%20Micro%20and%20Small%20Enterprises%20Order%2C%202012%20and%20Public%20Procurement%20%28Preference%20to%20Make%20in%20India%29%20Order%2C%202017.pdf

[61] https://www.dcmsme.gov.in/schemes/listof358itemsreserved.pdf

4.72 In context of deployment of indigenous products by Telecom Service providers (TSPs) in respective networks, the Authority in TRAI's Recommendations of 2011 have recommended:

(a) *Preferential market access should be provided to the domestic manufactured products (comprising both Indian Manufactured Products and Indian Products) in procurement by the Government and Government Licencees (service providers both public and private)*

(b) *Government or Government licencee (service providers- both public and private) would be responsible for meeting the market access criterion even if the installation, maintenance and operations are outsourced*

(c) *The service provider procuring more than 10% of the market access requirement of telecom equipment in the form of Indian Manufactured Products should get a rebate equivalent to 10% of its licence fee for that year and the service provider procuring more than 20% of its telecom equipment requirement in the form of Indian Manufactured Products should get a rebate equivalent to 20% of its licence fee for that year. For the purpose of this recommendation licence fee does not include USOF contribution of 5% of AGR*

(d) *If a service provider is not able to meet the criteria of market access then it will deposit an amount equal to 5% of the shortfall in the value of the equipment in the Telecom Research fund or the Telecom Equipment Manufacturing Fund*

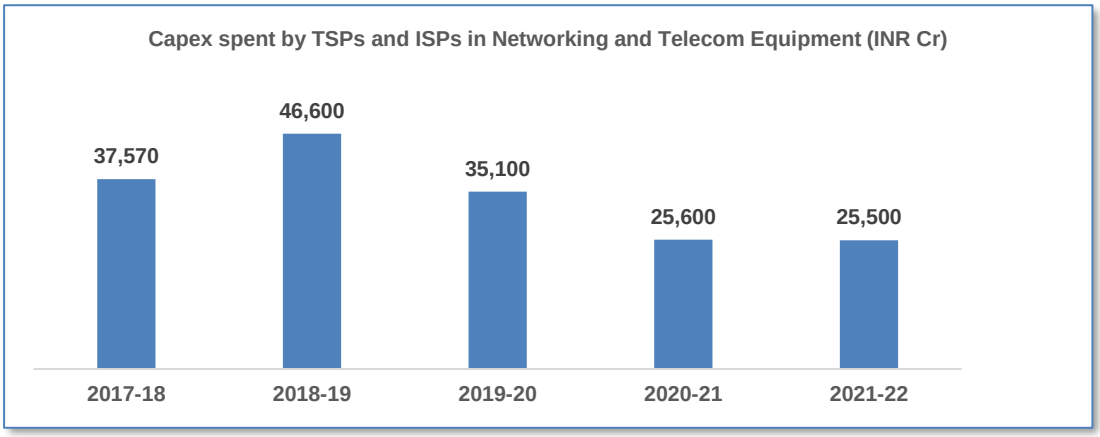
A re-emphasises on some of these aspects was also given in TRAI's Recommendations of 2018 where the Authority has recommended that *Telecom Service Providers should be incentivized for deploying indigenous telecom products, beyond the quantities to be mandated under the PMA, by giving them graded incentives.*

4.73 As shown in Fig. 4.5 above that the majority of NATE products are procured by Private TSPs but remains outside the purview of Preferential Market Access so far. At present, TSPs are focussing on

roll-out of 4G/ 5G services. As advanced communications technologies proliferate, terrestrial means of access are likely to be partially substituted by non-terrestrial means e.g. satellite based broadband communications services in coming years. The Authority views that mandating deployment of indigenous NATE products uniformly in all telecom networks by respective TSPs may lead to goal-displacement with respect to roll-out targets etc. Therefore, the Authority prefers the incentive route for gradual deployment of indigenous NATE products on progressive basis. This is likely to create much better collaboration and inter-working between manufacturers and the service providers.

4.74 Fig 4.6 below illustrates the minimum capital expenses made by 05 TSPs & 03 Internet Service Providers (ISPs) on year-to-year basis during 2017 to 2022 for NATE. It may be deduced that actual expenses would be higher than the amount illustrated below. Table 4.11 further indicates the major categories of telecom equipment deployed by TSPs in the last 05 years. Future trend towards capital expenses (as estimated) by TSPs/ISPs indicates that service providers would continue to make capital expenses focussing on some of the key areas: 5G roll-out, strengthening 4G services capacity nearly country-wise, fiber-based networks for broadband services, and satellite services.

Figure 4.6: Cumulative minimum capex spent by TSPs and ISPs from 2017 to 2022



Source: TRAI compilation based on data shared by 05 TSPs/ ISPs. Figure 2.10 was prepared using data on capital expenditures of TSPs and ISPs as shared by them with TRAI. The

cumulative yearly expenditures from 2017 to 2022 have been prepared using data on 5 TSPs and 3 leading ISPs for this period.

Table 4.11 Major categories of telecom equipment deployed by TSPs in the last 5 years

Product Categories	Product Description
Core Transmission Equipment	1.MME (Mobility Management Entity) 2.HSS (Home Subscriber Server) 3.TAS (Telecom Application Server) 4.Media Gateways 5.Cables
4G/5G, Next Generation RAN and Wireless Equipment	1.Baseband Unit 2.Radio Unit 3. Antenna
Access and CPE, IoT Access Devices & other wireless equipment	1.LTE CPEs 2.FWA (Fixed Wireless Access)
Enterprise Equipment	1.Routers 2.Switches

4.75 It would be a win-win position for the industry manufacturing and service sector to work together. The incentives to licensed service providers for deploying indigenous NATE in telecom networks would simultaneously lead to higher market access for NATEM players and expanding opportunities for further collaborations & innovations. Use of indigenous products (with high local content) when deployed in live-service networks would act as testimony to the overall market. This may expand manufacturing ecosystem, promote investments, generate additional employment while reducing consistent dependence on global supply chains. For service sector, goal of providing universal access to 'un-connected' at most affordable rates would be served. To make such a proposition more practical, certain minimum qualifying amount on annual aggregate basis should be prescribed.

4.76 One of the ways to incentivise any TSP is to give them rebate in license fee payment on value spent on procuring indigenous NATE products. This can be done by reducing on annual net basis, an amount equivalent to the aggregate certified value of indigenous NATE deployed in respective telecom networks during a year from Applicable Gross Revenue (Ap-GR). The Authority understands that in today's globalised world there will be very few products that can be said to be

completely manufactured in India. The PMA policy in its current form also recognises this principal and have therefore fixed product wise local value addition criterion for a product to qualify for PMA. The Authority is of the opinion that the same criterion can be extended for providing incentives to TSPs for local procurement. For those products for which the local value addition criterion has not been fixed in current PMA policy, they should qualify for claiming benefits if such products have local content of at least 50 % of its value. The Authority understands that settling such claims will require suitable submissions by TSPs and the formats for submitting periodic financial statements will require modifications in corresponding license authorization. There are hundreds of ISP licensees who operate on very small scale and have negligible subscriber base. Settling claims of few thousand rupees for such licensees will create problems of cross verifications. The overall impact of such small procurements will also be negligible on the intended policy outcomes. Therefore, the Authority is of the view that there is a need to introduce a minimum yearly threshold value of local NATE procurement for claiming this benefit. And therefore, the Authority is of the opinion that to claim this benefit, the licensee should procure at least Rs 1 Crore of such NATE equipment per financial year on all-India basis. To streamline the claim settlements, the Authority is also of the opinion that all such benefits should be claimed only once in a year in the last quarter of the financial year. A situation may arise, especially in new network rollouts, where the Applicable Gross revenues may be less than the total amount spent on procuring local NATE. In such cases the difference should be allowed to be carried forward for offsetting against Applicable Gross revenues of subsequent 3 years at the maximum. In order to actualise it, formats for submitting periodic financial statements in corresponding license authorization need to be modified appropriately.

4.77 The Authority is also of the opinion that in addition to Central Government & Bodies under its control, PMA/PMI should also apply

to all public procurements funded fully or partially by the Central Government under (i) USOF projects, (ii) Participating State Government & bodies under their respective control, and (iii) External Development projects aided by India.

4.78 **The Authority therefore recommends that**

(i) Applicable Gross Revenue[62] (Ap-GR) for a licensed service provider should be reduced on annual net basis, by an amount equivalent to the aggregate certified value of indigenous Networking & Telecom Equipment (NATE) deployed in respective telecom networks during a financial year.

(ii) For a claim to be qualified under this benefit, the product-wise local value addition criterion as specified in current PMA-PPI order, should be applicable. The products for which the local value addition criterion has not been fixed in current PMA policy should qualify for claiming benefits, if such products have local content of at least 50 % of its value.

(iii) To claim this benefit, the licensee should procure at least Rs 1 Crore of such NATE equipment per financial year on all-India basis.

(iv) Such benefits should be claimed by licensee only once in a year in the last quarter of the financial year.

(v) In cases where the Applicable Gross revenues may be less than the total amount spent on procuring local NATE, the difference should be allowed to be carried forward for offsetting against Applicable Gross revenues within three subsequent years.

[62] https://dot.gov.in/sites/default/files/Updated%20UL-AGREEMENT%20up%20to%2031%20Mar%2023.pdf

(vi) For settling such claims, suitable modifications should be made in the formats for submitting periodic financial statements in corresponding license authorization.

4.79 **The Authority also recommends that PMA/PMI should apply to all public procurements funded fully or partially by the Central Government under (i) USOF projects, (ii) Participating State Government & bodies under their respective control, and (iii) External Development projects aided by India.**

4.80 Turn-key or special projects, where public procurement norms cannot be followed completely, should be explicitly dealt with by the Committee constituted by DoT or escalated to Standing Committee of DPIIT. Deviations from Public Procurement Order, should not be permitted in case of turnkey or special projects by the competent authority. In rarest of rare cases, where any deviation is permitted, it should be published on DoT's website/portal for benefit of the entire industry.

4.81 In specific reference to Start-ups, M/o MSME vide Policy Circular[63] No. 1(2)(1)/2016-MA dated 10 March 2016 has clarified that *all Central Ministries/ Departments / Central public Sector Undertakings (CPSUs) may relax condition of prior turnover and prior experience with respect to MSEs in all public procurements subject to meeting of quality and technical specifications.* It is further clarified vide Ministry of Finance O.M.[64] dated 25 July 2016 that *all central Ministries/ Departments may relax condition of prior turnover and prior experience in public procurement to all Start-ups (whether MSE or otherwise) subject to meeting of quality and technical specifications in accordance with the relevant provisions of GFR, 2005.*

[63] https://dcmsme.gov.in/Office%20memorandom_10316.pdf

[64] https://doe.gov.in/sites/default/files/RelaxNorms_StarupMedEnterprise25072016_0.pdf

For purpose of the Government Schemes, Start-up, as defined[65] under 'Start Up India' means *an entity, incorporated or registered in India not prior to five years, with annual turnover not exceeding INR 25 crore in any preceding financial year, working towards innovation, development, deployment or commercialization of new products, processes or services driven by technology or intellectual property. Provided that such entity is not formed by splitting up, or reconstruction, of a business already in existence.*

These notifications already provide for relaxations to MSEs in terms of prior turnover and prior experience, subject to meeting of quality and technical specifications by such MSEs. Besides, registered MSEs and DPIIT's registered Start-ups are exempted from paying Earnest Money Deposit[66] (EMD). Further, MSEs are exempted[67] from paying for tender documents as well. This applies only to MSE manufacturers for goods and Service Providers for Services.

Besides, provision of exclusive market access to registered Start-ups/ MSEs i.e. by creating a Reserve List of innovative offerings catering to niche' market segment, can help reduce entry barriers for such entities. Those entities who can bring forth beneficially owned[68] resident IPRs may find it easier to make a mark. Since Reserve List[69] identifying 358 items is already notified by M/o MSME, suitable modifications could be proposed.

4.82 Keeping in view the discussions above, **the Authority recommends that**

[65] https://doe.gov.in/sites/default/files/RelaxNorms_StarupMedEnterprise25072016_0.pdf (Page 28)

[66] https://doe.gov.in/sites/default/files/Amendment%20to%20Rule%20170%28i%29%20of%20General%20Finance%20Rules%20-GFR%202017.pdf

[67] https://sisikolkata.gov.in/uploads/2021/03/schemes/Revised%20FAQs%20for%20PPP-MSE.pdf

[68] A beneficial owner is a person who enjoys the benefit of ownership even though the title to some form of property is in another name. Residency determines the application of territorial laws such as taxation.

[69] https://www.dcmsme.gov.in/schemes/listof358itemsreserved.pdf

(i) Deviations from Public Procurement Order, should not be permitted in case of turnkey or special projects by the competent authority. In rarest of rare cases, where any deviation is permitted, it should be published on DoT's website/portal for benefit of the entire industry.

(ii) On the lines of items reserved for Purchase from Micro and Small Enterprises (MSEs), DoT should specify a reserve list of NATE for niche market segment of such Start-ups *or* MSEs that have beneficially owned resident Intellectual Property Rights (IPRs). For the same, DoT should also devise a process to identify and register such start-ups or MSEs.

4.83 In reference to the stakeholders' concerns regarding deviation from DoT's Public Procurement Order on different grounds, TRAI's has earlier recommended in year 2018 that *a Nodal Officer should be appointed in DoT/TEC to look into the cases related to lack of implementation of Preferential Market Access (PMA) policy issued by DoT.* DoT has recently provided for Standard Operating Procedure (SOP)[70] to deal with such concerns/ specific complaints from stakeholders as Nodal Department. As per SOP, if local suppliers of telecom products, services or works have complaint against procurement process by any specified procuring entity, the same may be preferred before DoT Investment Promotion Cell in the specified proforma. DoT has already constituted a Committee chaired by Joint Secretary (Telecom) entrusted with vetting the restrictive and discriminating terms and conditions against domestic manufactures of telecom products, services and work. The Committee is normally scheduled to hold meeting on every 1st and 15th day of the month.

[70] https://dot.gov.in/sites/default/files/SOP-PPP-MII.pdf

4.84 As per SOP, the comments/feedback on the complaint are to be ascertained from the related Ministry under intimation to the procuring entity within 15 days. The comments or status thereafter is to be placed before this Committee. The Committee's decision after giving hearing opportunity to the entity is conveyed in a week's time to the related Ministry to seek Action Taken Report (ATR) upon it. In event of failure to provide ATR, DoT refers the issue to the Standing Committee of DIPP, as under Clause 16 and 17 of DIPP PPP-MII Order dated 28 August 2018. Efforts are being made to map the procedure to an Online Portal.

4.85 The Authority is of the view that to bring transparency in the entire process i.e. receipt of grievances, their handling and decisions thereof should be mapped to an online process using centralised portal. All cases that are handled through this portal should be publicly listed on regular basis. The Authority also agrees with the views of some of the stakeholders that invitation to bids prescribes certain limited number of days by which the completed bids are to be submitted. In the event of grievance relating to the live-tender, taking an appropriate decision with definite timeline is crucial. Therefore, in order to avoid potential complications, the best course is to adopt a definite timeline for deciding complaints related to PPP-MII order. Keeping in view that generally notice inviting bids for public procurement have 21 days timeline, the Committee's decision should be made known through the portal within 18 days of grievance received at the same portal. It would allow further operational time to the stakeholders to decide upon submission of bids on informed basis. Alternatively, if any violation is observed in the tender conditions by the Committee, such procurement should be immediately stopped. Taking urgent action is important in such cases.

4.86 **The Authority therefore recommends that DoT should –**

(i) Create an online portal for receiving, handling and disposal of complaints as outlined in Standard Operating Procedure. The proposed portal would enable ease of doing business and facilitate implementation of DoT's PPP-MIII Notification 2018.

(ii) Define fix timelines (say 18 days) for giving final decision by the Committee.

(iii) Each final decision relating to the grievance received should be invariably published online on the same portal for public-use.

IV. Range of financial and fiscal incentives needed beyond PLI

4.87 NATE manufacturing is essentially capital-intensive and products' commercial life span is becoming shorter. In such a scenario, insufficient availability of funds could be a major roadblock for rapidly evolving equipment ecosystem in the country. It has been observed that easy availability of capital, soft-loans, contract financing, and credit default insurance play crucial role towards promoting productivity across all manufacturing sectors. Even though telecom industry has been given infrastructure status in April 2013, still access to low-cost finance is not commensurate with sectoral requirements.

4.88 Earlier, TRAI vide its Recommendations in 2011 has recommended various financing options which included (i) access to debt-finance on easier credit terms to the manufacturers having annual turnover below Rs. 1000 Crore, (ii) creation of Telecom Manufacturing Fund (TMF) for providing venture capital, in the form of equity and soft loans to support pre- and post- commercialization product development.

4.89 The Authority vide its Recommendations in 2018 further recommended for creation of Telecom Research and Development Fund (TRDF) with initial corpus of Rs. 1000 Crore. Besides, it

recommended that DoT should co-ordinate with Ministry of Finance for making available the financing options including Venture Capital in Equity or Soft loans, in-line with practices in other export-oriented economies, towards indigenous telecom equipment manufacturers.

4.90 In 2015, MEITY has notified Electronic Development Fund[71] (EDF) as envisaged by National Policy on electronics (NPE). NPE proposes that EDF will be set-up as '*Fund of Funds'* to participate in '*Daughter Funds'*. The objective of the EDF policy is to support Daughter Funds including Early-Stage Angel Funds and Venture Funds in Electronics System Design and Manufacturing (ESDM), Nano-electronics and IT. It would provide risk capital to Start-ups in Electronic System Design and Manufacturing and IT, leading to creation or acquisition of numerous IPRs. The scope would include companies working in IoT, Robotics, Drones, Autonomous Cars, Health-tech, Cybersecurity, AI/ML, etc.

4.91 Given the generalised nature of EDF, it does not have exclusive focus for the Telecom sector, and it may not meet the specific requirements of R&D in Telecom and upcoming technologies like 5G, IOT etc. Therefore, the Authority in CP raised the following questions –

Q3. Does the Electronic Development Fund (EDF) meet the requirements of promoting NATEM in India? What are the limitations in EDF for the NATEM sector and how can its scope be enhanced?

Q4. Is there a need for creation of separate funds on lines of EDF or those earlier recommended by TRAI (like TEPF and TMPF) for promoting NATEM in India? What institutional mechanisms should be put in place to govern the fund(s)? Give justification and elaborate on its possible impact on the sector.

[71] https://www.meity.gov.in/writereaddata/files/Notification%20of%20Policy%20for%20EDF_English.pdf

4.92 The stakeholders have unanimously stated that EDF is focused on a wide array of interest areas in fields of Electronics System Design and Manufacturing (ESDM), Nano-electronics and IT. As such EDF cannot offer the precise focus that the NATEM ecosystem requires at present. Since the funds are not dedicated to Telecom sector, they are not sufficiently catering to venture funding requirements of creating a NATEM ecosystem in India. The criteria for selection of Daughter Fund by EDF includes superior investment returns (absolute and relative) and evidence of value creation through operational improvement, among others. Hence it is likely that the selected daughter funds may not be inclined in investing in nascent firms involved in R&D for development of cutting-edge technology as they have longer gestation period.

4.93 The stakeholders have stated that the NATE ecosystem at this point requires sectoral focus and specific funding to become competitive which is not suitably addressed by EDF because of the large, diversified interest areas that the fund caters to. The provision of grants or seed funding to Start-ups/SMEs would entail significant expenditure for the sector. In spite of various financing and incentivization schemes existing to promote electronics manufacturing, separate dedicated funds for financing and incentivizing design, development, and manufacturing of new-age NATE for 5G and other advanced communication technologies are required. The stakeholders have submitted that Telecom Product Funds may be disbursed in the following modes:

- Soft Loans: Soft-secured loans at concessional interest rates may be given to Indian Telecom Companies for developing Indian Products. The collaterals may be in the form of physical assets and IPR generated, which can be taken over by the Government in case of default.
- Interest Subsidies: Large sum of working capital will be required, at competitive rates, by Indian Telecom Companies for their

internal use and for providing long-term financing to customers (telecom operators). For such large requirements, the fund size will not be adequate, therefore these funds may be used to provide interest subsidy, while the actual lending may come from commercial banks.

- Equity: In the case of SMEs or telecom start-ups supported by Telecom specific EDF (TEDF), funds may be treated as an investment in the venture. Other variants of equity instruments such as convertible debentures may also be considered. All the investments might be as per prevailing Guidelines issued by the Securities & Exchange Board of India (SEBI). The typical investment horizon may be 5-8 years although lower periods may also be considered.
- Soft Loans/ Grants (in exceptional cases): R&D institutes and labs, telecom incubators, societies and Section 8 (Companies Act 2013) companies with telecom research and development focus may be provided Soft Loans/ Grants (in exceptional cases) for purchase of tools and equipment once the project proposal is approved.

4.94 The stakeholders have further stated that as 5G and futuristic technology infrastructure is going to be largely software driven (intangible asset), a separate fund for development of telecom related software may be conceptualized for the overall growth of the telecom & networking product ecosystem. It is pertinent to note that MEITY has introduced the National Policy on Software Products[72] in 2019 with the objective to create sustainable Indian software product industry. As envisaged, it is to be driven by intellectual property (IP) and scale up supplies by ten times to the Global Software product market by 2025.

[72] https://www.meity.gov.in/writereaddata/files/national_policy_on_software_products-2019.pdf

4.95 Some stakeholders have opined that the previous Recommendations of TRAI as released on 12 April 2011 whereby Telecom Research and Development Fund (TRDF), Telecom Research and Development Corporation (TRDC), and Telecom Manufacturing Fund (TMF) were recommended to be formed, has rightly comprehended the issues, thereby remains hugely relevant till date.

4.96 According to few stakeholders there are primarily three types of telecom products as mentioned below and depending on the type of product under consideration, funding support needs to be curated to fulfil the requirements in an efficient manner:

(a) Software based applications – Investment needed from 1 lakh to few crores.

(b) Software based products using Commercial, Off-The-Shelf (COTS) IT equipment: - Like 4G & 5G core. Investment needed is tens of crores & 2-3 years' time.

(c) Hardware based products like e-NodeB for 4G & New Radio for 5G – Hundreds of crores needed & minimum 4-5 Years' time.

4.97 A few stakeholders mentioned that a multi-pronged scheme incentivizing Indian R&D is required to address challenges faced by domestic telecom industry so that innovation, incubation and global scale operations can be supported. The stakeholders have outlined various key points for a proposed scheme as mentioned below -

(a) Under Innovation, the scheme should include
- R&D and Product development
- Creation of IPR and patents
- Soft Loans & Grants (exceptional cases)
- Common testing and standardization

(b) Under Incubation, it should include -
- Start-up/Risk Financing
- Incubation Centres, Accelerators, and Innovation labs
- Strengthen telecom entrepreneurship leadership and engineering capability, And

(c) Under scaling, it should include -

- Low interest, long-term funding for Indian Products
- Subsidies/incentives to overcome disabilities
- Promote success in India and also globally

Analysis Of the Issue and Authority's View

4.98 TRAI recommendations of 2011 have addressed funding requirements for telecom sector. The relevant recommendations are as under:

(a) The Recommendations strongly focused on creation of funds to cater to the requirement of local players and upcoming entrepreneurs. TRAI stated that *'TRDC should set up Telecom Research and Development Fund (TRDF) with a corpus of Rs 10,000 crore which should be invested in secure deposits and bonds and the interest accruals should be used for financing R&D projects.'* The Recommendations cited the need to create a formation of a Telecom Research and Development Corporation (TRDC) and Telecom Manufacturing Fund (TMF) for providing venture capital to indigenous manufacturing.

(b) The Authority has also recommended identification of ten telecom manufacturing clusters to promote the TEM and stated that *'A Telecom Research and Development Park should be established with the purpose of facilitating research, innovation, IPR creation and commercialisation for fast and sustainable growth of the telecom industry'.*

(c) Recommended the Telecom Entrepreneurial Promotion Fund (TEPF) and Telecom Manufacturing Promotion Fund (TMPF) so that issues relating to private sector participation in the manufacturing and market access for indigenous telecom equipment can be addressed effectively.

4.99 TRAI's Recommendations of 2018 have reiterated setting up of TEPF and TMPF to address issues relating to private sector participation and market access for indigenous products, as given below:

For promoting research, innovation, standardization, design, testing, certification and manufacturing indigenous telecom equipment, Telecom Research and Development Fund (TRDF), with initial corpus of Rs. 1000 Crore, should be created. Subsequently, setting up of Telecom Entrepreneurial Promotion Fund and Telecom Manufacturing Promotion Fund should also be considered so that issues relating to private sector participation in the manufacturing of indigenous telecom equipments and market access for indigenous telecom equipments can be addressed effectively.

4.100 The Authority in recommendations on '*Promoting Local Telecom Equipment Manufacturing'* dated 3 August 2018 has recommended that *'DoT should coordinate with Ministry of Finance for making available the following financing options, in line with the practices followed by other export-oriented economies, to indigenous telecom equipment manufacturers:*

(i) Venture capital in the form of equity and soft loans.
(ii) Project finance.
(iii) Contract financing options.
(iv) Credit default insurance.'

DoT has informed TRAI that the Digital Communication Commission's (DCC) while considering the said recommendations, has asked to seek further details from TRAI on the same. To start with, the above financing options have been discussed first.

4.101 Venture Capital (VC) takes the form of equity, conventional loans, conditional loans, and convertible loans. It fulfils the financing requirements in cases where high-potential idea under-development may bring potential business, but the developer itself has no sufficient finances to invest. In view of risks involved and lack of proven track record, regular credit institutions may not be ready to assume risk under their lending policies. In most cases, venture capitalist would

provide financial support in return of equity-shareholding (as beneficial owner). Debt-option is less used as the receiver entity (debtor) may not have sufficient asset-valuation to bear debt-related obligations.

4.102 A venture capital fund may be set up either by a company or by a trust and gets registered with SEBI to raise resources beyond minimum initial commitment of Rs. 5 Crore. In order to regulate overseas participation, SEBI has notified *Foreign Venture Capital Investor Regulations*. As venture capital business model is risk-prone, certain tax benefits are permitted such as capital gains on account of equity holdings. The Authority has examined some of the existing Government initiatives on making available venture capital.

4.103 **Electronics Development Fund (EDF) -** The objective of the EDF policy is to support Daughter Funds including Early-Stage Angel Funds and Venture Funds in the area of Electronics System Design and Manufacturing, Nano-electronics and IT. Any Daughter Fund which is registered in India and abides with relevant rules and regulations including the SEBI regulations on Venture Funds and is set up to achieve the objectives envisaged for EDF will be eligible for support from the EDF. In the ESDM sector, the EDF participation in Venture Capital Funds shall be available across the value chain of ESDM sector and its ecosystem including fabless semiconductor start-ups, research & development, the materials technologies required for electronic devices, design and manufacturing and product design. This fund is foreseen to act as a catalyst to attract private venture fund investors to such Daughter Funds. MEITY is the anchor investor of EDF. As per MEITY Annual Report[73] 2022-23, EDF has drawn Rs. 217.24 Crore from its contributors, which includes Rs. 210.33 Crore from MEITY. The total targeted corpus of 8 Daughter Funds under EDF is Rs. 2,176 Crore and the current commitment by EDF to these

[73] https://www.meity.gov.in/writereaddata/files/AR_2022-23_English_24-04-23.pdf (Page 76)

Daughter Funds is Rs. 271.30 Crore. As on 30 September 2022, EDF has invested Rs. 238.50 Crore in eight Daughter Funds, which in turn have made total investments of Rs. 1227 Crore in 128 Ventures/Start-ups. Total Funds raised by the supported Start-ups of the Daughter Funds (of EDF) are approximately Rs. 16,000 Crore. The supported Start-ups and companies are majorly working in IoT, Robotics, Drones, Autonomous Cars, Health-tech, Cyber security, Artificial Intelligence / Machine Learning etc. Thus, opportunity for venture capital-based funding through EDF for NATE Start-ups exists in-principle. However, supporting Venture Capital in telecom sector has remained limited so far. The Authority finds the EDF has been fairly successful in achieving its objective. The Authority is of the view that EDF like structure to support venture capital availability is highly suitable for imitating for NATE sector as well.

4.104 **Fund of Funds for Start-ups (FFS)** - In addition to EDF there is also Fund of Funds for Start-ups (FFS) which was approved and established in 2016 with a corpus of Rs 10,000 crore. FFS is to provide much-needed boost to the Indian Start-up ecosystem and enable access to domestic capital. The Scheme does not directly invest in Start-ups. Under FFS, capital is provided to SEBI-registered Alternative Investment Funds (AIFs), known as daughter funds, who in turn invest money in growing Indian Start-ups through equity and equity-linked instruments. The fund of funds makes downstream investments in venture capital and alternative investment funds that in turn invest in Start-ups[74]. The fund has been formed in a way that creates a catalysing effect. Funding is provided to Start-ups across different life cycles. FFS is operated by Small Industries Development Bank of India (SIDBI) through selection of suitable daughter funds and overseeing the disbursal of committed capital.

[74] https://www.startupindia.gov.in/content/sih/en/funding.html

4.105 **Software Product Development Fund (SPDF)** - Apart from EDF and FFS, the Software Product Development Fund (SPDF) works for the growth of the Software Product Ecosystem (SPE). It works beyond the scope of EDF and FFS to fulfil the gaps left by these funds. SPDF participates in venture fund to provide risk capital so as to promote scaling up of market ready Software Products. The fund was created with a vision to fill the gap between the capital requirements of technology and knowledge-based software product Start-ups enterprises and funding available from traditional institutional lenders such as banks. The scheme was envisaged to create a corpus of Rs. 5000 Crore with an end target to have at latest 100 Indian software product companies having valuation of Rs. 500 Crore or employing 200 persons. The Authority is of the view that similar requirement exists in telecom software domain within NATEM sector as early seed funding requirements of new age Start-ups/MSEs specialising in telecom software is relatively higher at the initial stages of development.

4.106 MEITY administers another Scheme that focuses on funding Accelerators for Start-ups i.e. ***Start-up Accelerators of MeitY for Product Innovation, Development and Growth*** **(SAMRIDH) Scheme**. This Scheme has collaborated with Venture capital enterprises such as LetsVenture. Other initiatives from MEITY also include Technology Incubation and Development of Entrepreneurs (TIDE) and TIDE 2.0.

4.107 As NATE sector is based on rapidly evolving cutting-edge technology, innovation yields commercial results only when the prototype/product is good enough for the contemporary requirements and meet international specifications. Associated entities face the resource gap in two key stages, (i) achieving proof of concept or demonstration of Minimum Viable Product (MVP), and (ii) scaling up the proven prototype to the stage of industrial production.

Therefore, such entities need access to a funding mechanism which could make fast techno-commercial assessments and take calculated risks.

4.108 Though EDF might have been effective in promoting innovation, technological development, and assisting start-ups for electronic equipment, the Authority agrees with the stakeholders' view that EDF does not comprehensively cater to the requirement of the OEMs of Telecom and Networking equipment at present. There is a requirement of creating separate/earmarked sectoral funds for financing and incentivizing design, development, and manufacturing of new-age NATE for 5G and futuristic technologies. Such fund along with proper administration for its disbursal can give a boost to domestic manufacturing. The investment in R&D is risk-prone, has a longer gestation period and low Return of Investment (ROI) in the initial stage. However, continued investment in R&D is the only full proof way of ensuring NATE ecosystem in India becomes agile and dynamic. Two-fold approach should be attempted, (i) Government backed venture capital fund to promote development of firms engaged in products with longer gestation period, and (ii) promoting private investment in R&D activities through faster commercialization of products. To that effect a specialized telecom R&D corpus may be carved out of EDF. Given the dynamic and extremely price competitive nature of NATEM, the dedicated funds would provide the domestic manufacturers incentives to invest in R&D. Since the Authority is initiating a parallel consultation process focussed on R&D and associated issues for NATE, the Authority is not making any recommendations in this regard here.

4.109 The Telecom Bill, 2022 envisages to replace the Universal Service Obligation Fund (USOF) with the Telecommunication Technology Development Fund (TTDF). The USOF has the prime objective of aiding and expanding rural connectivity. TTDF is envisaged with an

objective to boost connectivity in underserved urban areas, R&D, skill development, etc. However, the Authority feels that only one fund may not be sufficient to cater to diverse requirements of the sector, and hence, specific funds with exclusive focus are required for NATE. The Authority also opines that the approach of MEITY for creating different specific funds with streamlined and focused objectives has been widely successful in the past few years. DoT can take advantage of MEITY's prior experience of establishing EDF and other daughter funds for an overall benefit to NATEM. Funds with generalised set of purposes often do not achieve the goals in a systematic time bound manner.

4.110 **The Authority therefore recommends that on lines of Electronic Development Fund (EDF), a fund of funds should be created with a corpus of Rs 10,000 crore with objective to exclusively focus on promotion of NATEM in India. The fund is hereinafter referred to as Networking and Telecom Equipment Development Fund (NATEDF). For operationalizing this fund, DoT should take advantage of MEITY's prior experience in establishing EDF.**

4.111 The question then arises is - who will manage this fund? The Authority has observed that CANBANK Venture Capital Funds Ltd. (CVCFL) a subsidiary of Canara Bank, is the Fund Manager for EDF. The Authority is of the opinion that a similar arrangement where an agency that has ample of experience of financial sector, should be entrusted with the responsibility of administrating the proposed NATEDF.

4.112 **The Authority therefore recommends that suitable financial institution may be identified/created for managing and administering NATEDF.**

4.113 Here Authority would also like to delve upon action taken by DoT on one of TRAI's earlier recommendations. TRAI in 2018 Recommendations, had recommended:

Establishment of multidisciplinary Telecommunications Equipment Development Board (TEDB) for faster and coordinated decisions related to funding of and incentives for design, development, and manufacturing of telecommunications equipment in the country. It should be responsible for facilitating innovation, R&D, testing & certification, and manufacturing in the telecom sector in the country TEDB would be responsible for administration and disbursal of funds from TRDF.

On these recommendations, vide DoT letter no. 18-09/2018-IP dated 24th August 2021, it has been conveyed that Digital Communications Commission (DCC) is of the view that C-DoT is already working with this mandate and has recommended to seek TRAI's suggestions on further improvement in this matter.

4.114 The Authority takes note that C-DoT is a registered society under Societies Registration Act and is also registered with DSIR as 'Public Funded Research Institution'. While C-DoT's role in indigenous product/ equipment development in telecom sector has been phenomenal, assigning multi-functional administrative role of co-ordination, monitoring, disbursal of funds for undertaking design, development & manufacturing of telecommunication equipment by multiple different entities of varying attributes (ranging from industry, academia, and research & development), poses direct conflict of interest. The Authority foresees a serious principle-agent conflict in assigning such a role to C-DoT. Moreover, acceptability of C-DoT in dual role by the market/ industry is a potential challenge. An R&D institution who also seeks funds from Government, if involved with administrative roles such as fund disbursal, would pose another challenge "of keeping arms' length distance" between

these roles in pursuit of corporate governance at all times. Moreover, it may affect C-DoT's role/participation at institutional forums such as European Technical Standards Institute (ETSI), 3rd Generation Partnership Project (3GPP), oneM2M initiative, Asia Pacific Network Information Centre (APNIC), Open Networking Foundation (ONF) etc.

4.115 As per Authority's recommendations dated 3 August 2018, TEDB would be responsible for administration and disbursal of funds from TRDF. The Authority vide letter dated 26 April 2021 had already reiterated that the responsibility of disbursing and administering funds from TRDF cannot be given to an organization which itself is involved in R&D and, therefore is one of the stakeholders. The Authority foresees a serious principle-agent conflict in assigning such a role to C-DoT. Further, the mandate of C-DOT does not empower it to administer and disburse R&D funds. TRAI had in very clear terms re-iterated to DoT vide TRAI letter No. R-14/(1)2021-BBPA-Part(1) dated 22 October 2021 (Copy enclosed at **Annexure-III**) that DoT should, consider TRAI's recommendation and constitute a Telecom Research & Development fund (TRDF) with initial corpus of Rs. 1000 Crore and also constitute multidisciplinary Telecommunication Equipment Development Board (TEDB) who would be responsible for administration and disbursal of funds from TRDF.

4.116 The Authority has noted that in the meantime, Telecom Technology Development Fund (TTDF) has been setup under Universal Services Obligation Fund (USOF) of DOT, Government of India to promote the ecosystem for research, design, prototyping, proof of concept testing, IPR creation, field testing, security, certification and manufacturing of products etc. in telecommunication field[75]. The guidelines[76] for the scheme mentions that '*Apart from the existing R&D funding mechanisms, annual collections under the Universal Service Obligation*

[75] https://usof.gov.in/en/ttdf-proposal-2023

[76] https://usof.gov.in/web_assets/img/ttdf_guidelines.pdf

Fund (USOF) will also be utilized by the Department of Telecommunications (DoT) for funding research and development of technologies, products and services for the purpose of providing telecom services in rural and remote areas. An allocation of 5% of annual collections from USOF will be available for funding R&D in the Telecom sector, starting with the funds collected in the financial year 2021-22.' For TTDF, C-DOT is an Implementation Agency (IA) that will implement the Scheme on behalf of USOF/DoT for technology intensive projects which are generally above Technology Readiness Level (TRL) 3 and with funding requirement of more than Rs. 10 Crore.

4.117 In view of aforesaid, the Authority, recommends that **on lines of the Technology Development Board (TDB), working under the Chairmanship of Secretary, Department of Science and Technology, Government of India, a multidisciplinary Telecommunication Equipment Development Board (TEDB) should be constituted in the DoT, for faster and coordinated decisions relating to funding of incentives for design, development and manufacturing of telecommunication equipment in the country. It should be responsible for facilitating innovation, R&D, testing and certification and manufacturing in the telecom sector in the country. This board would be responsible for administration and disbursal of funds from TRDF as well as TTDF. Immediate corrective action may be taken to withdraw any such related responsibility from C-DOT to avoid conflict of interest.**

4.118 It is felt that in absence of proper institutional mechanisms and monitoring, modest progress has been made on Recommendations given by Authority in 2011 and 2018. As envisaged in NDCP-2018, if India's contribution to global value chains is to be maximized, by focusing on domestic production, increasing exports and reducing the import burden then several parallel initiatives need to be taken.

As has been discussed in the CP also, there are many issues involved in Promoting Local Telecom Equipment Manufacturing and TRAI recommendations of 2011 and 2018 on the subject have dealt with them in detail. Promoting telecom equipment manufacturing in India would entail many issues that need to be addressed simultaneously, inter-alia, including the following:

(i) Steps to promote R&D.

(ii) Providing funds for R&D and Developing R&D parks.

(iii) Putting in mechanisms to develop skillsets.

(iv) Address issues related to Patent framework like Rights & obligations of SEP holders.

(v) Dispute resolution.

(vi) Promoting Incubation Centres.

(vii) Addressing issues related to Testing & Certification.

(viii) Ensuring availability of Component ecosystem and setting up cutting edge technology fab facility.

(ix) Creating funds for promoting manufacturing and entrepreneurial activities and providing various fiscal and non-fiscal incentives.

(x) Creating Infrastructure for facilitating manufacturing like tech parks and extending incentives for creation of such infrastructure/manufacturing facilities.

(xi) Addressing issues related to power availability and pricing.

(xii) Implementation, monitoring and periodic review of PMA policy.

(xiii) Addressing issues arising out of Free Trade Agreements (FTAs)/Information Technology Agreements (ITAs).

(xiv) Announcing Incentive Schemes for telecom equipment parts.

(xv) Addressing Ease of doing business issues including expediting clearances, review all compliances requirements.

(xvi) Promote deployment of indigenous products in other countries through incentivizing system integrators.

(xvii) Showcase make in India startups & their products in international events and

(xviii) Upgrading the manufacturing PSUs under DoT to effectively harness strategic and operational synergies etc.

4.119 Realizing the importance of time bound and focused approach on various aspects of planning, policy formulation, implementation, monitoring and development of whole ecosystem for manufacturing in telecom sector, the Authority has maintained that a separate and dedicated unit in DoT is required. Accordingly, the Authority in 2018 had recommended *"The progress of indigenous telecommunication equipment manufacturing in the country should be monitored in Department of Telecommunications (DoT) at least at the level of Member, Telecom Commission. For time bound progress, a dedicated unit in DoT should be made responsible for facilitation and monitoring of telecommunication equipment design, development, and manufacturing in the country".*

4.120 The recommendation of the Authority is yet to be implemented. It is felt that in absence of proper institutional mechanisms and monitoring, modest progress has been made on recommendations given by Authority in 2011 and 2018. In this regard, the Authority has also written in detail to DoT vide its letter dated No. R-14/(1)2021-BBPA-Part(1)dated 22 October 2021 (at **Annexure-III**). In the letter attention of DoT was drawn towards the approach followed by certain other Ministries/ Department such as Ministry of Electronics and Information Technology and Department of Pharmaceutical, that have shown progressive results in the direction of Make in India initiatives. For example, in MEITY, there are various officers at Additional Secretary and Joint Secretary level who look after various aspects related to local electronic equipment manufacturing as has been detailed in table below:

Sr	Level of officer	Handles work related to
1	Addl Secretary rank	Standards and interoperability
2	JS level	Electronic Hardware and semiconductor FAB

3	JS level	Software industry promotion
4	JS level	R&D in electronics
5	JS level	R&D in convergence and public broadband access, Wi-Fi, 5G
6	JS level	R&D in Information Technology and look after various skills development initiatives

In addition, there are autonomous bodies like Software Technology Park of India (STPI) who are working on establishment and promotion of incubation centers and, Standardisation Testing and Quality Certification (STQC) Directorate that is working on standardization, testing and quality certification.

4.121 Similarly, in the Department of Pharmaceutical there is a unit Pharma Bureau which is a separate unit which looks after investments in Pharmaceutical and medical devices and is an interface of the Department of Pharmaceutical with industry. It also coordinates with concerned Ministries of Central Government and State Government thus facilitating local manufacturing in the Pharma sector.

4.122 Formation of a separate dedicated unit will not only provide a single point interface with the industry in the respective domain but will also help in fast-tracking decisions and coordination between the Central Government and State Governments. The dedicated unit in DoT will facilitate clearly defined strategies, stakeholder interactions focused on understanding & resolving industry wide issues, identifying policies that will unlock investment potential in sectors, pitching existing opportunities, exploring new projects/proposals, monitoring, and coordination for Atmanirbhar Bharat initiatives etc. The Authority is of the opinion that a dedicated unit in DoT should be formed and should be headed at least at the level of Member, Digital Communication Commission (DCC) as it used to be a few years ago.

4.123 **The Authority, therefore, re-iterates its earlier recommendation of 2018 that "*the progress of indigenous telecommunication equipment manufacturing in the country should be monitored in Department of Telecommunications (DoT) at least at the level of Member, Telecom Commission. For time bound progress, a dedicated unit in DoT should be made responsible for facilitation and monitoring of telecommunication equipment design, development, and manufacturing in the country*".**

Effectiveness of existing schemes relating to Capital Expenses (CAPEX) and Interest Subvention

4.124 Incentives linked to Capital Expenses (CAPEX) have a crucial role in strengthening the positions of relatively new enterprises in the market. Incentive schemes offered to cater to the initial capital can improve the strategic position and fuel market growth for the industries especially for NATE sector as CAPEX required is significantly high. To address this, certain Schemes, primarily for ESDM, have been implemented by MEITY from time to time.

4.125 One of the earliest scheme *Modified Special Incentive Package Scheme* (M-SIPS) was notified by MEITY in July 2012 to promote large scale manufacturing in the country. M-SIPS provided for incentive for investments on capital expenditure, (i) up to 20% for investments in Special Economic Zones (SEZs) and (ii) up to 25% in non-SEZs. This was envisaged to offset cost disability and attract investments in Electronics System Design and Manufacturing (ESDM) industry. Hence, it was open to both greenfield and brownfield investments in about 44 categories including telecom equipment (raw materials including assembly, testing, packaging and accessories, chips, components). Minimum investment threshold varied for each product category/ vertical (from Rs 1 crore for manufacturing of accessories

to Rs 5000 crores for memory semiconductor wafer fabrication unit. Revisions in M-SIPS were made in 2015 & 2017 and Applications were closed at completion of its 5-year tenure.

4.126 In April 2020, MEITY notified *Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors* (SPECS) with an aim to strengthen the manufacturing ecosystem for electronic components and semiconductors by providing a Capex incentive of 25 % on units manufacturing electronic components, semiconductor/ display fabrication units, and capital goods. However, telecom specific equipment has remained largely uncovered.

4.127 In December 2021, comprehensive program for development of a sustainable semiconductor and display ecosystem has been approved to deal with setting up of (i) semiconductor & display fabs, (ii) compound semiconductors, silicon photonics, sensors fabs, Semiconductor ATMP & OSAT units, (iii) semiconductor design companies, (iv) modernisation of Semiconductor Lab (SCL) and (v) India Semiconductor Mission (ISM).

4.128 Under the *Interest Subvention Scheme,* a subsidy or rebate in the rate of interest on the loans is extended by financial institutions and subsidy is borne by the Government to promote the industry. RBI has introduced such a scheme for MSMEs where relief up to 2% interest rate could be availed on term loans extended by banks.

4.129 NATE manufacturing requires diverse set of components, devices, chemicals, packaging etc. which are sourced from dedicated MSME units. Given this opportunity, MSME faces competition from established players in high technology industry and limited credit facilities. Some of the MSME scheme relevant to telecom sector include

(i) *Technology Incubation and Development of Entrepreneurs* (TIDE) - for setting up/strengthening technology incubation centres

(ii) *SIDBI Make in India Soft Loan Fund* (SMILE)

(iii) *Assistance to re-energize capital investments by SMEs*(ARISE)

(iv) UBHARTE SITAARE programme

4.130 In order to ascertain efficacy of such Capex and Interest subvention schemes for NATE manufacturing or there is a need for scheme dedicated to telecom sector, the Authority has raised the following questions –

Q7. Whether the existing schemes relating on CAPEX and interest subvention are meeting the requirement of finance for NATEM in India.? Suggest modifications/ new schemes needed if any with details.

Q8. Whether the existing financial assistance for MSMEs that are into NATEM are sufficiently catering to their requirement or a separate dedicated scheme is required for the sector? Please provide a detailed response along with suggested schemes if any.

4.131 Stakeholders have submitted that the Government of India launched the *Modified Special Incentive Package Scheme* (MSIPS) in 2012 to promote large-scale manufacturing in the country and attract investments in Electronics System Design and Manufacturing Industries. The scheme provides a capital expenditure subsidy of 20-25%. However, the disbursement has witnessed significant delay on account of the lack of transparency and arbitrary clauses introduced in the process. There was also certain inefficiency in the existing M-SIPS process as is evident from the Standing Committee Report on Information Technology, which states that as of 10 March 2021 MEITY had approved investment proposals worth Rs. 81,1262 Crore (FY 2012-21). Incentives worth only Rs. 1,072 Crore have been

disbursed, just about 12.5% of the committed incentives of Rs. 8,593 Crore.

4.132 In view of the shortfall in the existing Scheme, certain improvements have been outlined by the stakeholders for success of the Scheme such as (i) guidelines should not be amended once the applications are filed for a scheme, (ii) they should be strictly adhered to in a timely manner. They also called for larger transparency and publishing of disbursement records in public domain on quarterly basis. Additionally, a financial incentive of up to 50 % on capital expenditure for the identified list of NATE for both new units and expansion of capacity/ modernization and diversification of existing units has been suggested.

4.133 A few Stakeholders have stated that fiscal support/incentives for every part of the supply chain including electronic components, subassemblies and finished goods should be announced. Financial support from the Government can be offered, including Grant-in-Aid, Viability Gap Funding in the form of Equity and/or Long-Term Interest-Free Loan, tax incentives, and infrastructure support, among others. Interest subvention schemes, allowing a subsidy in the rate of interest on the loans, can be extended by financial institutions and subsidies may be borne by the Government to promote the industry. It has been suggested that Interest subvention schemes can play a significant role in supporting the domestic equipment manufacturer to stay competitive in the domestic and global market and enjoy a level playing field against foreign manufacturers. Government may consider co-investing via joint ventures or technology transfer to bring mid-size component manufacturers to next market level. It may also provide tax incentives to Start-ups to enable favourable pricing.

4.134 A couple of stakeholders have submitted that Indian manufacturing companies in general are unable to use the existing schemes relating

to Capital Expenses (CAPEX) and interest subvention. Some of the schemes are also counter-productive due to the ways in which these have been implemented. Schemes that extend concessional credit, provide exemption from payment of Earnest Money Deposit, facilitate Bank Guarantees and Price preference to MSME remain un-attentive to the fact that MSME could be only promoting a Multi-National Corporation (MNC) product (in the domestic market). In other words, domestic entity may indirectly support overseas-business just by bringing trade-in goods into the domestic market. Stakeholders have submitted that many Chinese products like cameras, phones, switches are sold by MSME or Small Industries. They have expressed that instead of local value addition, only the assembling happens in India which is counter-productive in the long run. It is therefore essential to focus on MSMEs that are indeed manufacturing telecom and network related equipment or adding significant process value in the country itself.

4.135 Some stakeholders have further submitted that CAPEX needs to be extended to

- Test systems development
- Hardware product design
- Product engineering and evaluation.
- Supporting ancillary industries providing part-materials to NATEM manufacturers such as metal enclosures, aluminium

  die-castings used as enclosures for housing/heat sinks and moulded engineering plastics used as enclosures in NATEM products and Customer premises equipment.

4.136 Some stakeholders have suggested that MSMEs should be supported by System Integrators in order to compete with large foreign firms System Integrator (SI) is a business entity that collaborates with multiple manufacturing entities including MSMEs to integrate

various part- supplies as one industrial solution. System Integrator better understands end-to-end business requirements and adapts faster to technological trends. Therefore, SI can orient the MSMEs to adopt contemporary ways of manufacturing such as Industry 4.0 for improving competitiveness and business agility. It is also suggested that Special provisions are needed for telecom sector whereby procurement officer/TSPs asks System Integrator to give committed preference to MSME products.

4.137 It has been further suggested that telecom sector is included in Emergency Credit Line Guarantee Scheme (ECLGS 2.0 & 3.0), as announced for twenty-six sectors, or various other relief schemes announced by the Government.

Analysis of the Issue and Authority's View

4.138 In addition to M-SIPS, various other Schemes to aid domestic Electronics manufacturing are on-going under the Central Government. A brief about these Schemes is mentioned in Table 4.12 below:

Table 4.12 Capital-support Schemes for Electronics Manufacturing by Central Government

Scheme	Focus & extent of support	Features
Electronics Manufacturing Cluster (EMC, EMC 2.0)	• Capital support for establishment of Electronics Manufacturing Cluster (or expansion of EMC or established of Common facility Centre-CFC). • For Green field EMC- up to 50% of For Brownfield EMC- up to 75 % for CFC • EMC 2.0 further mandates presence of Anchor Units i.e. units taking in at least 20% of cluster-land and investing over Rs. 300 Crore	• Central support towards EMC/CFC at cluster-level is provided through Nodal- PMA & State-wise PIAs for land acquisition/development etc. Capital support for land-allocation in EMC at entity-level eventually depends upon State-level incentives as well. • For example, in case of Karnataka, capital support at entity-level may include 25% of cost of Fixed Asset created, with maximum size of 50-acre beyond Bengaluru, if resourced through Government Agency. It is capped at Rs. 12.5 Crore (equivalent to Rs. 25 lakh /acre) for 50-acre land-plot in EMC.

Scheme for Promotion of Manufacturing of Electronic Components & Semiconductors (SPECS)[77]	• Capital support towards Plant & Machinery (including R&D, Transfer of Technology, Sensor Fabs, ATMP, OSAT & e-Waste Re-cycler). Permits imported machinery with minimum Residual life of 05 years • Upto 25% of capital expenses are supported for identified list of electronic goods.	• Provides for graded investment window as per product-line, ranging from Rs. 5 Crore to Rs. 1000 Crore. • Specified goods have downstream production value.
Modified Programme for Semiconductors etc. and Display Fab	• Capital Support for Plant & Machinery relating to Semiconductor fabs, Display Fab, Compound Semiconductors, ATMP, OSAT • Up to 50% on pari-passu basis for all technology nodes under Scheme for Setting up of Semiconductor Fabs in India.	• Targets more Capital-intensive initiatives. However, beneficiary under SPECS would be non-eligible.

4.139 Respective States in the country also provide for limited Capital support towards electronics manufacturing (in the State territory) as per their respective Industrial policy/ Electronics Manufacturing policy/ ESDM or Semiconductor policy. A brief status for a few States is given in Table 4.13 below:

Table 4.13 Capital-support & Interest Subvention Schemes for Electronics Manufacturing by a few State Governments

State	Capital expenses support	Interest Support
Gujarat	Capex subsidy on Plant, Machinery, Equipment, associated Utilities & Construction costs within 02 years of operations commencement. **i)** Upto 20% of Eligible Capex, capped at Rs. 200 Cr for Capex < Rs. 1000 Cr. **ii)** Upto 15 % of Eligible Capex for Capex> Rs. 1000 Cr. Special Incentive under Semiconductor Policy: 75 % subsidy upto 200 acre (EMC/ CFC) at Dholera Special Investment Region.	Up to 7% on Term loan, Capped at Rs. 10 Cr/annum, for 05 years (2% min interest rate to be borne)

77 https://www.meity.gov.in/writereaddata/files/scheme_for_promotion_of_manufacturing_of_electronic_components_and_semiconductors.pdf

State	Capital expenses support	Interest Support
Karnataka	**i)** Under Special Incentive, up to 25% (of Fixed Asset created) capex-support for land -max size upto 50 acre, in areas beyond Bengaluru (Urban & Rural) if land taken thru' Govt Agency. Capped at Rs. 12.5 Cr. (~Rs. 25 Lakh/acre subsidy). All duties/ levies are excluded. **ii)** Up to 20% of Eligible Capital Expense on Plant & Machinery Under ESDM Policy **iii)** Up to 10% Capex subsidy for first two Anchor Unit in each EMC, Capped at Rs. 10 Cr/unit where land, building, Plant & Machinery cost are included. MSME/ Start-Up are excluded. **iv)** For Plant, Machinery, Equipment, associated Utilities & Construction costs within 02 years of operations commencement-- - Up to 20% of Eligible Capex, capped at Rs. 200 Cr for Capex < Rs. 1000 Cr. - Up to 15 % of Eligible Capex for Capex> Rs. 1000 Cr.	for MSME – Up to 6%, Cap at Rs. 10 lakh/ year for 08 years whenever it does not exceed net SGST paid in the corresponding year
Haryana	**i)** Up to 50% top up of Capex support from MEITY under M-SIPS for first 10 Anchor unit, Capped at Rs. 10 Crore/unit. Anchor Unit: Min investment Rs. 100 Crore. 7 setting-up with at least 05 vendor units in the same Cluster. **ii)** Special package possible for Mega- and Ultra Mega – projects.	For MSME – Up to 6%, Capped at Rs. 10 lakh/ year for 08 years whenever it does not exceed net SGST paid in the corresponding year
Telangana	**i)** Investment support up to 20%, capped at Rs. 2 Crore for the 25 eligible companies in Medium, Large and Mega categories AND up to Rs. 50 Lakhs for the first 50 eligible companies in MSE category **ii)** Special Incentive for Mobile manufacturing land without infrastructure cost considering to "Anchor Unit". Total 10 such units will be considered for allocation of land on cost basis	Up to 5.25 % on Term loan for 05 years (Cap at Rs. 1 Crore/unit/annum)
Tamil Nadu	**i)** Capital support based on Investment Range & Location for New/Expanded unit: - For Rs. 200 to 500 Cr– subsidy at 15 %, 20%, 25 % depending upon Districts – A, B or C. - For > Rs. 500 Cr, subsidy is enhanced to 18%, 24 % & 30 % respectively.	Up to 5% on Term loan for 06 years (Cap at Rs. 0.2 Crore/Large unit/annum)

State	Capital expenses support	Interest Support
Maharashtra	Special Incentives for fab units: 10 % (max 15 % capital subsidy) based on Investment range, qualifying under M-SIPS/ SPECS	Up to 5% ; room for higher for MSME units
Uttar Pradesh	Capital support to ESDM units based on Investment Range & Location: **(i)** 15 % subsidy for Fixed Capital Investment, FIC (exc land, bldg.) Cap Rs. 10 Cr for FIC upto Rs. 200 Cr., Cap Rs. 150 Cr for FIC upto Rs. 1000 Cr, Cap Rs. 250 Cr for FIC > Rs. 1000 Cr (&if employment given to min. 3000). **(ii)** 50 % land subsidy to SPV/PIA for EMC/ESDM in Bundelkhand & Purvanchal; 25 % land in Madhyanchal & Paschimanchal: Cap Rs. 75 Cr Note: Individual Units will get land subsidy as above, if the land subsidy is not already availed by SPV/PIA. EMC contributions: Union Govt(50 %), UP State Govt (50%) & PIA (25 %) CFC: Union Govt (75%), PIA (25%)	Up to 5 % if Invested amount is Rs. 200 Cr (Capped at Rs. 1 Cr/year for 05 years *i.e*. Rs 5 Cr per unit)
Odisha	**(i)** Upto 50% Capital subsidy to SPV for Pvt Industrial Parks or Cluster, cap at Rs. 25 Cr against min 100 acre. (unit becomes member of SPV) *OR* First 02 Anchor Unit may receive Infrastructure development Subsidy for ESDM Park development– for basic amenities– 25% of Building & Park development costs, Cap at Rs. 10 Cr. **(ii)** Slab-wise Capital Subsidy on Fixed Capital Investment: 20 % with Cap at Rs. 10 cr for FCI < Rs. 50 Cr. 10 % of Incremental FCI over 50 cr to 1000 Cr. + Rs. 10 Cr. Flat; Cap at Rs. 105 Cr. 10% of Incremental FCI over Rs. 1000 Cr + Rs. 105 Cr flat, Cap at Rs. 250 Cr. **(iii)** New units for Thrust Sector inc ESDM qualify for 50 % special concession industrial rate for land IF the company provides direct employment to min. 1000 state-domiciled persons (except in Cuttack & Bhubaneshwar) - 30% capital investment subsidy IF captive power plant established. - 30% Capital Investment subsidy for Plant & machinery (exc. Cost of land & building) IF MSME start operations within 03 years & Others within 05 years.	Interest subsidy – 5% per annum for Term Loan, for 05 years (Cap based on FCI: Rs. 2 Cr. to 10 Cr.)

State	Capital expenses support	Interest Support
Assam	Up to 25% Capital rebate on allotted land in Notified IT park OR Up to 50 % rebate for cost of land outside the Notified Parks, Cap at Rs. 5 Cr. / unit , to be provided after Start of operations within 02 year of land allotment. Max 25 acre/unit. First 02 Anchor Unit may receive Infrastructure development Subsidy for ESDM Park development– for basic amenities– 25% of Building & Park development costs, Cap at Rs. 10 cr. North-East Industrial Development Scheme 2017 (1) Central Capital Investment Incentive for Access to Credit(CCIIAC) Upto 30 % of investment made on Plant & Machinery anywhere in NER, cap at Rs. 5 Cr. Per unit	Interest subsidy – 2% per annum for Term Loan, for 05 years (Cap at Rs. 50 lakh/unit) **North-East Industrial Development Scheme 2017** Central Interest Incentive(CII)– 3% rebate on Working Capital credit for 05 years, anywhere in NER. Working capital capped at 25 % of Annual Turnover.

4.140 As per Electronics Manufacturing Cluster (EMC) Project Management System[78], 22 EMC projects have been approved. Out of total 402 units for which land has been allocated, 82 units are operational. Against aggregate Project cost of Rs. 3498 Crore, Rs. 1470 Crore stand granted of which Rs. 848 Crore have been released. In principle, there is further scope of land allocation as out of 2178 acre saleable land, only about 1580 acre have been allocated. In addition to EMC scheme, Modified Electronic Cluster Scheme (EMC 2.0) has been notified on 1 April 2020. Under EMC 2.0, out of total 13 Applications, 11 relate to EMC and 02 to Common Facility Centres (CFC). CFC is a project located in an area where significant number of existing ESDM units are present and the focus is on upgrading common technical infrastructure and providing common facilities for the ESDM units as per Annexure-III of EMC 2.0 guidelines[79]. Apart from essential services, CFC should provide on common basis:

(i) Support services (including Centre of Excellence for R&D, Incubation, Skill Development facilities) and,

[78] https://emcpms.gov.in/site/login

[79] https://www.meity.gov.in/writereaddata/files/Final%20Guidelines%20of%20EMC%202.0%20Scheme%20-31st%20May%2C%202020.pdf

(ii) Manufacturing support (including Tool room, CAD/CAM Design House, Plastic Moulding, Metal sheet Stamping, Component Testing, Packaging services)

Under EMC 2.0, the cluster would set up in geographical areas of certain minimum extent, preferably contiguous[80], where the focus is on development of basic infrastructure, amenities and other common facilities for the ESDM units. For Common Facility Centre (CFC), there should be a significant number of existing ESDM units located in the area. 05 projects have been approved so far. Application submission period has been also extended[81] up to 31 March 2024.

4.141 The indicative land rate[82] in different EMCs (located in 13 States across India) ranges from Rs. 28 Lakh/acre to Rs. 2.5 Crore/acre. It includes sale of land as well as land-lease whose period ranges from 25 years to 99 years. In a few cases, land-development cost is also included. So far as Stamp Duty charges on land are concerned, most of the States have permitted 100% reimbursement in case of electronics sector. Similarly, Registration charges have been kept nominal, 1 % in most cases and their reimbursement is also permitted in a few States.

4.142 Several States have maintained policy flexibility regarding land allocation in favour of *Anchor units* mandated under EMC 2.0. This Scheme mandates the presence of Anchor entity(s) in the proposed EMCs. *Anchor units* are those units that would take allocation of at least 20% of cluster land and make minimum investment of Rs. 300 Crore. In some cases, it would include land allocation for 5 ancillary units associated with Anchor unit. In case of North-Eastern States,

[80] https://pib.gov.in/PressReleasePage.aspx?PRID=1607489

[81] https://emc2.stpi.in/assets/web_assets/Includes/files/EMC%202.0%20Scheme.pdf

[82] https://emcpms.gov.in/uploaded_docs/ratenew.pdf

Hill Sates and Union Territories, the *Anchor unit* should get allocation of 10 % land and make minimum investment of Rs. 150 Crore.

4.143 In respect of manufacturing clusters, TRAI's recommendations in 2011 have recommended that *Ten telecom clusters be identified immediately. The Central/ State Governments should make all efforts to develop infrastructural facilities in a time bound manner so that the infrastructure related disabilities are removed for the units that are located in the clusters.*

Further, TRAI in year 2018 has recommended that *Telecom Product Development Clusters (TPDCs) within Electronic Manufacturing Clusters (EMC) should be established. The Government should extend suitable incentives to the TPDCs so as to attract talent and investments into these clusters.*

4.144 The Authority has noted that the EMC performance statistics indicate that various clusters across the States are under-developed and about 1/4th of total land under such EMCs is yet to be allocated. Keeping above discussions and this fact in mind, the Authority is of the view that on-going Cluster development schemes (EMC & EMC 2.0) which draw capital support of Central Government & respective State Government Agencies should be optimally utilised. TPDCs may therefore be co-located within approved EMCs. Such a proposition should yield faster roll-out of telecom clusters by making use of planned development efforts by both Centre and State Agencies. If required, States could facilitate by arranging land for TPDCs near EMCs under their own industrial policies and investment promotion set-ups.

4.145 The Authority also notes that the range of telecom products under domestic production in the country is still limited and therefore, support through incentives or otherwise is required to improve manufacturing base within the country. Current Schemes such as

SPECS (refer Table 4.12) are relevant to electronics manufacturing but may not provide focussed approach on forward & backward integration within the telecom sector. The need for telecom & networking-specific Capital Support Scheme is highly imperative when 5G technology, IoT/M2M or Sensor based networks, Data Centre/ Edge data centres, OFC based networks are under rapid proliferation and NATE is being imported from outside the country.

4.146 Such capital support scheme can be developed, on the model of SPECS, for expanding production-base of NATE manufacturing. It can have the following features:

(a) Extend one-time Capital support up to 25 % of overall costs towards 'Plant & Machinery' meant for domestic manufacturing of telecom & networking equipment/ components. The eligible cost-elements should also include expenses on account of facilities for Assembly-Testing-Marking & Packaging (ATMP) and Outsourced Semiconductor Assembly and Test (OSAT) for other domestic products as well. It may also permit used machinery with certified minimum residual life of 7 years to become eligible for capital support provided such machinery is not manufactured in India. It may further allow inclusion of costs due to Transfer of Technology/ Intellectual Property/ Product Standardisation-Labelling. But it should exclude costs due to land acquisition & civil construction.

(b) This Scheme may have fixed tenure of five (05) years to support NATE manufacturing for both fresh capital expenses (greenfield) & augmentation of manufacturing establishment (brownfield investments) involving at least 25 % capacity augmentation, valued in terms of installed capacity.

(c) The range of overall costs thresholds should be kept from Rs. 5 Crore to Rs. 1000 Crore depending on range of eligible Plant & Machinery which may include

(i) Precision automation equipment including EDA toolset,
(ii) Process control equipment
(iii) Surface Mount Technology equipment
(iv) Inspection & Testing equipment
(v) Quality Assurance equipment
(vi) Chemical storage & processing equipment.

As the cost for such production equipment varies greatly according to the degree of automation, precision control over miniature elements, auto-detection of faults, potential re-cycling of chemicals, ageing, production capacity, it would not be prudent to classify such equipment into cost-slabs. Alternatively, adopting certain thresholds based on investment potential of manufacturing units- Global, Domestic, MSME and Start-ups to meet capital costs of 'Plant & Machinery' may provide more certainty regarding scheme's implementation. It should not happen that the entire allocation of the scheme is garnered by few big manufacturers. Therefore, adoption of slab-wise thresholds would clearly exhibit the range of capital-support (up to 25 % of Capital costs) that could be accessed by an eligible entity during the tenure of the scheme. The suggested thresholds are given below:

Table 4.14 Qualifying thresholds related to Capital cost of 'Plant & Machinery' and likely range of Capital-support per entity

Sr.	Classification of manufacturing entity	Thresholds relating to Capital cost of 'Plant & Machinery' for 05 year tenure (in Rs, Crore)	Likely range of Capital-support to an eligible entity (in Rs, Crore)
1	Global entity	250 to 1000	62.5 to 250

2	Domestic entity	100 to 1000	25 to 250
3	MSME	5 to 100	1.25 to 25
4	Start-up	5 to 25	1.25 to 6.25

(d) The reimbursement of 50% of Capital support should be given once minimum committed investments have been made and declared production has actually commenced. The remaining part of Capital support should be reimbursed in 5 equal yearly instalments.

(e) The priority-list for selection of eligible applications should be based on entity's self-declaration regarding estimated increase in value-addition within its scope of manufacturing activities.

4.147 **In view of the discussions above, the Authority recommends that on the lines of *Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors* (SPECS), a new scheme should be introduced to partially fund the Capital expenses of manufacturing facilities with respect to domestic manufacturing of NATE and related components. The salient features of this scheme should include:**

(a) Extend one-time support up to 25 % of the overall Capital expenses towards establishment of 'Plant & Machinery' for undertaking domestic production of telecom & networking equipment/ components.

(b) The eligible cost-elements should also include expenses on account of facilities for Assembly-Testing-Marking & Packaging (ATMP) and Outsourced Semiconductor Assembly and Test (OSAT) for other domestic products as well. It may also permit such used machinery with minimum certified Residual life of 7 years to become eligible for capital support provided such machinery is not manufactured in India. It may further allow inclusion of costs due to Transfer of Technology/ Intellectual Property/ Product

Standardisation-Labelling. But should exclude costs due to land acquisition & civil construction.

(c) This Scheme may have fixed tenure of five (05) years to support NATE manufacturing for both fresh capital expenses (greenfield) & augmentation of manufacturing establishment (brownfield investments) involving at least 25 % capacity augmentation, valued in terms of installed capacity.

(d) The range of overall costs thresholds should be kept from Rs. 5 Crore to Rs. 1000 Crore. Slab-wise thresholds depending upon the type of manufacturing entity should be as follows:

Sr.	Classification of manufacturing entity	Thresholds relating to Capital cost of 'Plant & Machinery' for 05 year tenure (in Rs. Crore)	Likely range of Capital-support to an eligible entity (in Rs. Crore)
1	Global entity	250 to 1000	62.5 to 250
2	Domestic entity	100 to 1000	25 to 250
3	MSME	5 to 100	1.25 to 25
4	Start-up	5 to 25	1.25 to 6.25

(e) The reimbursement of 50% of Capital support should be given once minimum committed investments have been made and declared production has actually commenced. The remaining part of Capital support should be reimbursed in 5 equal yearly instalments.

(f) The priority-list for selection of eligible applications should be based on entity's self-declaration regarding estimated increase in value-addition within its scope of manufacturing activities.

4.148 MSME contribution in NATE manufacturing is still at sub-par level. Further, availability of Foreign Investment (FDI or FII) and easy Bank/commercial credit at least in the foundational years is less likely in case of MSMEs. Therefore, the Authority is of the opinion

that adequate apportioning, in favour of MSMEs[83] (where planned investment does not exceed Rs. 50 Crore), will be required in above suggested scheme. The Authority recommends that **at least one-fourth of the scheme outgo should be to support applicant-beneficiaries that are drawn from such MSME entities where eligible planned investment during the entire tenure of the Scheme does not exceed Rs. 50 Crore.**

V. Financial assistance to MSMEs - Interest Subvention

4.149 Till 31 March 2021, 2% Interest subvention on incremental credit remained available to GST registered MSMEs through Central Government. *Interest Equalisation Scheme* (IES), currently under implementation caters to MSME manufacturer exporters. Under this Scheme, rate for Interest equalization has been revised to 3% for MSME led exports under any HS lines and to 2% for manufacturer exporters and merchant exporters exporting under 410 HS lines (not of it applies to NATE). However, benefits under this scheme exclude PLI beneficiaries. The interest rebate relates to the loans taken during pre-shipment and post-shipment. This scheme has been extended till 31 March 2024 vide RBI circular 8 March 2022. The annual net subvention amount has been capped[84] at Rs. 10 Crore per Importer-Exporter- Code (IEC) in a given financial year in effect from 1 April 2023. IEC is a unique 10-digit alpha numeric code issued on the basis of Permanent Account Number (PAN) of an entity.

4.150 Technology Development Board[85] (TDB) administers '*Fund for Technology Development and Application*' for the development and application of indigenous technology. TDB provides financial assistance up to 50% of the project cost (as soft loan); 25% of project cost (equity) and grant (in exceptional cases). Applicable rate of

[83] https://msme.gov.in/faqs/q1-what-definition-msme

[84] https://content.dgft.gov.in/Website/dgftprod/bc5f73b9-828d-468a-ad3d-60f13f485bcc/Trade%20Notice%2005-2023-24%20dated%2025-05-2023.pdf

[85] http://tdb.gov.in/downloads/#pfg

interest is 5 % simple annual interest for credit equivalent to 50 % of project cost[86] capped to Rs. 2.5 Crore. The maximum re-payment period is 4.5 years after allowing one-year moratorium as development period. Though TDB has been involved in project-financing of various IT projects[87], it has supported only few telecom related projects in the last 10 years, as given below:

Table 4.15 TDB assistance in Telecom sector

Company/entity	Project description	Project cost	Assistance sanctioned
		(Rs. In Crore)	
Mymo Wireless Technology Private Ltd., Bangalore	Commercialization of 4G wireless 3GPP LTE Products: Base Station (eNodeB), User Equipment (UE) and LTE Emulators	5.85	2.40
Mobme Wireless Solutions	Development and Commercialization of Core Mobile Network Elements for Managed Mobile Services	8.12	2.0
M/s Silvan Innovation Labs	Real-time video analytics over wireless IP video surveillance camera system	11.00	4.00
M/s Coral Telecom Limited	Development of IRIS NGX That Will Meet New Generation Network Requirement for Enterprise As Well As Defence	10.25	4.50
M/s Sankhya Technology Pvt. Limited	Development and Commercialization of System Design Solution for Automotive Electronics, Consumer Electronics and Communication and Networking Devices	7.54	2.38
NMS Works Software Pvt. Limited	Management System for Heterogeneous SDH Networks)	4.00	1.50

4.151 Under RBI's *Special Liquidity Facility* (SLF), Small Industries Development Bank of India (SIDBI) has introduced Direct-project credit facilities to MSMEs during FY 2021-22. Under *Thematic Assistance for Purchase of Capital Assets in New Enterprises*[88] (STHAPAN), loans for land purchase, construction of building and buying machinery may be borrowed by new or existing MSME. It targets such enterprises which are working in sectors that fall under PLI Scheme. This term loan is capped to Rs. 20 Crore (or 75 % of Project cost) with maximum repayment period of 9 years including two-year moratorium. Promoters' contribution is required to be

[86] http://tdb.gov.in/modes-financial-assistance/

[87] http://tdb.gov.in/wp-content/uploads/2017/02/IT-projects.pdf

[88] https://www.sidbi.in/en/products

minimum 25 %. Interest rate payable is based on 6 to 7.30 % per annum after adding Floating interest rate to Repo rate i.e. based on MCLR (Marginal Cost of Funds based Lending Rate).

For loans above Rs. 5 Crore, Promoters should have prior experience of 5 years in business. For loans up to Rs. 5 Crore, the promoters of the new entity should have prior business experience of 3 years in manufacturing activity.

Machinery loans under '*Assistance to Re-energize capital Investments by SMEs'* (ARISE[89]) are available to existing MSMEs working in priority or high-growth sectors. Such enterprises should be at least two years old. Maximum term loan is up to Rs. 7 Crore (or 80 % of the machinery cost) with maximum repayment period of 7 years. Interest rate payable is based on MCLR. There is a provision for 100 % term loan up to Rs. 5 Crore against interest bearing Fixed deposits equivalent to 25 % of the loan amount.

4.152 Various States under their respective policies have also made provision for Interest Subvention against term loans only, as briefed in Table 4.13 above. Respective States provide for Interest subvention ranging from 5 to 7 %, capped in terms of overall credit and maximum repayment period. Term loan limits generally range from Rs. 10 Lakh to Rs. 10 Crore with most of the States limiting it below Rs. 1 Crore. The corresponding maximum duration allowed for re-payment is 5 years in most of the cases.

4.153 National Electronics Policy 2019 (NEP) also envisaged an interest subvention scheme where interest subsidy up to 4 % on loans maximum up to Rs. 1000 Crore for Plant & Machinery could be provided. In case of ethanol production, the Government has extended interest subvention at rate of 6 % or half the interest loan charged by the banks (whichever is lower) for a period of 05 years. In case of NATE sector, one way to operationalise interest subvention

[89] https://www.sidbi.in/en/products

scheme is through dedicated Daughter fund under NATEDF. The cost differential due to higher interest rate prevailing in India is one of the highest in Asia and could be brought in level with international borrowing rates[90]. **The Authority therefore recommends that a dedicated Daughter fund for Interest Rate Subvention under NATEDF should be constituted. The maximum of subvention should be kept as 4 % in case of MSMEs for a tenure of 05 years. The maximum lending at reduced rates for Plant & Machinery should be capped to Rs. 25 Crore per entity.**

Project financing, Contract financing and Credit Default Insurance

4.154 TRAI vide its Recommendations on '*Promoting Local Telecom Equipment Manufacturing*' of 3 August 2018 has recommended:

Recommendation 3.6 (h):

DoT should co-ordinate with Ministry of Finance for making available the following financing options, in-line with practices in other export-oriented economies, to indigenous telecom equipment manufacturers:

(i) Venture Capital in Equity or Soft loans;

(ii) Project Finance;

(iii) Contract Financing options;

(iv) Credit Default Insurance.

DoT has conveyed DCC remarks vide OM No. 18-09/2018-IP of 8 October 2020 stating that *TRAI may be requested to furnish more details on this recommendation for taking up with Ministry of Finance.* TRAI has therefore taken-up these issues for stakeholders' consultation vide CP. Venture capital related discussions have been taken-up in Section IV above.

[90] https://tradingeconomics.com/country-list/bank-lending-rate

4.155 *Project financing*[91] is a loan structure that relies primarily on the project's cash flow for repayment, with the project's assets, rights, and interests held as secondary collateral. Project finance is especially attractive to the private sector because companies can fund major projects off-balance sheet. Hence, it may not affect the credit of the shareholders, and shifts some of the project risk to the lenders in exchange for which the lenders obtain a higher margin than for normal corporate lending. For risk-management purposes, the project company is generally a limited liability special purpose project vehicle, and so the lenders' recourse will be limited primarily or entirely to the project assets (including completion and performance guarantees and bonds) in the case of default of the project company. In context of telecom sector, projects supported through Universal Services Obligation Fund (USOF) may find project-financing suitable. Besides, telecom projects undertaken under External Development Assistance by India in other developing countries may also fall under its scope.

4.156 *Contract Financing* (Vendor Financing scheme) refers to how a business can receive advance funding on an awarded contract-which is yet to completed. When a business has the expertise and resources to undertake a contract but lacks the funds to complete it, the lack of funding may cost it the contract. It may also be relevant in phase-wise contractual milestones achieved or to be achieved so that it works like a revolving credit with risk-assessment. Sometimes, this may help mitigate commercial risks such as business cycle, demand fluctuations, inflation risk if payments are linked to prices. Since most commercial contracts in the industry are paid for in milestones throughout the process or fully at the end of contract completion, it is one of ways for a business to access business loans against a contract which it has

[91] https://ppp.worldbank.org/public-private-partnership/financing/project-finance-concepts

already won. It is essentially underwritten based on the terms of a contract the business has already signed and the creditworthiness of the client rather than the borrower's assets or credit record. Therefore, supplier/contractor generally bears the risk of loss to property, even though title is vested in other person i.e. indemnification applies until otherwise it has been waived-off in favour of lender. In public procurement exercises, contractor having Letter of Intent may apply to a financing institution for a loan, as per general or sectoral Credit Policy prevailing. If the financing institution is willing to extend credit, but considers a government guarantee necessary, potential lender may apply to designated institution for determination of seeker's creditworthiness/ eligibility for such financing terms. In context of telecom sector, this option may be relevant for Small yet performing Enterprises.

4.157 *Credit default insurance* or Credit Guarantee is a financial agreement to mitigate the risk of loss from default by a lender. It acquires significance in cases where there is information asymmetry between demand & supply -side or participating players are relatively unknown. Commercial lenders such as Banks & Financial Institutions tend to limit their exposure in case of MSMEs, due to lack of risk assessment or track-record of financial performance. Hence, specialized provision for extending credit guarantee i.e., Credit Guarantee Scheme (CGS) for MSME with collateral-free credit has been introduced.

4.158 To determine the financial challenges faced by the sector players in respect of availing instruments like project financing, contract financing & credit default insurance, the Authority has raised following issues in the Consultation paper –

Q 6(a) Which of the financial instruments related to project financing, contract financing and credit default insurance currently

available in India are being used by the stakeholders and to what extent?

Q 6(b) Are these financing instruments able to cater to the needs of NATEM in India?

Q 6(c) Are there any suggestions to further improve these financial instruments or are there any new proposed financial instruments that can cater to the needs of NATEM in India? Please provide full details along with justification.

4.159 The stakeholders have responded that in order to promote the growth of the sector, the Government should explore options to allow lower interest on debts to NATEM borrowing entity. This is because foreign manufactures offer equipment to Indian TSPs on credit facility without any need for Indian TSP to approach the foreign credit agency. On the contrary, Indian manufacturers expect TSPs to either pay the amount upfront or arrange credit at their respective level. It may happen because domestic manufacturers do not have sufficient capital resources in their approach to carry-on production for extended periods without revenue flowing back into the production-entities.

4.160 Further, the stakeholders' while referring to some other countries where access to soft loans for manufacturing entities is generally practised, seek relief on interest rates to the tune of 5 to 6 %. Hence, either banks should grant preferential access to capital to domestic companies through subsidies, low-interest loans, and bonds, especially for small and medium-sized enterprises or a master fund is to be established to offer soft-credit lines to buyers of telecom equipment (both in the domestic and global market) from select Indian ventures so that TSPs could be incentivized to purchase indigenous products. Some of the stakeholders' state that the Government can finance some of the mission critical projects of national importance through Exports Imports Bank (EXIM) by making use of Letter of Credit (LOC) and applying reduced interest

rates. Further, a few have proposed to categorise such important projects as deemed export as well.

4.161 A few Stakeholders have stated that a lender/borrower risk of investment may be reduced by shifting all or a part thereof towards an insurance company. National Credit Guarantee Trustee Company Ltd. has been set up by the Department of Financial Services, under Ministry of Finance, to function as a common trustee company to manage and operate various credit guarantee trust funds. *The Credit Guarantee Scheme for Micro and Small Enterprises* (CGS) was launched by the Government of India to make collateral-free credit available to the micro and small enterprise sector. However, existing financing instruments are still unable to cater fully to the needs of NATEM in India. The stakeholders submitted that NTP 2012 had provisions for setting up a Telecom Finance Corporation, which could not materialise.

4.162 According to a group of stakeholders, third-party credit risk mitigation to lenders can be an important policy instrument for easing financing constraints. Schemes to offset infrastructural and freight disabilities such as duty credit scrip, excise payment credit scrip, etc. along with low-interest funding may be implemented to support the buyer of the telecom equipment. It is prevalent in a few countries where State owned banks grant preferential access to capital towards domestic companies by way of subsidies, low-interest loans, and bonds, especially for small and medium-sized enterprises. If the banks could extend 5 to 6% of interest subvention, it will benefit the telecom sector.

Analysis of the Issue and Authority's view

- **Project Financing**

4.163 In India, project financing is not regulated by any single Government institution. Hence, norms prevalent through Development Financial

Institutions or Banks for funding infrastructure projects may differ. Lending tenure usually lasts from eight to ten years, therefore insufficient for all kinds of projects to get completed. Therefore, in cases where the longer time is required, there might be need for re-financing options.

4.164 *Micro & Small Enterprises Cluster Development Programme* (MSE-CDP) Scheme[92] was introduced in year 2007 with an objective to assist enhancement of productivity and competitiveness of MSEs through cluster-based holistic development approach. As per New Guidelines[93] dated 24 May 2022, it provides for financial assistance for (i) Common Facility Centres (CFC) establishment and, (ii) Infrastructure Development (ID):

(i) CFC provides for common facilities for testing, training, raw material depot, effluent treatment, complementing production processes, etc. as per the list of admissible items given in Annexure-I of the Guidelines.

(ii) Similarly, the Scheme assists in ID for a new / existing cluster as per list of admissible items given in Annexure-II of the Guidelines. It includes walls, roads, water-supply, drainage, power, Flatted factory complex, common utilities space, warehousing for raw materials etc.

(iii) The funding pattern of the project is illustrated as follows:

Components	Total Project cost	Funding Pattern		
		Govt of India	State Govt	SPV
a.1 Common Facility Centre	Rs 5 crore to Rs 10 crore	70%	20%	10%
a.2 Common Facility Centre	Rs 10 crore to Rs 30 crore	60%	20%	20%
b.1 Infrastructure development-New	Rs 5 crore to Rs 15 crore	60 %	40%	---
b.2 Infrastructure development-Upgradation of existing Infrastructure	Rs 5 crore to Rs 10 crore	50%	50%	--

[92] https://pib.gov.in/PressReleasePage.aspx?PRID=1911134

[93] https://www.dcmsme.gov.in/schemes/New-Guidelines.pdf

In case of projects located in the Aspirational Districts, NER, Hill States, Islands, and Left Wing Extremism (LWE) affected districts, the funding pattern is as follows:

Components	Total Project cost	Funding Pattern		
		Govt of India	State Govt	SPV
a.1 Common Facility Centre	Rs 5 crore to Rs 10 crore	70%	20%	10%
a.2 Common Facility Centre	Rs 10 crore to Rs 30 crore	60%	20%	20%
b.1 Infrastructure development-New	Rs 5 crore to Rs 15 crore	60 %	40%	---
b.2 Infrastructure development-Upgradation of existing Infrastructure	Rs 5 crore to Rs 10 crore	50%	50%	--

SPV – Special Purpose Vehicle, Section 8 company under Companies Act 2013.

(iv) For preparation of Detailed Project Report (DPR) a sum equivalent to 4% of Project Cost[94] not exceeding Rs.50.00 lakh will be considered as a contribution by the State Government or Special Purpose Vehicle (SPV).

(v) By March 2023, 540 projects including 212 projects pertain to setting up of CFCs and 328 projects for ID under have been approved, out of which 92 CFCs projects and 200 ID projects have been completed across the country so far.

4.165 Project-related assistance available through Technology Development Board and project-credit through SIDBI's STHAPAN & ARISE has been discussed earlier in para 4.151.

4.166 For technology upgradation amongst MSEs in select sectors, *Credit Linked Capital Subsidy Scheme for Technology Upgradation Scheme* (CLCSS) launched in year 2000-01 provides for credit in the form of project-related term loans. Against Rs. 1 Crore, capital subsidy up to 15 % of project cost is permitted for induction of well-established and improved technology in select 51 sectors including '*Electronic*

[94] https://msme.gov.in/sites/default/files/FAQs-MSE-CDP.pdf

equipment via test, measuring and assembly/ manufacturing, Industrial process'. CLCSS further provides for specific subsidies such as

(i) *Digital MSME*[95] for adoption of Cloud Computing in MSE business process and production ,

(ii) *Assistance for Entrepreneurial and Managerial Development of MSMEs via Incubators*[96] to promote adoption of latest technologies for validation of project-ideas at the proof-of-concept level,

(iii) Zero Defect Zero Effect Scheme (ZED) which provides for ZED certifications for 'manufacture of computer, electronic and optical products'.

The 3-tier certification paves the way for further incentives regarding assistance towards international marketing, discount on freight charges, bank processing charges etc.

- **Export-linked Project Financing**

4.167 For export oriented MSMEs with untapped potential & turnover below Rs. 500 Crore, Ministry of Finance has launched *Ubharte Sitaare Alternative Investment Fund*[97] in July 2021 to facilitate debt and equity funding in select sectors. It is co-sponsored by India Exim Bank and SIDBI with a contribution of Rs. 40 Crore each. Term loan for modernisation, technology / capacity upgradation, R&D and balancing of production facilities by investment in activities such as machinery and equipment; tools, jigs and fixtures; Testing / quality control equipment; land and building to MSME is provided. MSMEs under NATE can be considered under '*precision engineering*" as one of the select sectors. Eligible entity may get term loan up to Rs. 30 Crore (or 80 % of the project cost) in Indian Rupees or Foreign Currency to meet the project-costs. The repayment period varies from 06 to 10 years with up to 02 years' moratorium. The Scheme permits

[95] https://www.dcmsme.gov.in/schemes/DigitalMSME-Guideline-CLCS-TUS-2019-2020.pdf

[96] https://www.dcmsme.gov.in/schemes/SUPPORTFOREMDTI.pdf

[97] AIF is a privately pooled investment vehicle that collects funds from sophisticated investors, whether Indian or foreign, for investing it in accordance with a defined investment policy for the benefit of its investors

conversion of debt into equity participation at the option of the creditor.

4.168 EXIM Bank of India provides for pre- and post-shipment credit facilities to exporter manufacturers. While pre-shipment credit facilitates exporters to purchase raw materials and other inputs, along with foreign currency arrangements for the projects- in hand, post-shipment credit enables Indian exporters to extend term credit to importers at the post-shipment stage.

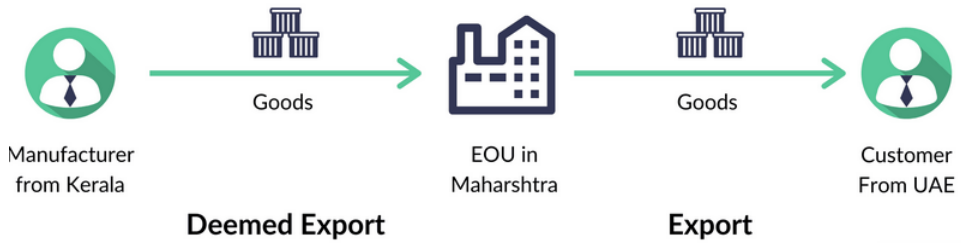
(i) Pre-shipment finance is the facility of extending working capital finance to the exporter of the goods, in order to export them to another country. It enables the exporter to procure raw materials, labour, supplies, so as to produce, package, store and transport the goods. The credit is based on contract payments, and therefore involves both payment & performance risk;

(ii) Post-shipment facility is a form of loan extended by the bank to the exporter against shipment of goods which is already done. Therefore, the credit is served for the period since documents are filed against exports made till the realisation of payment from overseas. As it involves only payment risk, it might be preferable;

(iii) These credits are availed generally in the form of Overseas Buyer's Credit (OBC), Line of Credit (LOC), and Re-lending to Overseas Banks. Under OBC, credit is directly offered to foreign entities for import of eligible goods and related services, on deferred payment. Under LOC, finance is available to foreign financial institutions and government agencies in the respective country for import of goods and services from India. Re-lending facility is concerned with the credit extension to overseas banks enabling them in providing term finance to their clients across the globe for imports from India.

4.169 Further, Indian Project exporters executing project export contract overseas may also avail *Export Project Cash Flow Deficit Finance* (EPCDF) facility by the Bank. It is available in domestic and foreign currency for managing temporary cash flow deficits during contract execution period. The credit facilities are extended to *Deemed Exports* as well. Deemed Exports refers to the supply of finished goods that do not leave the country and the payment of transaction can be in Indian Rupees or free foreign exchange. It involves domestic movement of goods manufactured/ intermediate supplies (not for services) which are subsequently transported locally to another unit (such as Export Oriented unit (EoU) for exports later, as illustrated below:

Fig. 4.7 Deemed exports and Physical exports



4.170 To address quick liquidity concerns, a web portal, www.psbloansin59minutes.com has been brought in operation where a MSME may secure in-principle approval of loans from banks in only 59 minutes[98]. The borrowing limit ranges from Rs.10 Lakh to Rs. 5 Crore. It is digitally integrated to credit insurance facility for eligible entities as well.

- **Contract Financing**

4.171 In India, some Banks provide for Contract Finance under Vendor Finance Agreement or as Supply Chain Financing or as Working Capital loan to credit-worthy entities having past track-record of at least 3 years. It is quite supportive to such growing entities who have

[98] https://www.psbloansin59minutes.com/home

secured the purchase order and need fast access to credit for arranging input supplies. OEMs attempting to increase their market presence also offer credit lines to their customers against realisation of sales. The credit repayment towards OEM is linked to the future returns expected from credit-based investment.

4.172 Most of this facility is operated by Banks, Non-Banking Finance Companies and Corporate driven financing is relatively low. The quantum of contract financing usually varies from Rs. 10 Lakh to Rs. 50 Crore at *Repo Linked Lending Rate (BPLR)* for a tenure of 5 to 7 years. These terms are extended by the Banks to their own customers with in-house track-record or to Contractors of good repute, registered with the Government, having a track record of minimum 03 years, and having at least one Contract in-hand to be performed. So far as NATE sector is concerned, there is no established practice of significance to the entire ecosystem.

4.173 Despite presence of several schemes discussed above, stakeholders' submissions indicate that number of projects and credit support in telecom-sector is not commensurate with the growth prospectus for indigenous product design, development & manufacturing. General credit-pool arrangements tend to lose sectoral focus & thus may not cater to dynamic manufacturing environments such as telecom. Lack of adequate credit facilities indirectly hampers (potential) market access by domestic manufacturers to contribute towards projects under USOF, Scheme for Special Assistance to States for Capital Investment/Expenditure, and projects under India's External Development Assistance. As per Ministry of External Affairs, 222 Lines of Credit[99] worth USD 14.07 billion covering 357 projects have been recently extended to 42 countries in Africa. These projects cover varied sectors like roads, railways, power, ports and shipping,

[99] https://economictimes.indiatimes.com/news/india/india-extended-37-line-of-credit-worth-usd-14-bn-to-5-countries-in-neighbourhood/articleshow/93056388.cms?from=mdr

telecom, health, education and aviation. For example in case of railways[100], India has so far committed USD 24.2 billion in soft loans for rail and other infrastructure projects to over 60 countries in the past 14 years. Most of the financing for India's international rail diplomacy is channelled through EXIM Bank, which typically extends Lines of Credit (LOC)- a soft loan with concessional interest rates coupled with *a rider that 70 per cent of the goods will be sourced from India*.

4.174 The Authority noted the submissions made by stakeholders that presently foreign manufactures with larger capital base may offer equipment to Indian TSPs on credit facility for extended periods, making them lucrative to TSPs. Indian manufacturers on the other hand require the TSPs to either purchase partly in cash or make upfront payment. Commercial banks are often not in favour of extending cheap credit to domestic OEMs because of a longer gestation period and low initial return on investment. There is also a high-risk component in extending loans to companies with no established products and no sufficient market access for scalability. Low-cost financial techniques or instruments are therefore required for the manufacturers.

4.175 Therefore, there is perceived need for extending Project-credit availability for establishment of tangible assets *as well as* Contract financing for encouraging supply-linked cash-flows for growth-oriented NATE sector in the country. Based on empirical studies[101] for related data during years from 2000 to 2020, it is established that the export of the country is significantly determined by the loan disbursement by EXIM bank to the domestic export entities & foreign importing entities and institutions as well under different schemes. Therefore, buyers (Exports including Deemed Exports) of NATE domestically manufactured in India should be provided credit-facility

[100] https://indbiz.gov.in/indian-railways-foreign-projects-to-boost-relations/

[101] https://www.ilkogretim-online.org/fulltext/218-1614973693.pdf

on priority. In case of Buyer's unwillingness to take NATE supplies on credit-basis, alternative option to provide credit-facility to equipment manufacturer. It should remain linked to procurement order/ project order/ work award based on contract driven payment schedule.

4.176 In view of the discussions above and one of the prior recommendation to set-up NATEDF as Fund of funds (vide para 4.110 above), **the Authority recommends that**

(i) **on the lines of post-shipment credit facility available through Export Import Bank of India (EXIM), the funding requirements including credit to overseas Buyers against exports of domestic NATE, may be sourced from NATEDF.**

(ii) **Similarly, on the lines of pre-shipment credit available to exporter manufacturer of domestic NATE through EXIM, the funding requirements for term loan against the contract for exports may be sourced from NATEDF.**

(iii) **The scope of funding should include (a) Project finance and, (b) Contract Finance**

4.177 Further, *the Credit Guarantee Fund Scheme for Micro and Small Enterprises* (CGMSE) has been launched by the Government of India in year 2000 to make available collateral-free credit to the Micro and Small enterprise sector. Both the existing and the new enterprises are eligible to be covered under the Scheme. The credit facilities which are eligible to be covered under the Scheme include both term loans and working capital facility, up to Rs.1 Crore per borrowing unit. This is extended without any collateral security or third party guarantee, to a new or existing micro and small enterprise with Guaranteed credit capped at Rs. 50 Lakh. The guarantee-cover available under the Scheme, in general, is to the extent of 75 percent of the sanctioned amount of the credit facility. However, it may go

higher as illustrated in the Table 4.16 (outlining extent of Guarantee Coverage[102] for different type of entities/ beneficiary-groups and respective locations *w.e.f.* 1 April 2023):

Table 4.16 Credit Guarantee Fund Scheme for Micro and Small Enterprises:

Category (including Trading activity)	Maximum extent of Guarantee Coverage Where guaranteed credit facility is		
	Up to Rs. 5 lakh	Above Rs. 5 lakh & up to Rs. 50 lakh	Above Rs. 50 lakh & upto Rs. 500 lakh
Micro enterprises	85 %	75 %	75 %
MSEs located in North-East Region (incl. Sikkim, UT off Jammu & Kashmir & UT of Ladakh	80 %		75 %
Women Entrepreneurs/ SC-ST Entrepreneurs/ MSEs in Aspirational District/ Persons with Disability/ MSEs promoted by Agniveers/Zed certified MSEs	85 %		
All categories of borrowers	75%		

4.178 To increase the flow of credit to MSEs, Annual Guarantee Fee[103] (AGF) structure has been revised recently *w.e.f.* 1 April 2023:

Table 4.17 Credit Guarantee Fund Scheme – Annual Guarantee Fee

Slab	Standard Rate (per annum)
Upto Rs. 10 lakh	0.37 %
From Rs. 10 to 50 Lakh	0.55 %
From Rs. 50 lakh to 1 Crore	0.60 %
From Rs. 1 Crore to 2 Crore	1.2 %
From Rs. 2 Crore to 5 Crore	1.35 %

An additional concession of 0.10% is permitted for under Social Category (Women/SC/ST / Person with disability (PwD)/ Agniveers), Geographic base (North-Eastern Region, NER including Sikkim,

102 https://cgtmse.in/Default/ViewFile/?id=1680282300234_Circular%20No.%20220_Increase%20in%20ceiling%20of%20Coverage.pdf&path=Circular

103 https://cgtmse.in/Home/VS/47

Union Territory, UT of Jammu & Kashmir, UT of Ladakh (Up to Rs. 50 Lakh)/ Aspirational District) and Zero Defect Zero Effect (ZED) certified MSMEs.

4.179 Budget Statement 2023 has proposed to revamp[104] the Credit Guarantee Scheme through an infusion of Rs.9,000 crore in the corpus for MSMEs, effective from 1 April 2023. It will enable additional collateral-free guaranteed credit of Rs.2 Lakh Crore, and the cost of the credit will be reduced by about 1%.

4.180 The Authority takes a view that Credit Guarantee facilities to MSEs have been adequately established so that the need to provide credit-worthiness based on credit-rating or annual financial statements during formative stage has been mitigated. So far as Medium Scale Enterprises are concerned, there are several recent initiatives especially through SIDBI that can provide for credit-financing based on entity's past performance and business in-hand. Therefore, the Authority refrains from making further recommendations in this regard.

Effectiveness of Schemes allowing Tax holidays/ tax deferment

4.181 In any industry, there is an unavoidable time-gap between investments made and realisation upon commencement of production. Still, it may take some significant time before break-even could be achieved. In case of NATE manufacturing, (i) requirement of high-cost sophisticated machinery, (ii) expenses related to intellectual property rights, imported raw materials- integrated circuits, highly skilled man-power and (iii) global competition create a business challenge for the manufacturing entity to reach break-even. The provision of tax break or tax deferment for initial setting-up of manufacturing entity or to extend hand-holding support or to provide safeguard against unforeseen disruptions may provide

[104] https://pib.gov.in/PressReleasePage.aspx?PRID=1912500

anchor-support to the entity. Sometimes these provisions facilitate spread out of the production activities for inclusive development. Thus, it may take many forms such as relief in terms of Corporate Income Tax, relief in terms of taxes/duties on land acquisition/ lease/ rental and utilities consumed during production, relief in terms of *adjusted* tax on "capital expenses" or refund of domestic tax/duty for products exported out of the country for sale. Sometimes, these mechanisms are utilised to orient the industry towards relatively less developed industrial regions of the country to reinforce inclusive development. To inquire the efficacy of such policy in context of NATEM, following questions were raised in the Consultation Paper.

Q.10. Whether schemes allowing tax holidays/deferment of tax are available for NATE manufacturers? If yes, are they meeting the requirement? If no, what modifications are required? Please justify and provide details.

4.182 Stakeholders have unanimously suggested that tax-based incentives among others, are required to make up for the cost disadvantage. As per the stakeholders, effective Corporate Tax rate @ 27% in India has created a competitiveness gap between indigenous industry vis a vis other countries especially those countries which have been providing significant Corporate Tax Rebate to their respective industries. Further, some of the stakeholders have stated that instead of tax deferment, one alternative way is to allow for 200% weighted R&D deduction for tax purposes for five years. This was prevalent prior to 2015 where all DSIR certified R&D organizations were given tax-break.

4.183 A few stakeholders have mentioned about automobile manufacturing sector. It has been expressed that high incidental Custom Duties on imported vehicles (@ 100 % for Vehicles above Rs. 30 Lakh and @ 60 % for vehicles below Rs. 30 lakh) has contributed to the local

presence of almost global automobile manufacturing companies. Besides, local value addition is of the order of 70 %. Thus, such stakeholders suggest that same measures should be adopted in NATE sector.

4.184 Some Stakeholders have referred to a recently introduced provision in the Income-Tax Act (w.e.f. FY 2019-20) which provides an option to a domestic company to pay income-tax @ 22%, subject to condition that any other exemption/incentive will not be applicable. They hold that, gap due to Corporate taxation remains still significant keeping in view such countries where the rate is near 20 % or even below it. Further, the stakeholders have referred to another recent provision (w.e.f. FY 2019-20) which provides an option to a domestic company to pay Income-tax @ 15% *provided* such a company has been incorporated on or after 1 October 2019 and, commences production on or before 31 March 2023, after making fresh investment in manufacturing during the period. The stakeholders have further suggested that the companies could not make sufficient use of the recent provisions on account of business disruptions in years 2020 and 2021, therefore, the same should be suitably extended.

Analysis of the Issue and Authority's view

4.185 As referred by some stakeholders, Section 115BAB[105] of Income Tax Act 1961 (IT Act) implies lower tax-rate of 15 % (plus surcharge and cess) to new manufacturing companies. The new effective tax rate, which will apply to domestic companies after availing the benefit of Section 115BAB comes to about 17.16 %. Vide Budget Statement 2023, the corporate concessional tax rate of 15% has been already extended towards the manufacturing companies incorporated on or before from 31 March 2024.

[105] https://incometaxindia.gov.in/acts/taxation%20laws%20(amendment)%20act,%202019/102520000000110029.htm

4.186 In addition to above, Department for Promotion of Industry, and Internal Trade (DPIIT) certified[106] Start-ups are eligible to apply for tax-breaks under Section 80 IAC[107] of IT Act. This applies for Start-ups incorporated (as Private limited company or a limited liability partnership) on or after 1 April 2016 but before 1 April 2021. Accordingly, a deduction of 100 per cent of the profits and gains is allowed for any three consecutive assessment years among the five years beginning from the particular year in which the eligible Start-up is incorporated. The same benefit has been extended up to 1 April 2024 vide Budget 2023.

4.187 As per Budget 2023, payments made to MSMEs shall be brought to within the ambit of Section 43B of the IT Act, to promote timely payments to MSMEs. Thus, a deduction for such payments will only be allowed when it is actually paid to MSME. However, it would continue to be on an accrual basis only when the payment is made within the prescribed time i.e. 45 days under the MSME Development Act 2006.

4.188 Moreover, certified Start-ups fulfilling the criteria i.e. if Aggregate amount of paid up share capital and share premium of a Start-up after the proposed issue of share, if any, does not exceed Rs. 25 Crore, such Start-up is eligible to apply for tax-break under Sec 56 (Angel Tax) of IT Act. *Angel tax* is the tax charged on the closely held company when it issues shares to a resident person at a price which is more than its fair market value. When this provision is triggered, the aggregate consideration received from issue of shares as exceeds its fair market value is charged to tax under the head 'Income from other sources' under section 56(2)(viib). With this exemption, qualified Start-ups can potentially save 30.9 % tax on net investments in excess of the fair market value. However, after recent modifications vide Budget 2023, non-resident investment in an

[106] https://dpiit.gov.in/sites/default/files/Startup_Notification11April2018_0.pdf

[107] https://incometaxindia.gov.in/Acts/Income-tax%20Act,%201961/2016/Others/section80iac.htm

unlisted company over and above fair market value will now be taxed from 1 April 2023 onwards.

4.189 As per Budget 2023, benefit of carrying forward of losses on a change of shareholding of Start-ups under Section 79 of Income Tax Act 1961 has been extended from seven years to ten years. The condition of continuity of a minimum of 51% shareholding to set off of carried-forward losses is relaxed for eligible Start-ups if all company shareholders continue to hold those shares.

4.190 Besides, a few States such as Assam, Haryana, Telangana provide for up to 100 % reimbursement of State Goods & Services Tax (SGST) to electronics/NATE manufacturers under their respective Electronics/ Industrial/ESDM policies.

4.191 In order to facilitate investments required for highly evolving NATE manufacturing, it is felt that such potential investments should be incentivised in correlation with higher value-addition. One of the ways to achieve this correlation is to incentivise those investments towards R&D driven manufacturing activities. It would in turn lead to higher degree of resident IPRs. These may include Copy rights over software, Design rights over industrial designs, and Patent rights for product-innovation, registered in India. Therefore, the Authority views that investments made towards IPR-based high technology manufacturing in the country should be incentivised by extending tax-relief window to such enterprising manufacturers. Apart from boosting innovation-led manufacturing, this would aid level-playing field between existing enterprises and new enterprises (beneficiary of tax-relief) as well. References have already been made regarding such initiatives prevalent in countries such as China's HNTE program. For developing sustainable NATE ecosystem, the salient features may be as follows:

Table 4.18 Proposed Tax Relief to Innovative Enterprises

Sr	Key-aspects	Related Provisions
1	**Objective**	To incentivise high technology IPR-driven investments into NATE sector by extending tax-relief against prospective Income Tax for such enterprises / companies
2	**Duration**	Initially for 3 years, extendable by another 3 years.
3	**Tax relief**	On the lines of Section 115 BAB of Income Tax Act, the incidental rate of Corporate Income Tax applicable is 15 %, subject to fulfilment of certain conditions specified therein.
4	**Essential Conditions:**	
4a	• *Body Corporate*	**(i)** Corporate bodies such as Companies, Partnerships and Joint Ventures has remained registered in India for at least one -year before are eligible ;
4b	• *NATE R&D based Manufacturing*	**(ii)** The eligible enterprise should be NATE manufacturers. As outlined in CGST Act: 'Manufacture' means *the processing of raw material or inputs in any manner that results in the emergence of a new product having a distinct name, character and use activity ;*
4c	• *Beneficiary resident IPRs*	**(iii)** The enterprise has obtained fully-owned Intellectual Property Rights such as software copyrights, Design rights, Patent rights resident in India during the last 3 years ;
4d	• *Exclusive Production License/ Transfer of Technology*	OR The enterprise has acquired exclusive production-License/ Transfer of Technology (ToT) for a minimum of 5 years;
4e 4f	• *Regular R&D expenses and* • *Qualified R&D Manpower*	**(iv)** The enterprise has made continuous investments towards in-house R&D: (a) by allocating, at least 5% of its Annual Turnover towards in-house R&D (b) by employing at least 10% employees for in-house R&D of which minimum 30% are qualified Post-graduate and Doctorate-fellows technologists/engineers in the fields of Telecommunications, Networking, Electronics Design, Software Engineering, Material Sciences, Chemical Engineering, Instrumentation Engineering, Reliability Engineering;

4g	• *Turnover Contribution based on beneficial IPRs held*	**(v)** At least 50 % of Annual Turnover of such an Enterprise is accounted as aggregate combination of: (a) Sales Turnover due to self-manufacturing based on fully-owned IPRs OR exclusive ToT (b) Proceeds due to licensing/ royalty against domestic Electronics Contract Manufacturing (c) Services associated with NATE products manufactured via (a) or (b)
4f	• *Minimum qualifying Turnover*	**(vi)** Minimum qualifying Annual Turnover i.e. Turnover as per (v) above is: (a) Rs. 5 Crore for Small Enterprises (b) Rs. 25 Crore for Medium Enterprises (c) Rs. 100 Crore for Others
5	**Renewal**	Each enterprise desiring renewed term should be required to submit audited statement regarding its financial health and R&D investment prospects in next 3 years.

4.192 In view of the discussions above**, the Authority recommends that a scheme, that offers tax incentives in the form of 15% corporate income tax to innovative enterprises with beneficiary resident IPRs, should be introduced for domestic enterprises working for NATE manufacturing. The salient features should be as follows:**

Sr	Key-aspects	Related Provisions
1	**Objective**	To incentivise high technology IPR-driven investments into NATE sector by extending tax-relief against prospective Income Tax for such enterprises / companies
2	**Duration**	Initially for 3 years, extendable by another 3 years.
3	**Tax relief**	On the lines of Section 115 BAB of Income Tax Act, the incidental rate of Corporate Income Tax applicable is 15 %, subject to fulfilment of certain conditions specified therein.
4 **4a**	**Essential Conditions:** • *Body Corporate*	**(i)** Corporate bodies such as Companies, Partnerships and Joint Ventures has remained registered in India for at least one -year before are eligible;

4b	• *NATE R&D based Manufacturing*	**(ii)** The eligible enterprise should be NATE manufacturers. As outlined in CGST Act: 'Manufacture' means *the processing of raw material or inputs in any manner that results in the emergence of a new product having a distinct name, character and use activity;*
4c	• *Beneficiary resident IPRs*	**(iii)** The enterprise has obtained fully-owned Intellectual Property Rights such as software copyrights, Design rights, Patent rights resident in India during the last 3 years; OR The enterprise has acquired exclusive production-License/ Transfer of Technology (ToT) for a minimum of 5 years;
4d	• *Exclusive Production License/ Transfer of Technology*	
4e **4f**	• *Regular R&D expenses and* • *Qualified R&D Manpower*	**(iv)** The enterprise has made continuous investments towards in-house R&D: (a) by allocating, at least 5% of its Annual Turnover towards in-house R&D (b) by employing at least 10% employees for in-house R&D of which minimum 30% are qualified Post-graduate and Doctorate-fellows technologists/engineers in the fields of Telecommunications, Networking, Electronics Design, Software Engineering, Material Sciences, Chemical Engineering, Instrumentation Engineering, Reliability Engineering;
4g	• *Turnover Contribution based on beneficial IPRs held*	**(v)** At least 50 % of Annual Turnover of such an Enterprise is accounted as aggregate combination of: (a) Sales Turnover due to self-manufacturing based on fully-owned IPRs OR exclusive ToT (b) Proceeds due to licensing/ royalty against domestic Electronics Contract Manufacturing (c) Services associated with NATE products manufactured via (a) or (b)
4f	• *Minimum qualifying Turnover*	**(vi)** Minimum qualifying Annual Turnover i.e. Turnover as per (v) above is: (a) Rs. 5 Crore for Small Enterprises

		(b) Rs. 25 Crore for Medium Enterprises (c) Rs. 100 Crore for Others
5	**Renewal**	Each enterprise desiring renewed term should be required to submit audited statement regarding its financial health and R&D investment prospects in next 3 years.

However, the issues pertaining to no domestic-taxes i.e. Basic Customs Duty and Safeguard measures have been separately dealt with in the subsequent sections.

VI. Promoting Start-ups ecosystem

4.193 India is emerging at the forefront of new age Start-ups in almost all sectors. These Start-ups with their creative ideas are bringing immense technical innovations and causing multiple positive disruptions. Since they are so instrumental for rapid development of a sector, promoting Start-ups within the NATEM space needs to be a priority. The main problem faced by Start-ups is the lack of funding required to convert ideas into commercialized products.

4.194 Besides, they have to face many persistent problems like lack of market access, opportunities for collaboration / trials in real-time scenario, lack of visibility or brand recognition in the initial days and consequent lack of faith arising thereof while going through series of steps in innovation cycle: Incubation-Accelerator-Proof of Concept-Minimum Viable Product. Accordingly, the Authority raised the following issue in the Consultation for stakeholders' opinion –

Q5. What additional measures are suggested for promoting and supporting the Start-ups ecosystem in the telecom sector in India?

4.195 Some stakeholders opined that to infuse confidence and stimulate a telecom product Start-ups ecosystem, proactive steps in the form of grants for early-stage tech risk sharing are required. Research

projects having commercialization potential, require funding and mentorship for initial years. They require support for making them scale to a matured eco-system in say next 5 to 10 years' period. A reference has been made to MEITY's Multiplier Grants Scheme (MGS) which aims to encourage collaborative R&D between industry and academic/R&D institutions for development of products and packages. Under the Scheme, if industry supports R&D for development of products that can be commercialized at institution level, then the Government supplements financial support that is up to twice the amount brought by the industry. The proposals for getting financial support under the Scheme are to be submitted jointly by the industry and institutions.

4.196 The stakeholders have submitted that Start-ups have primarily two challenges. First and foremost, there is absence of seed funding. There are various limitations in the initial investment for product development. Beyond that once the product is designed, they need market pull. Multiple TCOE (Telecom Centre of Excellence) have been established in Telecom sector & each one has one IIT & one TSP associated with them. The stakeholder has also submitted that out of 30 products developed through these TCOEs, there is hardly any product has been inducted so far by any TSP in its network. Market Access to Start-ups in India has remained extremely stunted. It has further stated that the mechanism for commercialization of the developed telecom products needs to be in place else the same will result in wastage of efforts and national resources. Keeping in view the emerging communications technologies, one of the stakeholders has stated that the support should be provided by way of trial orders, Proof of Concepts, observer demonstrations and funding distribution based upon market studies.

4.197 It has been suggested by other stakeholder that the problem can be resolved if all grants (except for blue sky research) are disbursed through industry out of which 30% should be earmarked for Start-

ups. Presently most grants are given only to Academic institutions or Government labs. Alternatively, Industry / Start-ups may be involved in the process by requiring them to infuse 25 % of the project cost from own sources which gets supplemented by grants to the tune of 75 %. To induce effective use of grant resources, industry/ Start-ups may be permitted to release funds to Academic institutions or Government labs based on likely deliverables in the given timeframe. This will ensure commercially viable products are better funded, co-worked and go to quicker commercialisation.

4.198 Another stakeholder has suggested that Credit Default Insurance providing third party credit risk mitigation to SME/Start-ups (as lenders) can be an important policy instrument for easing financing constraints.

Analysis of the Issue and Authority's view

4.199 Over the last decade, the Indian Start-ups ecosystem has evolved dynamically. The targeted initiatives led by the Central and State Governments, in addition to existing inherent advantages like demography, technological developments, entrepreneurial spirit, and market potential, have changed the landscape of the Start-ups ecosystem in India. The number of recognized Start-ups has increased from 452 in 2016 to over 92,000 in 2023. The Indian Start-ups ecosystem have also created more than 8.6 lakh jobs[108] by the end of the year 2022. Patent applications filed by Start-ups have also increased[109] significantly from 179 in 2016-17 to 1500 in 2021-22, indicating that India is effectively transitioning towards a knowledge-based economy. Table 4.19 summarizes some of the key initiatives from the Government of India to support and grow the Start-ups ecosystem within telecom sector in India.

Table 4.19 Government initiatives that support growth of Telecom sector Start-ups

[108] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1884256
[109] https://www.pib.gov.in/PressReleasePage.aspx?PRID=1880465.

Initiative Description	Sector/ duration	Objective	Financial Incentives
Digital Communication Innovation Square Initiative[110] (DCIS)	Telecom & IT: Start-ups, MSME &Consortium 04 years (2022-23 to 2025-26)	• To promote the ecosystem for R&D, design, Proof of Concept testing, and IPR creation for both hardware and software telecom start-ups • Bridge the gap between R&D and commercialization • To develop and establish standards meeting national requirements and international participation	• The total budgetary outlay is Rs. 124 Crore for 8 focus areas & 02 new CoE • Provides milestone-based Grant- in-aid from the proof-of-concept stage as given below - Start-ups: up to Rs. 50 Lakh - MSMEs: up to Rs. 2 Crore - Consortium: up to Rs. 10 Crore
Telecom Start-ups MSMEs Mission[111] (TSuM)	Telecom: MSME & Start- ups	• R&D facilitation for Start-ups, MSMEs including technology standardization, conducting trials and PoC, funding, and access to spectrum • Enabling facilitation and coordination with DoT, other Ministries, State governments, and other Agencies • Market enablement, handholding as needed • Any other areas to support Start-ups and MSMEs in line with the objectives of NDCP[112].	
Voluntary Certification Schemes[113]	Telecom: MSME & Start- ups (05 years)	• These schemes certify the product/equipment based on testing against the various parameters and conditions specified by the applicable TEC technical standards	• Exemptions in fees of testing and certification • Reduced renewal fees (Rs. 10,000 or 20,000) as per product-category

Table 4.20 below summarizes the key initiatives from the Government of India to support and grow the Start-ups ecosystem on sector-agnostic basis.

Table 4.20 Government initiatives that support growth of Start-ups (Sector agnostic)

Initiative Description	Objective	Financial Incentives
Start-up India Seed Fund Scheme[114] Start-up India, DPIIT	Financial assistance to early-stage start-ups (from all sectors) for proof of concept, prototype development, product trials, market entry, and	• Grants of upto Rs. 5 crores will be provided to the eligible incubators • Grants of up to Rs. 20 lakhs for validation of proof of concept, or

[110] https://www.meity.gov.in/content/digital-communication-innovation-square-dcis-scheme-0

[111] https://dot.gov.in/sites/default/files/TSUM%20OM_0.pdf

[112] NDCP aims to set up a consistent policy and framework, that will enable the creation of a vibrant competitive telecom market to strengthen India's long-term competitiveness and serve the needs of the country.
Source: https://dot.gov.in/sites/default/files/2018_10_29%20NDCP%202018_0.pdf

[113] https://www.tec.gov.in/voluntary-testing-certification

[114] https://seedfund.startupindia.gov.in/

	commercialization --- for 4 years starting from 2021-22	prototype development, or product trials to startups by select Incubator Investments of up to Rs. 50 lakhs will be provided to the startups for market entry, commercialization, or scaling up through convertible debentures or debt-linked instruments.
Fund of Funds for Start-ups (FFS)[115] scheme Start-up India, DPIIT	• FFS has the focused objective of supporting the development and growth of innovation-driven enterprises • FFS facilitates funding needs for start-ups across all sectors through participation in the capital of SEBI-registered Alternative Investment Funds (AIF)[116] AIFs supported under FFS shall invest at least twice the contribution out of FFS, in Start-ups as defined by the Government of India under the start-up India initiative	• Provides financial assistance to start-ups for Proof of Concept, prototype development, product trials, market entry, and commercialization with a corpus of Rs. 10,000 Crore. SEBI registered Alternative Investment Funds (AIFs) have target corpus of Rs. 48,000 Crore[117]
Technology Incubation and Development of Entrepreneurs Scheme[118] (TIDE) MEITY	• Aims to assist Institutions of Higher learning to strengthen their Technology Incubation Centres and thus enable young entrepreneurs to initiate technology Start-up companies for commercial exploitation of technologies developed by them • TIDE[119] 2.0 will promote tech entrepreneurship through financial and technical support to incubators in emerging technologies such as IoT, AI, Block-chain, Robotics etc.	• Grant-in-aid of up to Rs 155 lakhs per TIDE Centre (Rs. 30 lakh for infrastructure improvement and rest for financial support towards incubating companies @ Rs. 25 lakh/company as Soft-loan. 50% of loan is returnable at tenure-end & balance is converted into equity to the Centre. Closed in 2020 • Under TIDE 2.0, about 51 Centre are envisaged to hand-hold around 2000 Start-ups in 05 years. Such Centre would 3-layer structure <u>Incentives:</u> • Entrepreneur in Residence fellowship – Rs 4 Lakhs (Support Proof of concept ideas) • Grant Fellowship – Rs 7 Lakhs (Support prototype-based ideas – Pre-commercial based concepts)

[115] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1895964

[116] AIF is a privately pooled investment vehicle that collects funds from sophisticated investors, whether Indian or foreign, for investing it in accordance with a defined investment policy for the benefit of its investors

[117] https://pib.gov.in/PressReleasePage.aspx?PRID=1862374

[118] https://www.meity.gov.in/writereaddata/files/Details_of_Technology_Incubation_and_Development_of_Entrepreneurs(TIDE)_Scheme_Rev.PDF

[119] https://www.meitystartuphub.in/tide-2-0/

Initiative Description	Objective	Financial Incentives
Next Generation Incubation Scheme[120] (NGIS) MEITY, STPI	• NGIS focusses on Start-ups from 12 Tier-II locations across India viz. Agartala, Bhilai, Bhopal, Bhubaneswar, Dehradun, Guwahati, Jaipur, Lucknow, Prayagraj, Mohali, Patna, Vijayawada.	• Targets to incentivize 300 select Start-ups with seed-fund of up to 25 Lakh. • Pre-incubation 6-month Internship is provided with Rs. 10,000/- per month. • Marketing support, software product security testing service, Hackathon/ Challenge etc. •
Multiplier Grant Scheme (MGS)[121] MEITY	• Aims to encourage collaborative R&D between industry and academics/ R&D institutions for development of products and packages.	• Under the scheme, if industry supports R&D for development of products that can be commercialized at institution level, then government will also provide financial support that is up to **twice** the amount provided by industry.

4.200 Apart from existing initiatives by the Central government, several State Governments have also taken additional steps to support the growth of Start-ups ecosystem in their respective states, which could also be leveraged by Start-ups engaged in the telecom sector. Table 4.21 summarizes some of the key initiatives from a few State Governments which are generally sector agnostic:

Table 4.21 State Government initiatives to support growth of Start-ups

State	Infra-assistance	Sustenance Allowance	Mentorship support	Marketing Incentive	Interest subvention
Gujarat[122]	• Capital grant up to 50 % of Fixed cost of investment in plant & Machinery, capped at Rs. 50 lakh funding support for new Incubator facility, followed by recurring operational support, annual cap at Rs. 5 lakh. • Up to Rs. 10 Lakhs assistance	• Rs. 10,000/- per month as sustenance allowance per innovator	Available	Up to Rs. 10 lakhs	• Interest subsidy of 8% per annum for a period of 3 years against Bank loans, capped at Rs. 4 lakh/ year/ Innovator

[120] https://www.meity.gov.in/other-initiatives

[121] https://www.meity.gov.in/content/multiplier-grants-scheme

[122] https://www.startupindia.gov.in/content/sih/en/state-startup-policies/Gujarat-state-policy.html

	for Cost of Raw Material/ Components & other related equipment				
State	**Infra-assistance**	**Sustenance Allowance**	**Mentorship support**	**Marketing Incentive**	**Interest subvention**
Karnataka[123]	• Support of up to Rs. 10 Crore per Technology Business incubator for over a period of 5 years • One-time capital grant of max. 50% of Fixed Cost Investment, capped at Rs. 50 lakh for Private Incubator/Accelerator set-up beyond Urban Bengaluru.	One-time Grant-in-Aid, of up to Rs. 50 Lakhs	Venture Capital Fund of INR 100 Crores in select domains	• Reimbursements of 30% of the actual costs including travel incurred in international marketing, capped at Rs. 5 lakh per year per Start-up • 50% reimbursement of cost of quality certification fee (max 3 for Start-ups beyond Bengaluru)	• Direct loan of up to Rs. 10 Lakh through Karnataka State Women Dev. Corp. to women Start-up
Haryana[124]	• CoE on IoT set up with outlay of Rs. 22.6 Crore for 5 years • Capital grant of 50% , capped at Rs. 2 Crore for host Govt Institution and Rs. 1 crore for private (max 5 private incubators) • Support up to Rs 4 crore for Mobile application Development Centre • Established of one world-class Accelerator envisaged • Block-wise Seed grant for Start-ups ~ Rs. 10 lakh per Start-up	• Up to Rs. 10 lakh per Incubator for upgradation for IoT, AI etc. • Basic Plug-n-play facility at select 'Warehouse' locations • Reimbursement of lease-rent up to 50% for 03 years, capped at Rs.5 lakh/year/incubator with 100% reimbursement of Stamp Duty & Reg charges • Cloud-storage expenses reimbursement up to 75%, capped at Rs. 2.5 lakh/year/ Start-up	• Rs. 2.5 lakh per incubator, capped at Rs. 25 lakh/year • Acceleration assistance from 2.5 to 5 lakh per Start-Up	• Up to Rs. 50 lakh per incubator for delegation-level, capped at 12 events/year	
Tamil Nadu[125]	• Tamil Nadu Start-up Fund of Funds of INR 250 crore to be set up as AIF with Govt. funding of Rs. 75 Crore	• Provision of concessional lease/ rent to Start-ups	• one-time training grant of 75% of the training cost subject to a maximum of	• Declaration about planned Global Coordination Centre (GCC) to be set up in Dubai	• 3% interest subsidy, capped at Project cost – Rs. 25 lakh

[123] https://startup.karnataka.gov.in/docs/Startup_Policy_Karnataka.pdf

[124] https://cdnbbsr.s3waas.gov.in/s35352696a9ca3397beb79f116f3a33991/uploads/2022/07/2022071121.pdf

[125] https://startuptn.in/wp-content/uploads/2022/11/STARTUP-TN-Policy.pdf

	• Startup Seed Grant Fund of Rs. 50 Crore in partnership with FIs & Universities for early-stage financing (PoC etc.) • Revolving fund of Rs. 50 Lakh to set-up Sec 8 company to Technology Business Incubator (TBI) where 25% matching funds go from Seed fund against 75% sourcing by TBI • Up to Rs. 10 lakh seed Fund/ start up under TANSEED, limited to Rs. 1 lakh for Student Start-up		Rs 1 lakh for undergoing high impact entrepreneur-ship training of choice		under NEEDS[126]
Uttar Pradesh[127]	• Capital grant on setting up/scaling up technology infrastructure for Incubator up to Rs. 1 Crore/ Rs. 1.25 Crore for Purvanchal or Bundelkhand	• Up to Rs. 30 lakh per year for 05 years for Incubator • Rs. 17,500 per month per Start-up for 01 year (for 25 startups per incubator per year)	• Prototype grant of up to INR 5 Lakhs • Rs. 1 lakh per Start-up on matching grant basis for Accelerator program	• Marketing Assistance up to Rs. 7.5 Lakhs per Start-up (for max 25 Start-ups per incubator per year • Up to Rs. 1 lakh per Start-up for international events	

4.201 While the overall Indian Start-ups ecosystem has grown tremendously, the telecom sector hasn't experienced any noteworthy growth. The Networking and Telecommunication sector contributes to about 6 % of GDP**[128]**. Despite the strategic importance of the sector and its contribution to GDP, the sector lacks a mature Start-ups ecosystem. Currently, the telecom-based Start-ups account for only 1% of the overall number of DPIIT-registered Start-ups in India**[129].**

4.202 The extreme capital intensity of the NATE sector is the primary barrier for entrepreneurs from entering this space. Research and

[126] https://startuptn.in/Funding/

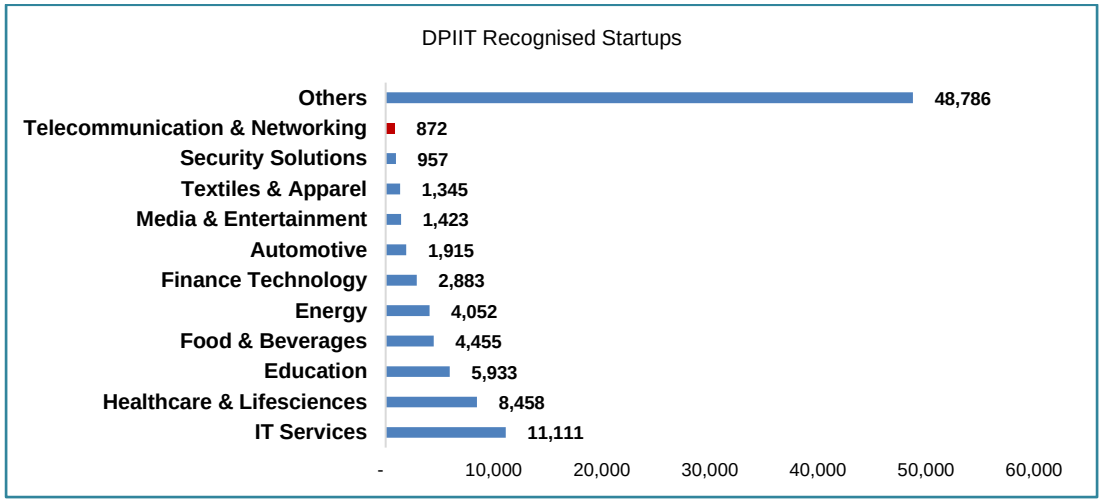
[127] https://invest.up.gov.in/wp-content/uploads/2023/02/Uttar-Pradesh-Startup-Policy-2020-First-Amendment-2022.pdf

[128] https://www.investindia.gov.in/team-india-blogs/telecom-industry-india-crosses-milestone

[129] https://www.investindia.gov.in/team-india-blogs/telecom-industry-india-crosses-milestone

development for new products, especially hardware products require significant investment and time. The telecom service providers also typically liked to work with two-to-three established vendors who generally have mature and interoperable products, making it exceptionally difficult for a Start-up to get access to the domestic market. This is reflected in the distribution of Start-ups across sectors as provided in Figure 4.8 where it is evident that the number of Start-ups in the telecommunications and networking sector pales in comparison to that in other sectors.

Fig. 4.8 Distribution of DPIIT[130]-recognised Start-ups across sectors

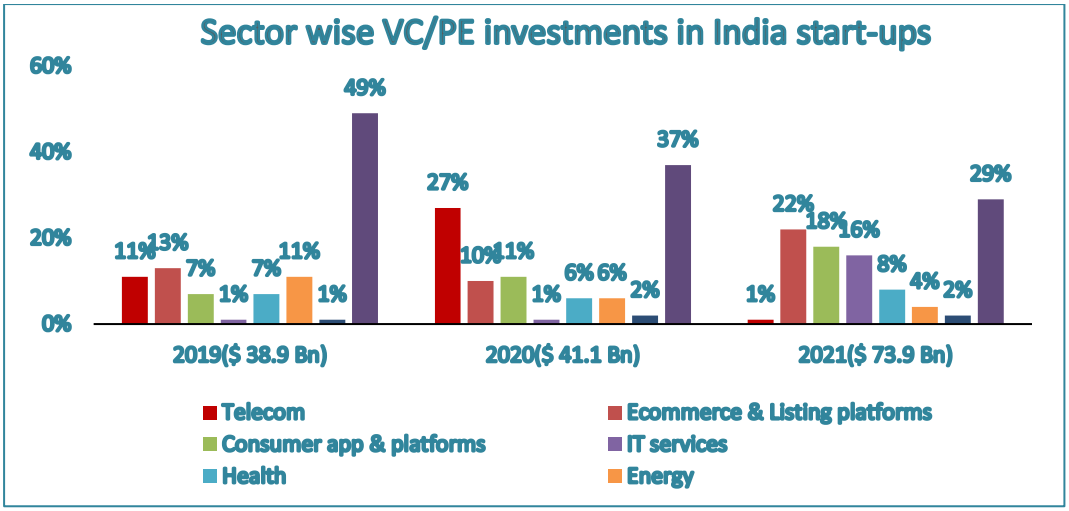


Source: https://www.startupindia.gov.in/, data as on 21-Feb-2023

Figure 4.9 below indicates that private investors remained more inclined towards investing in Start-ups in e-commerce, consumer platforms, and IT services sectors and the telecom sector ended up with only 1% of the total investments.

Fig 4.9 Sector wise investment breakup for Indian Start-ups (2019-2021)

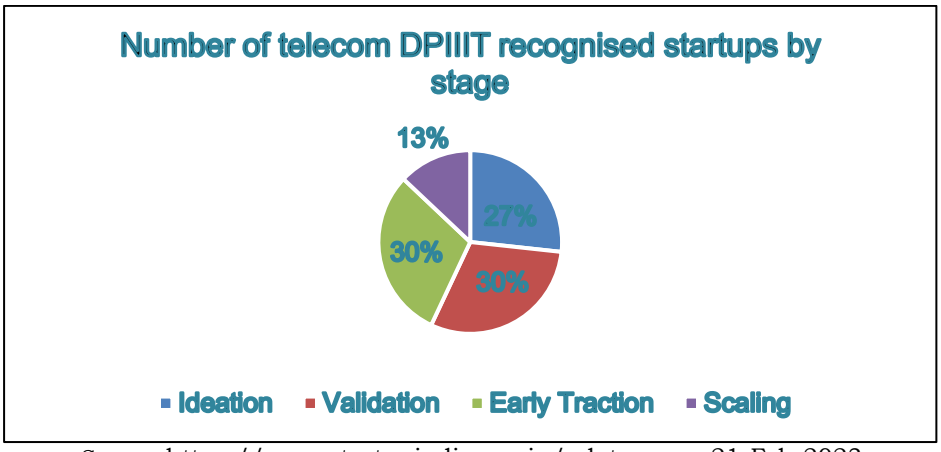
[130] Department for Promotion of Industry and Internal Trade



Source: India Investments Pulse 2021, Praxian Global Pvt.Ltd.

As evident from Figure 4.10 below, the telecom Start-ups in India are at a very nascent stage with a cumulative 57% of Start-ups still in product ideation and validation stages, and only 13% at the stage where they are scaling. The infancy of networking and telecom Start-ups necessitates those appropriate measures are adopted to nurture and help the Start-ups grow.

Fig. 4.10 Distribution of DPIIT Recognised start-ups across maturity stages



Source: https://www.startupindia.gov.in/, data as on 21-Feb-2023

4.203 In the telecom sector, Start-ups can be broadly classified into two categories based on the product segments that they focus on:

a) Software-based start-ups that focus on the development of applications like Virtual Network Functions (VNFs) or Cloud-native Network Functions (CNFs), Operations Support Systems (OSS), etc.

b) Hardware-based start-ups that design and manufacture hardware products like Customer Premises Equipment (CPE), base stations, switching and routing equipments, etc.

Table 4.22 provides a comparison of hardware-based and software-based Start-ups in the telecom sector based on various barriers to entry.

Table 4.22 Comparison of telecom Start-ups

Barriers to entry	Hardware-based product Start-ups	Software-based product Start-ups
Capital investment needed	• Hardware companies are capital-intensive. They require substantial funds at almost every stage of their lifecycle — from product ideation to mass manufacturing	• Overall set-up and operational costs are lower. • As the products are intangible, product prototyping and mass production costs are nominal.
Access to Capital	• Longer product development period (up to 5 years) and huge upfront capex needs make the segment less attractive to investors • As shown in figure 2.4, the investment in the telecom sector have decreased considerably through last few years	• Easier access to capital as the investment needed and gestation periods are lower
Time to market	• Very long time to market as product development and commercialization consumes significant time	• Shorter time to market • Easier to commence product distribution at scale, once the product is ready
Ecosystem maturity	• Inadequate collaboration between industry and academia, to further product innovation and R&D • Lack of adequate skill sets in hardware design and production •	• Numerous Start-ups Incubators and Accelerators are active in the country to support the start-ups • India is already a global powerhouse in software development
Market size and ease of access	• A sizable domestic market exists, but it is dominated by imports • New entrants face significant competition from incumbent players	• There is a significant domestic market with easier access to buyers when compared to hardware products

4.204 The advent of 5G, combined with a shift in government policies, is altering the situation and fuelling an increase in the number of telecom Start-ups in the country. Advancements in technologies such as SD-WAN (Software Defined Wide Area Network), NaaS (Network as a Service), NFV (Network Functions Virtualization), and service-based architectures introduced by 5G have now enabled TSPs to expose their networks to third parties such as Start-ups, which will accelerate innovation and improve competition in network functions and network-enabled services space. Telecom

operators around the world are hence, engaging with Start-ups with the objective to benefit from their agility, innovation, and execution speed. For Start-ups, such collaborations are a great opportunity to increase business know-how, receive investment and gain assurance of business.

4.205 Globally, leading telecom operators and OEMs in regions such as South Korea, Europe, and the USA are actively engaging with Start-ups working in the fields of 5G, Internet of Things (IoT), Cybersecurity, Cloud Computing, Artificial Intelligence (AI), Big Data and Analytics, and Network Functions Virtualization (NFV). For example, SK Telecom in South Korea, Deutsche Telekom, and Nokia in Europe, and T-Mobile in the USA run their own Accelerator centres that provide investments, support product development and commercialization to start-ups to drive innovation in the telecom sector[131].

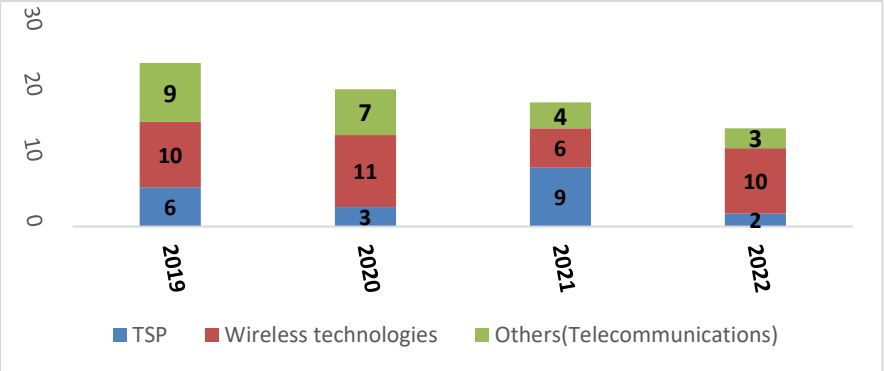
4.206 In India, the leading TSPs have recently started active-engagement with the Start-ups ecosystem through acquisitions, running Start-up Incubator and Accelerator programs, and hosting industry events. For instance, Bharti Airtel purchased a 10% stake in Waybeo a Start-up focussing on AI-powered call tracking for sales and marketing, and a majority stake in Lavelle Networks, which provides Software Defined Wide Area Network (SD-WAN) solutions to build end-to-end enterprise networking platforms. Airtel has also hosted the 'Start-up Innovation Challenge' to identify and nurture Start-ups developing solutions for 5G, IoT, Cloud Communications, Digital Advertising, and Digital Entertainment. Another leading operator Vodafone Idea has partnered with Start-ups such as Vizzbee Robotics Solution and Tweek Labs to test 5G-based solutions. Reliance Jio also collaborates and partners with several Start-ups through its JioGenNext Start-ups Accelerator.

[131] https://www.startus-insights.com/innovators-guide/telecommunication-innovation-map-discloses-emerging-technologies/

4.207 Based on stakeholders' comments and analysis thereupon, the Authority is of the view that there are still certain critical challenges affecting the growth of telecom Start-ups in India. Some of them are:

(a) *Access to capital:* Investors prefer to fund more mature Start-ups, and those with shorter incubation periods. Therefore, Start-ups in the telecom sector (especially start-ups working on hardware products) find it challenging to attract the interest of investors.[132] Globally, corporate investors remained wary of investing in telecom Start-ups last year. The value of telecom-related Start-ups deals backed by corporate sector fell[133] more than 87% last year, from USD 2419 million in 2021 to USD 307 million in 2022. There is a need to introduce alternate schemes providing financial support to Start-ups upfront for product development and commercialization, as they would otherwise find it difficult to attract the required private capital investments in telecom sector.

Fig. 4.11 Worldwide corporate backed deals in telecom Start-ups by sub-sector (2019-2022)



Source: https://globalventuring.com/corporate/investments-telecoms-startups-2021

(b) *Access to market* still continues to be challenging even for products co-developed with Telecom Centre of Excellence (TCOE) support so far.

[132] https://www.orfonline.org/research/the-indian-startup-ecosystem-drivers-challenges-and-pillars-of-support-55387/
https://trai.gov.in/sites/default/files/COAI_04042022.pdf
https://www.fiercewireless.com/tech/5g-powers-boost-telecom-startups-india
https%3A%2F%2Feconomictimes.indiatimes.com%2Findustry%2Ftelecom%2Ftelecom-news%2Fdot-clears-rs-50-crore-grant-to-43-startups-msmes-to-develop-indigenous-telecom-hardware%2Farticleshow%2F92575424.cms

[133] 'Tracxn Geo Annual Report: India Tech 2022.'

(c) *Access to telecom network for product trials* needs to be addressed as TSPs currently allow only carrier-grade products in their environment after completion of product development and stringent testing.

(d) *Lack of skilled manpower availability:* Currently, there is a demand and supply gap of 28% in the telecom sector for skilled personnel.[134] At present, workforce in India's telecom sector is estimated to be four million which includes 2.2 million direct employees and 1.8 million indirect employees. By 2025, India will need ~22 million skilled workers in 5G-centric technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), robotics and cloud computing[135].

(e) *Lack of awareness regarding Start-Ups ecosystem:* Despite multiple Schemes focussing on development of Start-ups ecosystem, awareness about such Schemes needs to be spread out amongst youth at fast pace. The Authority had interacted with several players in this space and found that most of them were unaware about the majority of initiatives taken by the Government.

(f) *Delay in IPR applications processing:* Despite being the second largest telecom market globally, India is not amongst the top patent appliers in the telecom sector. Furthermore, it takes approximately 58 months on average in India to end to end processing of patent applications, compared to approximately 20 months in China and 23 months in the United States[136].

4.208 To further understand the challenges faced by the evolving Start-ups ecosystem in India, the Authority studied about practices adopted in other countries such as South Korea. South Korea is regarded as one of the most innovative countries in the world. It has topped the 2021 Bloomberg Innovation Index, released in February 2021, for the

[134] https://www.tsscindia.com/App_Files/Media/220520041327-tmp359D.pdf
[135] https://www.ibef.org/industry/telecommunications
[136] https://www.ies.gov.in/pdfs/why-India-needs-to-urgently-invest-in-its-IPR-ecosystem-16th-Aug-2022.pdf

eighth consecutive year in Asia. It is also a global leader in the rollout of 5G and other emerging technologies[137]. Their Government has actively supported Start-ups, primarily through direct grants and funds to private equity and banks. South Korean Start-ups also frequently collaborate with established conglomerates to foster synergies and accelerate innovation which is one of the notable feature under State-led *Tech Incubator Program for Start-up (TIPS)***.** Types of support provided through this Incubator program includes[138]

(a) Funds to cover the cost of production of prototypes, purchase of equipment, procurement of necessary IPRs and test certifications up to KRW 100 million

(b) Financial support for global marketing, overseas exhibitions, incorporation, obtaining local permits, etc. up to KRW 100 million.

(c) Financial support of KRW 500 million (for 2 years) for commercialization and driving business growth.

[1 USD equals around 1323.5 KWR, 1 INR equals about 16.18 KWR]

The growth of the innovation ecosystem was also fuelled by strong participation through investments from the private sector. Venture investments in Korean start-ups have increased 78% year on year in 2021, surpassing 7.7 trillion won (Rs. 640 crore). As a result, in 2021, the number of new jobs created by Start-ups outnumbered those created by the four largest conglomerates in South Korea combined[139].

4.209 Taking a look at start up ecosystem in Israel, Israel's success as a Start-ups nation can be attributed to the country's dedication to promoting innovation in high-tech sectors by providing all the necessary ecosystem support elements such as access to capital,

[137] https://5gobservatory.eu/

[138] https://www.kised.or.kr/menu.es?mid=a20204040000

[139] https://www.weforum.org/agenda/2022/01/startups-in-south-korea-are-thriving-this-is-why/

access to the market, technology, and infrastructure. The Israel Innovation Authority[140] (IIA) has been set up as an independent agency, to effectively address the dynamic and changing needs of the innovation ecosystems. This includes early-stage entrepreneurs, mature companies developing new products or manufacturing processes, academic groups seeking to transfer their ideas to the market, global corporations interested in collaborating with Israeli technology, Israeli companies seeking new markets abroad and traditional factories and plants seeking to incorporate innovative and advanced manufacturing into their businesses. IIA has dedicated innovation divisions such as Start-ups, Division, Technological Infrastructure, International Collaboration, Advanced Manufacturing & Societal Challenges. Some of the key Government initiatives under IIA to promote the Start-ups ecosystem include:

a) *Incubator's incentive program:* The Incubators Program is intended to support Start-ups in the early stages of R&D who are having difficulty raising private financing through technological Incubators. No financial investment is required by the entrepreneur as the State would grant up to 85% of the approved budget (up to a maximum budget of Israeli New Shekel-NIS- 3.5 million) and the Incubator will supplement the State funding, with up to 15% of the approved budget. The incubator also provides physical space and infrastructure, administrative services, technological and business guidance, legal advice, and access to partners, additional investors, and potential customers.

[1 Israeli New Shekel, NIS ~ Indian Rupees 22.07]

b) *Innovation Labs program:* The objective of the program is to provide Start-ups with access to technological infrastructures, market insights, and sector expertise to help them transform a technological idea into a viable commercial product. The IIA

[140] https://innovationisrael.org.il/en/contentpage/israel-innovation-authority

funds 33% of the costs to establish the necessary technological infrastructure (50% in the periphery areas), up to a maximum of Israeli New Shekel 4 million (Rs. 0.09 billion), and 50% of the lab's ongoing operating expenses each year, up to a maximum of Israeli New Shekel 500,000 (Rs 0.01 billion), with no requirement for entrepreneur financing.

c) *Ideation (Tnufa) Incentive Program:* The objective of the Ideation (Tnufa) Incentive Program is to support up-and-coming Start-ups to develop and validate innovative technological concepts. Under this program, Start-ups can receive up to NIS 200,000 (Rs 45 Lakh) in conditional grants over two years, with NIS 100,000 (Rs. 22.5 Lakh) awarded each year (85% of the approved budget). Entrepreneurs are also not required to leave their current job to establish a company or to give up rights to the project as a condition of receiving support.

d) *The Early-Stage Incentive Program:* The Early-Stage Incentive Program was devised to support early-stage companies engaging in R&D and encouraging the growth and development of the high-tech industry in Israel. Start-up companies from all industrial sectors that are looking to upgrade their products and expand into the target market are eligible for the incentives, provided they have raised up to USD 10 million (Rs 0.8 billion) and had revenues of up to USD 1 million (Rs. 0.08 billion) in the previous year. The incentives include a grant of up to NIS 10 million each year (up to 50% of the approved budget) and additional incentives based on the geography they operate in.

4.210 Taking international best practices into consideration, innovation practice in many countries follows International Telecom Union's (ITU)

Innovation Model[141] for ICT centric ecosystems. The formative stages for an innovative Start-up go as follows:

(i) idea rich Start-ups are challenged to share their respective Concepts

(ii) the select formulations are mentored at Incubators to attain Minimum Viable Product (MVP) – first milestone

(iii) MVPs reaching the first milestone are mentored again at Accelerators to tailor technological innovations along with commercial aspects and user requirements i.e. Scaling-up - as second milestone

(iv) Product conformity to Standards & Labelling requirements-third milestone

(v) Market access including demonstrations at Trade Exhibitions-Fourth milestone

4.211 Recently introduced schemes/measures notified by Central and some State Governments have started working in this direction to boost innovations in advanced communication technologies up to 6G, IoT/ sensor networks, design practice with EDA tools (fabless design), computing & data centre, software development & testing etc. As Start-ups ecosystem is quite nascent, it should be adequately funded at key-stages:

(i) Seed capital

(ii) Incubation support

(iii) Accelerator assistance

(iv) Trial/testing in field conditions

(v) IPR management, Certification and Marketing Access.

The fund commitment for the same may come in Public Private Partnership (PPP) mode. So earmarked Public funds and Securities &

[141] https://www.itu.int/en/ITU-D/Innovation/Documents/Publications/Policy_Toolkit-Innovation_D012A0000D13301PDFE.pdf "Bridging the digital innovation divide: A toolkit for strengthening ICT centric ecosystem"

Exchange Board of India (SEBI) registered Private Venture Capital Ventures may participate together. Since private venture capital funds are quite adaptive at assessing market potential and associated commercial risks, each disbursal from the proposed Daughter Fund should become eligible only when a matching contribution is committed by the private hand.

4.212 The Authority has already recommended the establishment of NATE Development Fund (NATEDF) vide para 4.110 above. As the recommended corpus of NATEDF is Rs. 10,000 Crore, a new Daughter Fund to facilitate Innovation practice could be established by drawing at least 15% from NATEDF's corpus *i.e.* Rs. 1500 Crore as committed public contribution. The private sector should also be drawn for committing minimum corpus at least equivalent to public funding. Securities & Exchange Board of India (SEBI) registered Venture Capital fund should be invited to participate. This would set-up a Daughter fund with an initial target corpus of Rs. 3000 Crore on Public Private Partnership (PPP) basis. Involving both public & private sector should facilitate integrated approach (policy implementation with market-orientation) to make the domestic ecosystem innovative.

4.213 The Authority has also noted that renewal fees is being charged from MSEs/Start-ups under DoT's Voluntary Certification Scheme. Keeping in view that start-ups need to be incentivized, the Authority's maintains that the renewal fees charged from MSEs/Start-ups under DoT's Voluntary Certification Scheme should be fully exempted.

4.214 In view of the discussions above, **the Authority recommends that-**

(i) at least 15 % of NATEDF's total pool should be earmarked as Committed Public fund for *Daughter fund for innovation practice*. The Target Corpus, in Public Private Partnership ratio of 1:1, should be kept around Rs. 3,000 Crore. Only

Securities & Exchange Board of India (SEBI) registered Venture Capital fund should be entitled to participate.

(ii) This fund should exclusively sustain innovation practice by giving more focus on Accelerator stage.

(iii) Venture Capital, both in equity and soft loan mode should be made available to an eligible Start-up, subject to maximum of Rs. 20 Crore during its entire innovation cycle.

(iv) DoT should completely exempt MSE/Start-ups from paying renewal fees under Voluntary Certification Scheme.

4.215 DoT's DCIS provides for Ignition Grants to those Start-Ups and MSMEs who have already tested their prototypes (hardware/software innovations and need support for scaling up. As stakeholders have expressed concerns about capping of maximum support at Rs. 40 Lakhs per beneficiary for the project duration, the Authority views that in comparison to international best practices, capping the amount to only Rs. 40 Lakhs for scaling up of proven domestic product-idea is insufficient with respect to milestone requirements.

4.216 The Authority while interacting with the stakeholders also takes note that deserving Start-ups/MSEs should get required exposure to working practices at Standard-setting bodies to gain broader perspectives. It may include 100 % reimbursement of membership fees for participating entities after one-time registration through online portal. A sum of Rs. 50 Crore could be earmarked for such activity so that applicable fees could be reimbursed

4.217 Further, such Start-ups /MSEs who participate in standard-setting forums convened by relevant national or international Standard Setting Organisations (SSOs) should also be provided appropriate support including financial assistance against actual expenses. About Rs. 100 Crore could be provided for undertaking this activity The online portal proposed above, could subsume this activity as well.

The reimbursement should be made within 90 days of each completed submission.

4.218 This set of activities should be administered by Telecom Standards Development Society, India(TSDSI) which has been recognised[142] as Telecom Standards Development Organisation (TSDO) by DoT. In order to encourage academia's participation in standard setting forums, DoT/TSDSI should spread awareness through outreach programs targeting such Universities/ R&D Institutes and manufacturing units which are working in NATE related domains. The same online portal should integrate a 'help' feature where participating institutions may seek assistance through TSDSI regarding product standardisation.

4.219 In view of the discussions above, **the Authority recommends that**

(i) the Start-ups/ MSEs identified as beneficiary for award of Ignition Grants for scaling-up of proven product-idea should be supported by enhancing capped amount to Rs. One Crore in current tenure.

(ii) MSEs/ Start-ups should be provided with full reimbursement of applicable membership fees towards Telecom Standards Development Organisation (TSDO) and others.

(iii) Participating MSEs/Start-ups in standard setting forum, convened by relevant national Standard Setting Organisations (SSO) or international SSOs, should be provided appropriate support including financial assistance against actual participation expenses.

(iv) The fund-support of about Rs. 50 Crore and Rs. 100 Crore should be earmarked for reimbursement of membership fees and participation expenses respectively, to be

[142] https://tsdsi.in/wp-content/uploads/2020/09/Govt.-Authority-Letter-Establishing-TSDSI-as-National-Telecom-SDO.pdf

administered by Telecom Standards Development Society, India(TSDSI) through an online portal.

(v) TSDSI should facilitate participating MSEs/ Start-ups by providing an online portal where all eligible reimbursements are to be settled within 90 days once submitted through the portal.

(vi) TSDSI should organise awareness campaign regarding standardisation process prevalent by reaching out to the Universities, R&D institutions and manufacturing units working in NATE domain. TSDSI should facilitate participating institutions seeking its assistance for product standardisation by providing a 'help' feature on the online portal recommended to be set-up above.

4.220 Apart from extending financial support towards qualifying Start-ups/ MSEs, it is important to enrich the NATE manufacturing ecosystem in terms of highly skilled man-power. Given limited scale of co-working between the industry, Academic institutions and R&D houses at present, students of graduating courses in technological fields especially telecommunications & networking, advanced digital communications, instrumentation, and data computing must be made aware about innovation practices and entrepreneurial opportunities extended by Central/ State Government/ Industry. It would better orient the youth for higher participation in innovation practice - both as entrepreneur and as practitioner.

4.221 National Innovation and Start-up Policy 2019 (NISP) intends to guide Higher Education Institutions (HEIs) for promoting students' driven innovations & Start-ups and to engage the students and faculty in innovation and Start-ups activities in campus. However, the Authority while interacting with the stakeholders has noted that there is a clear need of raising awareness amongst students of technology or engineering so that they are oriented towards innovation opportunities by making best use of various support measures

already extended by the Centre, various State Governments and the industry.

4.222 Therefore, **The Authority recommends that DoT should take-up with All India Council of Technical Education (AICTE) to introduce an elementary compulsory course (of minor-credit value) for final-year curriculum of graduating courses in technological fields especially telecommunications & networking, advanced digital communications, instrumentation, and data computing in all affiliated institutions. Such course should orient the students towards innovation and make them aware towards various opportunities extended by Central/State Government & Industry in NATEM sector and for promoting entrepreneurs. The course should cover information on such policies as well as on schemes to support Start-ups eco-system. Content support for the recommended course should be extended by Telecom Centres of Excellence (TCoEs).**

4.223 Another obstacle in path of innovation practice, as referred by some of the stakeholders, is access to telecom networks for field-level test / trial of products under development. Since TSPs remain cautious about continuity of telecom services, securing their attention for live-testing under real-traffic conditions has not been forthcoming. TSPs however go for testing/ trial in case of established vendors or the product offering confirming to the international standards. The Authority has noted the concerns expressed regarding lack of Access to Trials/ Validation / testing etc. which ultimately hampers the commercialization process of new age telecom products. A Consultation Paper on '*Encouraging Innovative Technologies, Services, Use Cases, and Business Models through Regulatory Sandbox in Digital Communication Sector*' has been issued on 19 June 2023. Recommendations thereof shall be provided separately. Besides, aspects related to R&D are also under another consultation, R&D related concerns relevant to Start-ups have not been addressed here.

VII. Incentive structure for Telecom Product Development Clusters (TPDCs)

4.224 The objective of Telecom Product Development Clusters (TPDCs) that are dedicated to the manufacturers of technology products and solutions is to provide an environment that will enable development of an ecosystem where the input suppliers and finished product manufacturers are located close to each other. Therefore, creation of TPDCs has been recognized as a vital incentive to strengthen NATEM ecosystem in India. The Consultation Paper has discussed that it is very important for an Indian telecom manufacturing entities to have viable access to robust & reliable infrastructure, the cluster space for collaboration & co-creation and, conducive environment for high precision production.

4.225 Provision of incentives for TPDCs on lines of Special Economic Zones (SEZs), can go a long way in attracting sectoral investments, facilitate quicker compliances, commence production quicker and distributing common overhead costs. Any fiscal or non-fiscal support towards such Cluster may make it preferred place for setting-up production/ manufacturing facilities for potential investors. The Consultation paper has raised the question regarding needs to create TPDCs and appropriate the incentive plans as given below –

Q.13. What should be the incentive structure (fiscal and infrastructural) for Telecom Product Development Clusters (TPDC) set up within the EMCs or separately?

4.226 Some of the stakeholders have submitted that the essential features to be provided in such Development Clusters should include:

(a) Low-cost infrastructure (land/ utilities- power, water etc.)

(b) Superior communication and technology infrastructure

(c) Single window clearance for Central and State level approvals

(d) Centralized testing agency for all companies /Access to Trial / Testing beds

Desirable support features include:

(a) R&D Promotional Schemes and Incubation services

(b) R&D clusters co-located with innovation firms.
Plug and play office in such R&D clusters for start-ups.

(c) Schemes for nurturing MSME and Start-ups.

(d) Tax exemptions and subsidies (on lines of SEZ) –

i. Duty free import/domestic procurement of goods for development, operation, and maintenance of SEZ units.

ii. 100% Income Tax exemption on export income for SEZ units for first 5 years, 50% for next 5 years thereafter and 50% of the ploughed back export profit for next 5 years.

iii. Supplies to SEZs are zero rated under the Integrated Goods & Services Tax (IGST) Act.

4.227 As per stakeholders, availability of Cluster for collaborative innovation, incubation trials, Proof of Concept, Accelerator/ Test Bed, and manufacturing industry to interact can vastly enhance the utility of TPDCs as envisaged.

4.228 In some responses, reference has been made that China has several National Economic and Technological Development Zones (NETD Zones, or ETDZs) and Special Economic Zones (SEZs). It has recently developed policies supporting SMEs and manufacturing research and development (R&D) which incorporate huge deductions in taxes for various components in the manufacturing value chain. This might become a reference point for framing incentives for component manufacturing in the country.

4.229 Some stakeholders have suggested following incentive mechanisms:

(a) the Government may consider introducing Duty Credit Scrips linked to export quantum which could be offset against local duties for a period of 5 years;
(b) treat intra-SEZ transactions as deemed exports;
(c) the export benefits should propagate to component manufacturers within the manufacturing zone;
(d) refunds and accrual of CENVAT credit process be streamlined;
(e) component specific incentivisation may be considered to develop component ecosystem.

4.230 A few stakeholders also indicate need to facilitate TPDC having access to skilled work personnel, by keeping provision for nearby -

- 10+2/ITI/Diploma schools
- Low-cost residential housing in vicinity
- Medical and Banking facilities

4.231 Submissions of the stakeholders have also mentioned that TRAI's earlier Recommendations of year 2011 & 2018 have already taken-up the issue and the observations/ recommendations made then, are still relevant. They opine that quick action on the same is the need of the hour.

Analysis of the Issue and Authority's view

4.232 Realising the potential of Telecom Clusters in improving the profitability of domestic manufacturers through proximity of related units, better infrastructural facilities and cost benefit through better logistics, the Authority in 2011 has recommended that *Ten telecom clusters be identified immediately. The Central / State Governments should make all efforts to develop infrastructural facilities in a time bound manner so that the infrastructure related disabilities are removed for the units that are located in the clusters.*

4.233 Further, TRAI's Recommendations of year 2018 have recommended that *Telecom Product Development Clusters (TPDC) within the Electronic Manufacturing Clusters (EMC) should be established. The Government should extend suitable incentives to the TPDCs so as to attract talent and investments into these clusters.*

4.234 TPDCs can be promoted through Government's support or in Public Private Partnership mode by providing / facilitating pre-identified land, adequate availability of utilities such clean water, power supply, logistics, waste disposal facilities etc. Creation of thriving self-sustaining TPDCs may require some exemptions/ incentives and infrastructural support as it was envisaged during setting-up of Special Economic Zones(SEZs) and Software Technology Parks (STPs). Apart from basic infrastructure amenities, other facilities such as Incubation/ Accelerator services for nurturing MSEs & Start-ups, Access to Trial/ testing beds, Regulatory sandboxes could be provided in TPDCs.

4.235 As discussed in above sections, the Government has formulated Electronics Manufacturing Cluster (EMC & EMC 2.0) Scheme for wide set of electronic products to be manufactured indigenously. Some of the main deliverables for the benefit of domestic industry under EMC Schemes are mentioned in brief:

(i) Access to land-plot in an area exclusively developed as manufacturing cluster for electronics production at subsidised rates. Central Government's financial assistance on aggregate basis is around 20% of the Project-costs. This assistance is taken into account by Implementing Agencies working under respective State Governments while carrying out land-development & infrastructure facilities. These agencies while undertaking development of the complex pass-on certain subsidy benefits to industrial entities looking for land-parcel.

Degree of subsidy per acre of developed land, however, varies from State to State;

(ii) Under EMC 2.0, the cluster would be set up in geographical areas of certain minimum extent, preferably contiguous;

(iii) It also provides for Common Facility Centre (CFC) which provides common (i) Support services (including Centre of Excellence for R&D, Incubation, Skill Development facilities) and, (ii) Manufacturing support (including Tool room, CAD/CAM Design House, Plastic Moulding, Metal sheet Stamping, Component Testing, Packaging services);

(iv) Access roads towards Highways and nearby ports/ airports/ railway terminals

(v) Utilities such as electricity supply without statutory cuts, adequate water supply etc. for industrial usage are provided

(vi) Other essential facilities such as lighting, waste Management, effluent Treatment, firefighting and safety equipments are also envisaged.

(vii) Apart from above, operational incentives permitted by respective states under their industrial/ electronics/ ESDM policies are also available to EPC in respective States. It may include

(a) one-time relaxation/ reimbursement of Stamp Duty charges/ land use fees/ Registration charges

(b) electricity supplies at discounted tariff along with exemption from paying electric-duties

(c) reimbursement of State GST (SGST) up to 100 % in some cases

4.236 Table 4.23 given below gives an illustrative picture in case of a few States:

Table 4.23 Operational Incentives/ Infrastructure support, as per State's policies in a few States

State	Operational Incentive	Infra-support

Gujarat	(1) Stamp Duty – 100% reimbursement (2) Registration charges- 100 % Re (3) Interest Subsidy- up to 7% on Term loan, Cap at Rs. 10 Cr/annum, for 05 years (2% min interest rate to be borne) (4) Freight Subsidy: One-time plant re-location support, Up to 50 % on Imported Plant, Cap at Rs. 5 Cr. & Additional subsidy on Imported Freight up to 25%, capped at Rs. 5 Cr for 05 years. (5) Power Tariff subsidy: Re 1/- per unit for 05 years (6) Electricity Duty Exempted (7) Up to 100% Subsidy on Employer's EPF Contribution in case of Female employee & 75% in case of male emp.: For 05 years (8) Skill training: ▪ Train the Trainers: Up to Rs. 10 Lakh per faculty, domestic & international, for travel & stay. ▪ Provision of skill training thru' ITI, Training cells ▪ Up to Rs. 50K per month support for Post-Doc Fellow , towards domestic IPR creation. (9) Water Subsidy (Semiconductor Policy): Rs. 12 per cu m. for 05 years	(1) Single window Digital service for Application & further tasks (2) Dedicated co-ordination desk for ease-of-doing-business (3) Uninterrupted power supply provision (4) Support for Market out-Reach (5) Self-certification compliances to various Labour Laws
Karnataka	**Under Special Incentive**: (1) 100 % Reimbursement of Stamp Duty/ Registration/ Land conversion charges (2) Power subsidy: Re 1/unit for 05 years (Reimbursement) (3) Power Duty: 100% exempted (4) PLI @ 1% of Annual Turnover for 05 years	
	(1) Stamp Duty – 100% exemption for Start-ups & MSME & 75 % for Others (2) Registration charges- Concession rate @ 0.1 % (3) Land Conversion charges- 755 Re-imbursement to S &M, 50 % for Others (4) Interest Subsidy- up to 6% on Term loan for Start Ups & MSME, Cap at Rs. 50 lakh in 05 years (5) R&D Grant – to cover R&D expenses including expenses on full-time staff with Graduation in Engg. For less than 7-year-old company, Cap at Rs. 2 Cr per year/annum, Max 02 times in 05 years (6) Patent Registration - Up to 75 % upon filing, Cap Rs. 2 lakh for Domestic & Rs. 10 lakh for International Patent filing. Rest 25% upon grant of Patent (7) Quality certification – Up to 50% , cap at Rs. 10 lakh per year	(1) Karnataka Innovation Authority under the Act to provide for Regulatory Sandbox – controlled experiment basis by introducing time-limited leniency towards current compliance structure. (2) 47 Innovation Hubs 06 CoE (1 on IoT, 1 on AI) 05 Tech Business Incubators -- supported

	(8) Reimbursement of Prototyping Costs – Up to 50% , Cap at Rs. 10 lakh /year for max 02 sanction/year/company. (9) International Market Outreach– Up to 5 lakh per year against travel/stay cost of max 02 employee per year per company (10) Power Tariff: Industrial Rates to apply (Re 0.7 to 1.0 lower than Commercial rates) (11) Subsidy on Employer's EPF/ESI Contribution: Rs. 2000/ employee/month for 24 months, Cap Rs. 12 lakh (12) Effluent Treatment Plant: Up to Rs. 50 lakh support for Start Ups/MSME & Rs. 1 Cr for Others	
State	**Operational Incentive**	**Infra-support**
Haryana	(1) Stamp Duty – 100 % reimbursement for Blocks B/C/D & land notified for ESDM (2) Property Tax exemption– 10 years (3) SGST Reimbursement – 100 % for Block-A for 05 years & for Blocks- B/C/D/ for 10 years. (4) Interest Subsidy for MSME – Up to 6%, Cap at Rs. 10 lakh/ year for 08 years whenever it does not exceed net SGST paid in the corresponding year (5) Credit Rating Subsidy– Up to 75 %, Cap at Rs. 2 lakh for provision of Collateral free loan up to Rs. 1 Cr when State makes Rs. 100 Cr contribution to CGTMSE (Credit Guarantee Fund Trust for Micro and Small Enterprises) fund. (6) Power subsidy– Special tariff @Rs. 5.49/unit subject to MoU with State of Haryana (7) Electric Duty – 100 % Exempted for 07 years (8) Technology acquisition support– Up to 50% of cost due to technology sourced from recognized National Institutes, Cap Rs. 1 Cr. (once in 03 years) (9) Testing Equipment Assistance– Up to 50%, cap Rs 5 lakh for zero-defect product line (10) Patent Fee / Quality certification Re-imbursement– Up to 50%, Cap at Rs. 10 lakh & Rs. 25 lakh Domestic/ International patent filing & Cap of Rs. 6 lakh in 05 years for max 3 QCs. (11) Employment Generation subsidy--- Up to Rs. 36 K/ year/employee for 5-year period if unit is in B,C,D Block	(1) No statutory power-cuts. 02 dedicated feeders. (2) Participation space in International Trade fair (Haryana Pavilion) (3) Award for Innovative Product (Rs. 3 lakh) (4) Dedicated Single Roof service for Application etc with International Desk (5) PIU for mid-course policy interventions, based on feedback (6) Self-certification/ 3rd party Certification against 13 Labour Laws with only One Single Return & no Inspector site-visits (7) 3-shift operations permitted with women emp as well (8) Deemed Clearance for Land-use in 31 + 745 Blocks (9) IP Facilitation centre (10) Skill Training: - Train the Trainers: 500 trainers in 05 years (Rs 1 lakh/faculty) Max 5 faculty/year/University - ESDM Certified Course: Target 15,000 candidates in 05 years - Research Fellowship: 50 % research grant for max 50 Scholars per year, Cap per student-Rs. 10 lakh

State	Operational Incentive	Infra-support
Tamil Nadu	(1) Stamp Duty – 100% reimbursement for Distt –C & 50 % for other Distt A/B. (2) Interest Subsidy- upto 5% on Term loan for 06 years (Cap at Rs. 0.2 Cr/Large unit/annum) (3) Electricity tax exempted – 100 % (4) Training subsidy for TN natives -- Training subsidy of Rs. 4,000 per first time employee per month up to 6 months; and Training Subsidy for Women of Rs. 6,000 per first time employee per month can be availed up to 6 months. (5) Patent Filing - Upto 50 % of filing costs, Cap Rs. 2 lakh (Rs. 5 lakh /Application), not to exceed Rs. 50 lakh support per company. (6) Quality certifications: 50 % subsidy, Cap at Rs 1 Cr / company. (7) Train the Trainer support: Up to Rs. 2 lakh support	(1) Single Window Portal-Facilitation under Tamil Nadu Business Facilitation Act 2017 (2) 4 or 2 lane road connectivity to the EMCs from the nearest national / state highways. (3) Reliable power-supply thru' 02 feeders (4) Electronic repair parks with e-waste mgmt. envisaged. (5) Twin city agreements with electronics manufacturing cities in countries such as Japan, Vietnam, South Korea, Taiwan, Israel, Singapore etc. (6) Skilling over 1,00,000 persons each year for the next 4 years in five-levels (7) Self or 3rd party certification / labour laws & flexible working hours with 3-shift approval (women included) (8) Mega Electropreneur Centre (MEC) to be developed as CoE & Mini Electropreneur Centre (MiEC) as Prototyping Lab & Innovation Grants & Seed Capital Investments
Uttar Pradesh	(1) Stamp Duty – 100% waived (2) Interest Subsidy- Up to 5 % if Invested amount = Rs. 200 Cr (Rs. 1 Cr/year for 05 years *i.e*. Rs 5 Cr per unit) (3) Electricity tax exempted – 50 % for 10 years (4) Patent Filing - Reimbursement upon Successful Grant of Patent, Cap Rs. 5 lakh for Domestic & Rs. 10 lakh for International filing	(1) Policy envisages 03 CoE be set-up where 25 % fund support would be from State of UP & rest 75 % from Union Govt. (2) Self or 3rd party certification/ labour laws & flexible working hours with 3-shift approval (women included)
Maharashtra	(1) Stamp Duty – 100 % waived (2) Property Tax --100% exempted (3) Interest Subsidy- upto 5% ; higher support reserved for MSME (4) Credit rating subsidy for MSME: 75 %, Cap Rs. 50K (5) Power Tariff subsidy: Re 1/ unit for 03 years in A/B areas & 5 yrs in other areas	(1) Support to R&D institutions/Testing Facilities/Incubation and Innovation centers by providing 50% of the project cost excluding land and building, Cap at Rs 25 Cr.

	(6) Electricity Duty exempted – 100 5 for 15 years (7) Patent Filing 75 % subsidy, Cap Rs 10 L for Domestic/ Rs. 25 L for Int; (8) Quality Certifications- Max 03– Up to 50 % subsidy, Cap Rs. 6 L in 05 yrs. (9) For MSME— a) 25% subsidy on capital equipment for technology up-gradation, Cap Rs. 25 Lakh, b) 25% one-time subsidy on capital equipment for cleaner production, Cap Rs. 5 lakh.	(2) MH Electronics Development Fund (as Fund of Funds), initial Corpus Rs. 50 Cr. for Start-up venture funding etc. (3) No statutory power-cuts-Dedicated Feeders (4) Viability gap Funding for Domestic/ International Symposium thru' Industrial-Assoc., up to Rs. 10 Lakh (5) 50 % support for Convention/Trade Centre (exc land costs), Cap Rs.10 Cr (6) 3-shift operations permitted with women emp as well (7) Self-certification and filing of consolidated annual returns under 13 Labour Acts (8) Market Development Support–funding support to participate in International Trade fair/ National Conf/ Intern 'l Conf. including MSME.
State	**Operational Incentive**	**Infra-support**
Assam	(1) Stamp Duty, Registration & Conversion Charge – 100 % reimbursement for park developers and 50 % for first 50 units (2) SGST paid-- 100% reimbursement (3) Interest subsidy – 2% per annum for Term Loan, for 05 years (Cap at Rs. 50 lakh/unit) (4) Power Tariff subsidy– Rebate upto Rs. 6/ unit for 05 years, capped at Rs. 20 lakh per unit (for first 25 units) & 50 percent rebate for Incubation centre, capped at Rs. 6 lakh/year (for first 5 centre) (5) Patent Filing -- 50 % assistance, Cap Rs 2 L for Domestic/ Rs. 5 L for Int. per Filing, subject to Unit-level Cap at Rs. 10 L per 02 years & Rs. 25 L per 03 years respectively. (6) Technology Transfer and Quality Certification, ZED Certification– 75 % reimbursement of costs, cap at Rs. 10 lakh/unit. (7) E-waste Management assistance– Upto 40 % of Fixed Capital Investment, Cap at Rs. 4 Cr. / unit IF at least 75 persons employed (First 03 units only) (8) Effluent Treatment Plant – 50% cost assistance, Cap at Rs. 25 lakh/ unit (9) State level PMA Preference to manufactured products	(1) Flexible Working hours – 3 shift operations inc women permitted. (2) Single Window clearance & Nodal office support (3) Support to Innovation & R&D– Upto 30% assistance on R &D expenses inc HR costs, Cap at Rs 2 Cr. /unit/ year. & top-up of 50 % reimbursement of Sponsored Research (unit to Tech Institution), cap Rs. 50 L/ unit. (4) Support to CoE– For Govt partnered CoE, Stamp Duty 100% exempted, 20 % reimbursement for Quality certification up to Rs. 5 lakh/year, Event Promotions Support upto 30% of costs-upto Rs. 5 lakh / year, Internet Charges reimbursement upto Rs. 2 lakh /year and Investment Subsidy of 50% of FCI-upto Rs. 5 Cr.

	Central Incentives for new Registered industrial unit specific to NER: **North-East Industrial Development Scheme 2017** (1) Central Interest Incentive(CII)– 3% rebate on Working Capital credit for 05 years, anywhere in NER. Working capital capped at 25 % of Annual Turnover. (2) GST Reimbursement – 100 % reimbursement of CGST & IGST for goods produced in NER for 05 years. (3) Income Tax Reimbursement– Central portion to be 100% reimbursed for 05 years (4) Employment Incentive: Central Govt to bear 12 % Employer's contribution to EPF along with *PM Rojgar Protsahan Yojana* (5) Freight subsidy– 20 % for freight charges thru' railways / Inland Waterways & 33% of air-freight, connecting production centre (nearest station/ airport) to Buyer's nearest station/airport. **Condition:** Production to start within 18 months post-approval	(5) Exemption from Factories Act – Flexible Working Hours of Adults
State	**Operational Incentive**	**Infra-support**
Telangana	(1) Stamp Duty – 100% reimbursement (2) Registration charges- 100 % reimbursement (3) SGST Re-imbursement – 100 % for MSME- 05 years- Cap Rs. 5 Cr & 07 yrs for Others- cap Rs. 7 Cr (4) Subsidy on Lease rental-- 25 % , up to 10 years (5) Interest Subsidy- upto 5.25 % on Term loan for 05 years (Cap at Rs. 1 Cr/unit/annum) (6) Freight Subsidy: Reducing subsidy for Imports (60 % to 20 % in 04 annual steps) (7) Power Tariff subsidy: Industrial class tariff. Special Tariff for Mobile Manufacturing units (25% subsidy, Cap at Rs. 30 lakh in 03 years) (8) Electricity Duty Exempted– 100 % for 05 years (9) Patent Filing - Upto 50 % of filing costs, Cap Rs. 2 lakh (Rs. 5 lakh for mobile Manufacturing) (10) Quality certification – Up to 50% , cap at Rs. 2 lakh	(1) Plug-n-Play space for Electronics Companies (2) Single window system (TS iPASS): Chief Relationship Officer as Nodal (3) T-Hub, WE Hub & TSIC for innovation breeding. (4) No statutory power-cuts (5) Telangana Academy of Skill & Knowledge to impart training to 1.8 lakh personnel at no-cost. (6) 3-shift operations permitted with women emp as well (7) Self certification / labour laws (8) R& D support : 20% of project cost or up to INR 10 Lakhs for R&D entrusted to Govt R&D/ Tech college

4.237 From the above, it can be construed that most States have their own policies relating to land, industry, investment, employment, electricity, water supply, taxes within the jurisdiction, skill training etc. The most common financial incentives that States are providing are-

(i) One-time exemption from land related Stamp Duty, registration charges, change in land-use & lease charges;
(ii) Reimbursement of State GST on 100 % basis, subject to varying limits for MSME & non-MSME entities;
(iii) Interest subvention on Term-loan from 2 % to 7 %, subject to varying limits;
(iv) Freight movement including re-location of plant & machinery;
(v) Exemption from local duties on electric power supply & marginally lower unit rate per KWh; and
(vi) Support for Credit rating, Quality certification, e-waste management facility, skill training and patent filing.

Besides, some of the States also facilitate the following:

(i) Self or third party certification in respect of various labour laws, adaptation towards flexible working hours with approval for 3-shifts round the clock permitted;
(ii) Single-window interface for State-level permissions/ clearances /declarations;
(iii) Exemption from statutory power-cuts;
(iv) Part-funding support for Centre of Excellence/ setting-up of Innovation facility, participation in exhibitions;
(v) Access road connecting cluster to National/ State Highways; and
(vi) Part-funding support for setting up of Industrial Waste/ e-waste treatment facility in clusters

4.238 DoT has financially supported establishment of 5G test Beds at five (05) locations *i.e.* CEwiT/IIT Madras, IIT Delhi, IIT Hyderabad, IIT Kanpur and IISc Bangalore and has initiated plan to establish 100

labs for 5G use-case in various technical institutions/ Universities across the country. Giving preference to such EMCs / TPDCs where industrial collaboration with near/co-located technical institutions with adequate infrastructure support is need of the hour. Besides, ready access to testing facilities with world-class labs and R&D centre in the vicinity would enrich the innovation ecosystem established around EMCs or proposed TPDCs.

4.239 Ministry of Commerce is working on fresh legislation, *'Development of Enterprise and Service Hubs*' (DESH) relating to SEZs, where it is envisaged that State Governments would be participating in the development of facilities and access infrastructure in respective areas. Further, it is noted that State under their respective industrial-electronics manufacturing- ESDM-Semiconductor policies provide certain facilitations of monetary and non-monetary value.

4.240 In view of the discussions above, **the Authority recommends that**

(i) Telecom Product Development Clusters/ Parks (TPDCs) should be established on priority within approved Electronics Manufacturing Clusters (EMCs) or in close vicinity.

(ii) The facilities extended in any given EMC should be extended to the corresponding TPDC on *mutatis mutandis* basis. In addition, following benefits should also be extended to TPDCs :

(a) Provision of Power and water at reduced rates

(b) Waiver of Electricity Duty

(c) Reimbursement of stamp duty, conversion fee, transfer duty and registration fee

(d) Providing free Right of Way for Telecom Service/Infrastructure including Indoor Building Solutions (IBS)

(e) Time-bound single window clearance for Central and State level compliances

(f) State of the art testing labs with plug-n-play facilities and infra-support for R&D centre.

VIII. Support required for exporters of indigenous equipment

4.241 Both international arrangements and domestic policies of respective countries may influence export competitiveness of domestically produced goods. There are various ways in which the cost-disability suffered by indigenous NATE industry *vis a vis* some other countries and business-risks could be mitigated to limited extent. The Government has declared and implemented certain schemes to promote export. These include:

(i) *Remission of Duties and Taxes on Export Products Scheme* (RODTEP). The Scheme has been introduced so that the manufacturer exporters could receive refunds on the embedded taxes and duties previously non-recoverable like VAT, Mandi tax, Coal cess etc. thereby reducing their operational expenses.

(ii) *Term-financing* through Export Import Bank of India (EXIM Bank). Term finance is provided to Indian exporters of eligible goods and services which enables them to offer deferred credit for overseas buyers. EXIM Bank also provides term loan / deferred payment guarantees to 100 % export-oriented units, units in trade zones, computer software exporters in collaboration with International Finance Corporation, Washington. It therefore enables small and medium enterprises to upgrade export production capability.

(iii) *Interest Equalisation Scheme* – This scheme provides for rebate on interest rate to manufacturer exporters against the loans available from banks.

(iv) *Export Credit Guarantee Corporation Scheme (ECGC)*- This scheme has been implemented to provide insurance protection to Indian exporters against payment risks by offering several types of insurance covers. In order to discuss effectiveness of such schemes, the Authority has raised the following issue in the Consultation Paper -

Q15. Whether the current schemes/ measures or policy support for exporters of Indian manufactured equipment are sufficiently meeting the requirement to promote the global competitiveness of Indian NATE exporters? Are the Schemes/instruments in India consistent with the international schemes for exporters in leading manufacturing countries? Please suggest measures to bridge the gap if any.

4.242 Stakeholders have opined that there is a need for a policy whereby Indian manufacturers are provided with assistance to market their products globally. A local manufacturer should be able to market, compete and promote their products and solutions in foreign markets. This should be done by way of - financial benefits for export, some grant to participate in trade shows, expos and advertising spend in foreign markets. Additionally, simplifying export controls such as DGFT SCOMET to make exports' approval faster and easier for large volume exporters through a separate dedicated channel is necessary. A similar dedicated clearance channel is also required for making India a Repair Hub – for bringing faulty equipment in India, repairing, and returning within a fast-track timeline.

4.243 One of the responses has mentioned that Government of India has withdrawn most of the fiscal incentives supporting export promotion as under WTO there is not enough room now to provide fiscal measures (such as export subsidies). *Remission of Duties and Taxes on Export Products Scheme* (RODTEP) has replaced the MEIS (*Merchandise Exports from India Scheme*) in effect from 1 January

2021. As RoDTEP focuses over re-imbursement of local duties incidental upon production-inputs when such produced goods are exported, it would support the indigenous production. Earlier, there were no such re-imbursement schemes. Still, there is need for further export incentives.

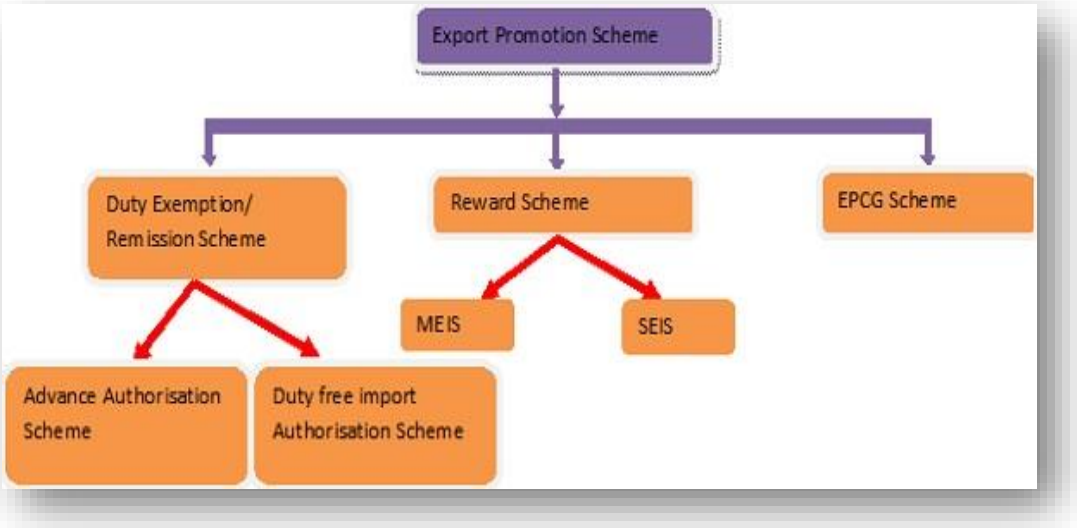
4.244 A few stakeholders have stated that the Government should aim to create National Champions in the telecom sector by identifying companies that have the potential to reach global size/scale and help nurture the domestic telecom product eco-system. National Champions should be given an opportunity to supply at "fair" prices, based on already discovered global prices (or imports) and/or based on their cost structure. Active export promotion through a $10 billion Government to Government lines of credit in bilateral trade is desired so that global volumes can be generated. According to them, the Government can facilitate the use of third-party patents by ordinary MSME and pay for the annual royalty fees to the inventors on behalf of the user to help them produce and sell at competitive prices in the global market. Fiscal incentive in form of duty rebates/subsidies, attractive credit options to the Indian NATE exporters should be provided. One suggestion seeks Government to extend Buyer's credit in line with globally prevalent practices by establishing master fund for provisioning of such credit lines.

Analysis of the Issue and the Authority's view

4.245 In context of exports facilitation, several initiatives have been introduced. These mainly include Duty exemption/ Remission schemes[143] (in place of earlier Reward schemes) and Capital goods promotion schemes as illustrated below:

Fig. 4.12 Export facilitation Schemes

[143] https://old.cbic.gov.in/htdocs-cbec/customs/cst2023-010523_new/csgen-expemtns-idx



The tax remission schemes are based on the trade principle that domestic taxes are not exported to overseas market. Once domestic produce is exported out, global trade laws permit proportional refund of domestic duties/taxes paid on inputs utilised to make that produce i.e. domestic tax component is not to be added to export value *in effect*.

RoDTEP – Local tax re-imbursement scheme

4.246 One of the key initiative in this direction is *Remission of Duties and Taxes on Export Products Scheme* (**RoDTEP**) which has been brought into effect from 1 January 2021 onwards. The scheme has been introduced with an objective to neutralize the taxes and duties suffered on exported goods which are otherwise not credited or remitted or refunded in any manner and remain embedded in the export goods. This scheme provides for a rebate of all hidden Central, State, and Local duties/taxes/levies on the goods exported which have not been refunded under any other existing scheme. This not only includes the direct cost incurred by the exporter but also the prior stage cumulative indirect taxes on goods. Hence, tax/duty paid on power-supply, fuel-supply, municipal tax, Stamp duty on Export

documents etc. are included. It is implemented across sectors uniformly.

4.247 The benefits permitted under RoDTEP scheme would be in the form of transferable duty credit scrip, or it may be in the form of electronic scrip which will be maintained in the electronic ledger. The ceiling on exports products (& quantity specified with it) is determined by prescribing ceiling rates or per-unit rate by RODTEP Policy Committee (RPC) chaired by DGFT comprising of the Department of Revenue/Drawback Division with the suitable representation of the Department of Commerce/DGFT, line ministries, and experts on the prioritized sectors. In case of NATE product lines as identified by family of Harmonious System (HS) Codes/ National Tariff Line mostly under HS Chapter 85 & 90, rate of reimbursement in most cases is 0.8 % of FOB (Free On-Board) value of the product. FOB price-value may be ex-factory price or price inclusive of domestic freight to the nearest port from which such exports are destined. However, in case of Mobile Phones, re-imbursement ceiling is Rs. 24.50 per unit. For PCB Assembly, unit-rate is Rs. 2.30 only.

4.248 The exporter community amongst the stakeholders have welcomed the introduction of RoDTEP Scheme (after withdrawal of export subsidies permitted under the *Export Oriented Unit (EoU) / Electronics Hardware Technology Park (EHTP)/ Software Technology Park (STP) Schemes, EPCG Scheme, and MEIS*) and re-imbursements based on transferable e-scrips. During analysis, it has come to notice that representations have been made to the Government by industry bodies such as Indian Electrical & Electronics Manufacturers' Association (IEEMA), India Cellular and Electronics Association (ICEA) regarding appropriate revision in RoDTEP product-wise ceilings. ICEA Report[144] while analysing data-inputs from industry including the domestic taxes/duties paid against production of goods

[144] https://icea.org.in/blog/wp-content/uploads/2021/02/RoDTEP-Report-ICEA.pdf

exported out, has sought general revision in RoDTEP ceiling rates from 0.8 % to 1.5 % for electronic items and fixing rate of 2 % in case of mobile phones. As per their studies, two main reasons have been accounted for suggested revision:

(a) increasing prices of production inputs and taxes incidental upon them, and

(b) inclusion of certain tax components for reimbursement calculations under RoDTEP as the same are applicable in favour of the exporters in various other countries.

Advance Authorisation – Duty Exemption Scheme, based on prior authorisation

4.249 *Advance Authorisation Scheme* (AAS) is a Duty-exemption Scheme where *Advance Authorisation* (*AA*) is issued to allow duty free import of inputs, which are physically incorporated in the export product, allowing normal allowance for wastage.

The following duties are exempted[145]:

(a) Basic customs duty & additional Customs duty

(b) Education cess

(c) Social welfare cess

(d) Anti-dumping duty

(e) Countervailing duty

(f) Safeguard duty

(g) IGST and compensation cess

In addition, fuel, oil and catalyst that is consumed/utilised in the process of production of the export product, is also allowed duty free.

[145] https://www.aepcindia.com/system/files/FAQ%20on%20AAS-SAAS.pdf

4.250 *AA* can be issued either to a manufacturer exporter or merchant exporter tied to supporting manufacturer on non-transferable basis. *AAs* are issued based on Standard Input Output Norms (SION) fixed by Director General Foreign Trade (DGFT) and, also on the basis of *ad hoc*/self-declared norms subject to approval by the Norms Committees (NC)/Self-ratification Scheme of Foreign Trade Policy (FTP).

4.251 Under *AAS*, minimum value addition required to be achieved for fulfilment of export obligation is 15 %. It is calculated using ratio = [(Free On Board, FOB value of exports- Cost, Insurance, and Freight, CIF value of inputs covered by Authorisation)/ CIF value of inputs covered by Authorisation)] *100. In other words, minimum value addition upon export should be at least 115% of CIF value of imported inputs. The raw material should be imported first; physically incorporated in the export product and then the export should take place.

4.252 One of the notable feature of *AAS* is a facilitating provision called as *Self-Ratification Scheme for Advance Authorisation* (Self Ratification). It allows Advance Authorisations to be taken on self- declaration and self-ratification basis for cases where Standard Input Output Norms (SION) is not notified, without the need of going through the process of norms fixation/ratification by the concerned Norms Committee (NCs). Any exporter holding certificate as *'Authorised Economic Operato*r' (AEO)**[146]** under the common accreditation program of the CBIC, can apply for Advance Authorisation under the Self-ratification Scheme. FTP 2023 has recently, extended[147] Self Ratification Benefits even to 2 Star**[148]** Export House and above status holders. The

[146] AEO is an international recognition certified by CBIC-Customs for duration of 3 to 5 years, denoting the holder as secure and reliable trade partner.

[147] https://www.pib.gov.in/PressReleseDetail.aspx?PRID=1912572

[148] For export promotion, DGFT certifies high performance export-entity as Star Export House based on past performance & annual exports volume. Rating run from 1 star to 5 Star (in increasing order) and is valid 05 years.

eligibility criteria for such exporters have been down-sized from US $ 25 million to US $ 15 million.

4.253 A further notable feature in context of Self Ratification is *Advance Authorization for Annual requirement*. Exporters having past export performance (in at least preceding two financial years) are entitled for it. The corresponding duty-free imports entitlement in terms of Cost, Insurance, and Freight (CIF) value shall be up to 300% of the FOB value of physical exports.

4.254 However, Self-Ratification excludes *Special Chemicals, Organisms, Materials, Equipment and Technologies* (SCOMET) listed items (category 8 is relevant to NATE products) on account of extant export controls over dual-use technologies.

Duty Exemption Scheme based on post-facto authorisation

4.255 Another duty exemption Scheme that works as post e-exports benefit is *Duty Free Import Authorisation* (DFIA). DFIA is distinct from AAS in following ways:

(a) it is a post-export benefit with minimum value-addition required as 20%
(b) only BCD is exempted
(c) this authorisation is transferable
(d) applies only when SION are notified

4.256 Depending upon location of the manufacturing entity and prevailing duty-structure within the country, it may be identified as:

A. Export Oriented Unit (EoU) in

(i) Special Economic Zone (SEZ)
(ii) Export Processing Zone (EPZ)
(iii) Electronics Hardware Technology Park (EHTP)
(iv) Software Technology Park (STPI)

B. *Domestic Tariff Area* (DTA) unit: A DTA unit is located outside the zone meant for 100 % exports upon manufacturing and therefore, most of the electronics manufacturing units are located in the country would qualify as DTA unit.

4.257 As manufacturing would often require inter-working amongst such units, the key duty-related provisions in force are as follows:

(i) Deemed exports: As the concept has explained earlier in Para 4.169, some of the main provisions are given below:

(a) Apart from physical exports, *AAS and DFIA* also apply to *Deemed Exports*.

(b) The following are included as Deemed Exports:

- Supply of goods to EOU / STP / EHTP / BTP units
- Supply of goods against Advance Authorization/ Advance Authorization for annual requirement / DFIA
- Supply of Capital Goods/Machinery against Export Promotion Capital Goods (EPCG) Authorization.
- Supply to other Government Funded projects, etc.

(c) The following supplies are taken as Deemed exports if received by units having:

- Advanced Authorisation (AA) / AA for annual requirement
- Duty-Free Import Authorisation (DFIA)
- EOU Unit located in EHTP / STPI

(ii) Local duty reimbursement under RoDTEP: RoDTEP Scheme excludes[149] products manufactured or exported by units situated in Special Economic Zone (SEZ), Export Processing Zone (EPZ), and EHTP. Besides, exported produce from 100 % Export Oriented Units (EoUs), *Deemed Exports*, exports under Advance Authorisation or Duty-Free Import Authorisation are also excluded.

[149] https://cip.icegate.gov.in/CIP/static/images/doc/RoDTEP/SCHEME1.pdf

4.258 From above, it may be derived that local duty reimbursements through RoDTEP and duty-exempted imports under Advanced Authorisation Scheme (AAS) are significant to the indigenous NATE manufacturers. Self-ratification benefit under AAS is extended to those exporters who have met exports beyond US $ 15 million, this provision should be extended on deemed basis to NATE manufacturer exporters meeting the same export volume. Further, such manufacturer-exporters who qualify for Self-Ratification on deemed basis and maintain export consistency for at least 2 years should also be extended the deemed-benefit of Advance Authorization for Annual requirement. This would facilitate competent manufacturer-exporters to import duty-exemption production inputs three times the value of physical exports.

4.259 **Therefore, the Authority recommends that an enterprise engaged in manufacturing of NATE products and has met export volume of US $ 15 million should be granted *Self Ratification benefit* under Advanced Authorisation Scheme (AAS) on deemed basis. Such enterprise which has met export target consistently for at least 2 years should be granted *Advance Authorisation for Annual requirement* on deemed basis.**

Export Promotion Capital Goods Scheme (EPCG)

4.260 *Export Promotion Capital Goods Scheme* (EPCG) facilitates duty-free import of capital goods for pre-production, production and post-production (including Complete knock down or Semi-knocked goods and computer software systems) at zero customs duty. Capital goods imported under EPCG Authorisation for physical exports are also exempt from Inter State GST (IGST) and Compensation Cess. EPCG covers extends to manufacturer exporters with or without supporting manufacturer(s), merchant exporters tied to supporting manufacturer(s) and service providers. Instead of direct imports,

indigenous capital goods sourced from EOU, SEZ, STP, EHTP, EPZ units also qualifies for EPCG Authorisation.

4.261 Some of the main conditions to be fulfilled for availing EPCG benefits include *Actual User Condition* and *Export Obligation* (EO).

(i) EO is equivalent to six (06) times of duties, taxes and cess saved on capital goods, to be fulfilled in six (06) years reckoned from date of issue of Authorisation. EO has been relaxed by 25 % in the cases such as units based in North-Eastern Region / UTs of Jammu & Kashmir and Ladakh, Green Technology Products, Incentive for early EO fulfilment and indigenous procurement. Exports realised under AA, DFIA, & RoDTEP Schemes and Deemed Exports are eligible towards fulfilment of EO under EPCG.

(ii) Under Actual User Condition, capital goods procured are not allowed to be transferred before five (05) years even if EO is fulfilled.

4.262 In specific reference to *Town of Export Excellence, Prime Minister Mega Integrated Textile Region and Apparel Parks*- PM MITRA, there is an extended provision under which EPCG Scheme benefits are provided to Common Service Provider (CSP). A similar facility, Common Facility Centre (CFC) is operated in context of Electronic Manufacturing Clusters (under EMC, EMC 2.0). It provides host of service-facilities as explained earlier in para 4.233. Extending EPCG to CFC associated with EMC/ EMC 2.0 could provide easier availability of latest design labs, design tools, computing/ simulation tools, test beds, machines tools, calibration facilities, validation/conformity assessment etc. on duty-free basis. Smaller units located in EMC would be able to make shared use of such facilities instead of making individual expenses on imports. As per procedure specified, DGFT certifies CSP to make it eligible for EPCG benefits. CFC should also be certified in similar way.

4.263 **In view of the above discussions, the Authority recommends that on the lines of Common Service Provider (CSP) under *Town of Export Excellence* scheme, EPCG Scheme benefit should be extended to Common Facility Centres (CFCs) established within Electronic Manufacturing Cluster (EMC, EMC 2.0) or in future TPDCs. Such CFCs involved as resource-centre for NATE manufacturing activities should be certified by DGFT as EPCG beneficiary.**

Resolving Foreign Earnings entitlement in context of Inter-working amongst domestic NATE manufacturers

4.264 Procurement / supplies between EOU / EHTP / STP unit *vis a vis* DTA-based unit are permitted subject to incidental tax provisions. A brief is given at **Annexure-IV**. The former is meant for the units that undertake exports of their complete production and maintain status as positive Net Foreign-Exchange earner (NFE). The following supplies effected from them are counted for fulfillment of positive Net Foreign-exchange Earning (NFE):

(a) Supplies effected in DTA to holders of Advance Authorization / Advance Authorization for annual requirement / DFIA under duty exemption / remission scheme / EPCG scheme

(b) Supplies effected in DTA against overseas forex remittance received

(c) Supplies of Information Technology Agreement (ITA- 1) items and notified zero duty telecom / electronics items.

4.265 In this context, it is observed that NFE entitlement norms are not specified if EoU/ EHTP/ STP based unit co-works with DTA-unit. Norms should be established so that co-working is simplified in terms of respective NFE entitlements. This would enable respective units to manage compliances and obligations. Therefore**, the Authority recommends that the entitlement norms for Net Foreign**

Exchange earnings (NFE) in case of co-working between units, one located in Domestic Tariff Area (DTA) and, other located in Export Oriented Unit (EoU) / Electronics Hardware Technology Parks (EHTPs) / Software Technology Parks (STPs), should be defined on-priority by DoT with Ministry of Commerce.

Export Credit Insurance

4.266 *Export Credit Insurance* is designed to protect the receivables of an exporter against risks related to overseas transactions. This measure bridges the information asymmetry and limits risk exposure against payment defaults owing to political, commercial, or other reasons. In other words, it insulates business revenues against potential risk and garners more trade opportunities. Hence, *ECGC's Export Credit Insurance scheme* provides a variety of risk insurance products that cover losses and bad debts on exports such as

(a) export credit insurance cover to banks and financial institutions so that they can provide trade-risk coverage to exporters

(b) overseas investment insurance to Indian companies that are entering into international joint ventures, in the form of equity or loans

(c) guidance on export-related activities to exporters, including credit rating-based information on different countries, and

(d) export factoring facilities for MSMEs.

4.267 *Export Factoring* is a package of financial products consisting of working capital financing, credit risk protection, maintenance of sale ledger and collection of export receivables from the buyer located in overseas country. ECGC will enter into agreement with the exporters to purchase the export receivables without recourse and assume credit risks on overseas buyer. In case buyer defaults, the liability is duly taken care of by ECGC.

4.268 ECGC has launched *new scheme to provide up to 90% export credit risk insurance cover for small exporters*[150]. Under the Scheme, manufacturer-exporters will be able to secure fund-based export credit working capital limit up to Rs 20 Crore (total packaging credit and post-shipment limit per exporter or exporter-group) excluding gems, jewellery and diamond sector and merchant exporters or traders. The working capital limit in the form of fund-based is referred to cash credit, packaging credit, short-term loans, export and import financing, etc., from banks.

Ministry of Micro, Small & Medium Enterprises has entered into MoU with ECGC to provide reimbursement of export credit insurance premium paid by the MSE under *Capacity Building of First Time MSE Exporters*[151] (CBFTE). The premium-limit for a MSE has been capped at Rs. 10000/- per financial year.

Exports- Interest Equalisation

4.269 Another facilitating measure is *Interest Equalisation Scheme* (IES) where the Government identifies eligible exporters and passes on the interest equalization amount directly to them. This Scheme, which is also referred to as interest subvention export scheme for exporters, was designed to benefit the MSME segment in particular. As it was originally implemented for five years, industrial, electrical, and engineering machinery and items manufactured by MSME & SME remained eligible for IES benefit.

The Government has *extended the Scheme w.e.f. 1 October 2021 and shall continue up to 31 March 2024* or till further review vide RBI Notification[152] dated March 8, 2022. Revised interest equalization rates under the extended Scheme will now be 3 % only for MSME

[150] https://pib.gov.in/PressReleasePage.aspx?PRID=1845036
[151] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1860886
[152] https://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=12252&Mode=0

manufacturer exporters under any HS-line. However, benefits under this scheme exclude PLI beneficiaries.

Market Access Initiative

4.270 Market Access Initiative Scheme[153] (MAI), revised in year 2021, is formulated on 'focus product-focus country' approach to evolve specific market and specific product through market studies/survey. Assistance is envisaged to Export Promotion Organizations/ Trade Promotion Organizations/ National Level Institutions/ Research Institutions/ Universities/ Laboratories, Exporters etc., for enhancement of exports through accessing new markets or through increasing the share in the existing markets. Eligible activities include

(i) Marketing Projects Abroad

(ii) Capacity Building

(iii) Support for Statutory Compliances

(iv) Market & Research Studies

(v) Project Development

(vi) Developing Foreign Trade Facilitation Web Portal.

4.271 Since MAI related allocations are administered centrally by M/o Commerce without any sectoral allocations, it is required that an appropriate agency under DoT should be nominated to handle participation in MAI in the interest of domestic manufacturing entities. Telecom Equipment and Services Export Promotion Council (TEPC) has been set up by the Government to promote and develop export of Telecom Equipment and Services in top-focus. The Council caters to the complete Telecom Ecosystem including Telecom Hardware Manufacturing, Telecom Service Provision, Telecom Software, and Consultancy. It thus represents the strength of Equipment Manufacturers, System Integrators, Service Providers and other stakeholders in the telecom domain.

[153] https://commerce.gov.in/wp-content/uploads/2021/07/Market-Access-Initiative-MAI-Scheme-2021-dated-19-July-2021.pdf

4.272 In view of above discussions, **the Authority recommends that DoT Facilitation Cell should co-opt Telecom Equipment and Services Export Promotion Council (TEPC) to undertake the set of Eligible Activities under Market Access Initiative (MAI) for benefit of domestic NATE having more export potential.**

Policy regarding return of goods exported for foreign exhibitions

4.273 Several goods are taken out of India *on exhibition or sample-consignment basis*. These goods are sold only when approved by prospective customers abroad. The unsold goods are then brought back to India. As per the clarifications issued by CBIC vide Circular No. 108/27/2019-GST dated 18 July 2019, the goods taken out of India for such purposes are required to be either sold or brought back within a period of six months from the date of removal, failing which it would be deemed supply. For fractional re-importation, the remaining part would be an actual supply as per invoice or deemed supply after six-months.

Certificate of Origin

4.274 Certificate of Origin has become a progressive requirement in global trade to delineate the goods transiting through other countries. It provides recognition to genuine manufacturing involving substantial transformation of inputs. Therefore, it keeps a check on mere 'declaration' that in cases where the product meant for 'exports' has been imported from other territory. As per prevailing trade rules, mere mechanical assembly of parts to formulate the whole does not entitle any product to get Certificate of Origin. Such requirements have been incorporated under Foreign Trade Policy (FTP) 2015-20 in reference to Interest Equalisation Scheme - Rules of Origin (Non-Preferential). According to these Rules[154] :

[154] https://www.rbi.org.in/Scripts/BS_CircularIndexDisplay.aspx?Id=10159

- The goods must be manufactured by the exporter as per the definition of 'manufacture' of the FTP.
- In the case of the use of imported inputs, the export products will be classified as originating in India only if they undergo significant processing or operation (described in detail in the Handbook of Procedures).
- The export of telecom products is eligible for the scheme, subject to minimum value addition as notified by DoT.

4.275 This measure has been gaining importance under trade agreements. For example, recent trade agreement such as Australia-India Economic Co-operation and Trade Agreement (ECTA)[155] dated 17 March 2023 also refers to such Rules of Origin[156] for claiming preferential tariff treatment for goods exported from India. Recently, CBIC (Customs) vide Instruction No. 19/2022-Customs[157] has clarified in context of Customs (Administration of Rules of Origin under Trade Agreements) Rules, 2020 (in short, CAROTAR)- "*in the event of conflict between a provision of these rules and a provision of the Rules of Origin, the provision of the Rules of Origin shall prevail to the extent of the conflict.*"

4.276 Since reliance on Certificate of Origin is expected to increase during foreign trade, it is necessary that there should be an appropriate authority for telecom sector to certify the 'origin' of domestically manufactured equipments. These arrangements are prevalent in case of all commodities exported from India such as tea (Tea Board), coffee (Coffee Board), marine products (Marine Products Exports Development Authority, MPEDA), handicrafts (Handlooms Commissioner), etc. DGFT has provide for dedicated web-portal where Authorised bodies after one-time registration may issue digital

[155] https://commerce.gov.in/international-trade/trade-agreements/ind-aus-ecta/
[156] https://www.abf.gov.au/free-trade-agreements/files/ECTA-rules-of-origin.pdf
[157] https://taxinformation.cbic.gov.in/view-pdf/1000434/ENG/Instructions

Certificate of Origin within their domain. The export documents are further e-processed at DGFT/Customs.

4.277 **Therefore, the Authority recommends that DoT should notify Telecom Engineering Centre (TEC) as authority for certifying 'origin' (preferential and non-preferential) of domestic NATE products meant for exports, at the earliest.**

Export controls- SCOMET

4.278 Export of dual-use items, including software and technologies, having potential civilian / industrial applications as well as use in weapons of mass destruction remains regulated. It is either prohibited or is permitted under an Authorization unless specifically exempted. As Export Policy, Category 8 of "*Special Chemicals, Organisms, Materials, Equipment and Technologies* (SCOMET) includes Special Materials and Related Equipment, Material Processing, Electronics, Computers, Telecommunications, Information Security, Sensors and Lasers, Navigation and Avionics, Marine, Aerospace and Propulsion. Telecom equipments, sensors, special materials & related equipment are therefore enlisted in the same category. As per Export Control regime, cross-border trade in such items generally requires prior authorisation from DGFT.

4.279 Major domestic manufacturers of NATE have expressed concerns relating to Export Control under SCOMET and seek faster pre-authorisations to make direct exports to the larger pool of countries. There are around 42 countries in the currently accepted list.

4.280 As per FTP 2023, exemptions from prior authorisation otherwise required on case-to-case basis has been provided:

<u>Option 1: Requires one-time prior Authorisation to make exports to the specified list of countries</u>

Subject to the fulfilment of the following conditions, FTP requires only one time authorization for export and/or re-export of SCOMET items including software and technology under SCOMET Category 8 (this exemption excludes items listed in Appendix 10 M of FTP[158]):

(i) where the export is an Intra-company transfer from the Indian parent company (applicant exporter) to its foreign subsidiary company or from the Indian subsidiary of foreign company (applicant exporter) to its foreign parent/another subsidiary of foreign parent company,

and;

(ii) based on a Master Service Agreement / Contract between the Indian parent company/Indian subsidiary of foreign company and foreign subsidiary of Indian company/foreign parent company of Indian subsidiary for carrying out certain services but not limited to design, encryption, research, development, delivery, validation, calibration, testing, related services, etc. in specified countries for the one time validity of 03 years subject to the post export reporting of all the exports done under the authorisation.

In such a case, compliance includes just filing of records after exportation to a given list of countries. The Authorisation remains valid[159] for 24 months and may be re-validated for further six months upon Application. The process steps are illustrated below:

GAICT - Global Authorisation for Intra-Company Transfers

[158] https://content.dgft.gov.in/Website/dgftprod/2deeba94-c6ee-47ee-94af-340b16e26a9c/Appendix 10M.pdf

[159] https://content.dgft.gov.in/Website/DGFT_FAQs_SCOMET-v1.0.pdf

Option 2: No prior Authorisation required to make exports to the specified list of countries

Alternatively, Pre-export authorisation will not be required[160], for export and/or re-export of SCOMET items including software and technology under SCOMET Category 8 (except items listed in Appendix 10 M), subject to the following conditions:

(i) where the export is an Intra-company transfer from the Indian parent company (applicant exporter) to its foreign subsidiary company or from the Indian subsidiary of foreign company (applicant exporter) to its foreign parent/another subsidiary of foreign parent company

and;

Note 1: In case of third party involvement in the supply chain, the end user has to be a foreign parent / another subsidiary of foreign parent company or a subsidiary company of Indian company.

(ii) where the transfer fulfils the conditions mentioned at (**a**) to (**h**) below:

(**a**) The items/software/technology to be exported/re-exported is based on a Master Service Agreement / Contract between the Indian parent company / Indian subsidiary of foreign company and foreign subsidiary of Indian company / foreign parent company of Indian subsidiary for carrying out certain services but not limited to design, encryption, research, development, delivery, validation, calibration, testing, related services, etc.;

Note 2: As a result of the service carried out by the Indian exporter in case of re-export, the items/software/technology should not undergo change in classification.

[160] Public Notice No. 14/2015-20-DGFT dated 13.06.2022

Note 3: The list of services mentioned above is illustrative, not exhaustive. However, the final decision to approve a GAICT authorisation lies with the relevant authority.

(**b**) These items including software and technology are to be exported / re-exported to the countries listed in the box below

(entire supply chain including any third party should be in the countries listed in box below)

Argentina, Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France,

Germany, Greece, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Republic of Korea, Romania, Russian Federation, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, United States.

Note 4: However, Inter Ministerial Working Group (IMWG) may allow countries other than those listed in the box above, on a case to case basis, while considering description/end use/end user of the item. Such cases are included in Monthly review of the Working group.

(**c**) The applicant exporter declares that the exported items would be used for the purposes for which it is intended by the foreign subsidiary of Indian company / foreign parent company / another subsidiary of foreign parent company, as the case may be;

(**d**) The applicant exporter furnishes either a certified/approved Internal Compliance Programme (ICP) or demonstrates compliance to the ICP of the foreign parent company or ICP certified by the Compliance Manager of the company or certified by any Government agency such as *Authorized Economic Operator* (AEO) scheme etc.

(**e**) The exporter agrees to allow on-site inspection, if required by the DGFT or authorized representatives of Government of India;

(**f**) No export authorisation would be granted for UN Security Council sanctioned destinations or countries;

(**g**) No export authorisation shall be granted to an exporter if they have come to adverse notice previously;

(**h**) The exporter is granted a *Global Authorisation for Intra-Company Transfers* (GAICT) as per procedure mentioned in para 10.15 B and Post reporting for re-export of items/software/technology under GAICT para 10.15 C (Reference: Page 191 to 193 of DGFT Handbook of Procedures 2023)

4.281 Under current constraints, exports of domestic NATE by GAICT exporter is first made to logistics hub in US or EU which is further re-exported to the final destinations. Since one of the focal area of FTP 2023 is handling dual use high end technology items under SCOMET, the Authority is of the view that DoT should take up the case for further liberalisation of export control regime in case of Category-8 SCOMET items related to NATE, with Ministry of Commerce. Repeat Authorisations meant for exports to the accepted list of countries should be fast-tracked using online process. Export authorisation under GAICT for exports beyond the accepted list of countries should also be checked-up to facilitate direct exports from India to a larger set of countries.

4.282 In view of the above discussions, **the Authority recommends that DoT should take up the case for further liberalisation of export control regime in case of Category-8 SCOMET items related to NATE, with Ministry of Commerce. Export-authorisation on repeat basis meant for exports to the accepted list of countries should be fast-tracked using online process. Export authorisation**

under Global Authorisation for Intra-Company Transfers (GAICT) meant for exports beyond the accepted list of countries should also be checked-up for liberalisation to facilitate direct exports from India to a larger set of countries.

IX. Trade facilitation measures affecting sectoral-competitiveness

4.283 Telecom product manufacturing is global in nature i.e. it is highly challenging for a country to produce all required machinery, instruments, components, specialty chemicals, assembled products, etc. for itself. Hence, Global Value Chains in this sector are highly significant. Various production-centres across the world have developed specialization in certain manufacturing activities rather than attempting end-to-end design, development & manufacturing at one place. This has helped such centres to attain process-specific '*Economies of scale'*. This has resulted in continued R&D towards technology development in respective directions. At times, such production centre tends to augment production at feasible locations by enabling technology transfer in the related processes. This has resulted in mutual dependence of the economies on each other to source raw materials, components, sub-assembly, and finished products across multiple destinations worldwide. Hence, foreign trade becomes an integral part of NATE production cycle for (a) sourcing inputs not readily available within the country and (b) exporting the manufactured products to the overseas market.

4.284 In context of global supply chains, the domestic manufacturers have been facing several issues that affect their competitiveness in the global as well as domestic markets. These include (i) Under invoicing/dumping of cheaper goods, (ii) mis-declaration of duty free HS-Codes, (iii) exploitation of Free Trade Agreements/ Information Technology Agreements (ITAs), (iv) Inverted Duty Structure, (v) Issue of landed-cost parity.

4.285 The Authority has acknowledged the various issues faced by domestic manufacturers, specific to domestic or international market and raised the following issues in the Consultation Paper –

Q14. Whether NATEM is facing any limitation affecting competitiveness of Local manufacturers due to misdeclaration of HS codes, inverted duty structures, landed cost differential etc.? Please provide specific details. What are the suggestions for improvement? Please elaborate.

4.286 In response to this question, a good number of stakeholders have informed that many NATE product-shipments are imported in India at Nil Basic Customs Duty (BCD) by invoking the provisions of Technology Agreement, 1996 (called as ITA-1)[161] to which India is one of the participating countries. Since the imported products landing at the national border are primarily identified on the basis of assigned HS-Code, use of such HS-Code labels that are within the domain of ITA-1, could provide the potential route for avoiding payment of applicable BCD. There may be certain products where one part-assembly or feature may attract one HS-code and other part-assembly, or feature attract other HS Code. It is also possible that the product under consideration is much evolved version of the product originally enlisted in 1996 e.g. '*VoIP Gateway*' has no specific assigned HS Code but invariably it is put under '*Router'* by describing it as '*Router with FXS (VoIP extensions) ports*' to circumvent the Basic Custom Duty (BCD). 'Router' is imported under nil BCD pursuant to ITA-1 but whereas VoIP switches essentially attract BCD. At times, market players seek guidance through Advanced Rulings through relevant Tribunals to identify the proper recourse before actual imports. HS Code 8517 xxxx is one such Code pertaining to NATE sector that could be mapped to the frequent issues stated by the stakeholders.

[161] https://www.meity.gov.in/esdm/ita

4.287 Since many HS-codes related to NATE sector refer to official 'Item description' as "Others" or "Parts" only, identification of the product based on its HS Code may be challenging for an importer as well as Customs administration. Some stakeholders have stated that mis-declaration of 'description' of the product and putting them in 'others' category is also a cause of concern. Some of them express that there are number of telecom equipment on which BCD was to be levied, however, putting them under 'Others' category leads to policy-circumvention. It is added that the import under category 'others' has been increasing year by year and has reached to the level of approximately 88% during 2019-20. It has shown a marginal decline of 2 to 3 % in the recent years and continues to stay on the higher side. As per the stakeholders, a thorough study of imports under "Others" and "Parts" categories should be initiated and those products that are imported in large volume should be recommended for separate HS Code classification. Assigning a dedicated HS Code (*i.e.* properly mapped) will help against potential circumvention of duties. In this context, stakeholders propose that the Government must consider introducing a 12-digit HS Code classification instead of the existing 8-digit HS Codes.

4.288 In above context, some stakeholder suggest that adoption of certain techniques would be particularly useful in preventing mis-declaration of HS codes –

(a) every HS Code is parented to Harmonised System Nomenclature (HSN) as adopted by World Customs Union to facilitate global trade. Therefore, adoption of automated system could easily track deliberate misrepresentation of HS Code, if any, (by comparing the sender and receiver credentials, system entries across the countries/ports). In view of the stakeholders, this is injurious to the basic developmental process of NATE

manufacturing. They added the suggestion that such a case should be brought under legal action and vendors be blacklisted. The blacklisted details should remain available in the public domain and the proven convict's trade license should be cancelled.

(b) Intensive Artificial Intelligence (AI) along with Document Management (DM) systems should deeply monitor every import by the virtue of its nature and compliance to the norms, and heavy penalty should be imposed on these corrupt individuals/ organizations for committing such heinous act of traitorship against India.

(c) vigil on e-waste import and, prevent its dumping in India.

4.289 It is recommended by some stakeholders that till the time the electronic component manufacturing industry is set up in India, no import duty i.e. BCD etc. should be levied on such imported inputs or raw material meant for domestic production/ manufacture of all goods. If production-inputs are rated at higher BCD as compared to BCD applicable on imported finished products, this kind of Inverted Duty structure would erode the competitiveness of indigenous industry. While the stakeholders have acknowledged the attention given by the Government on the issue of Inverted Duty Structure (IDS), some of them further suggest that the case for the Nil BCD on input-components/ raw material may be taken-up with the Department of Revenue, Ministry of Finance.

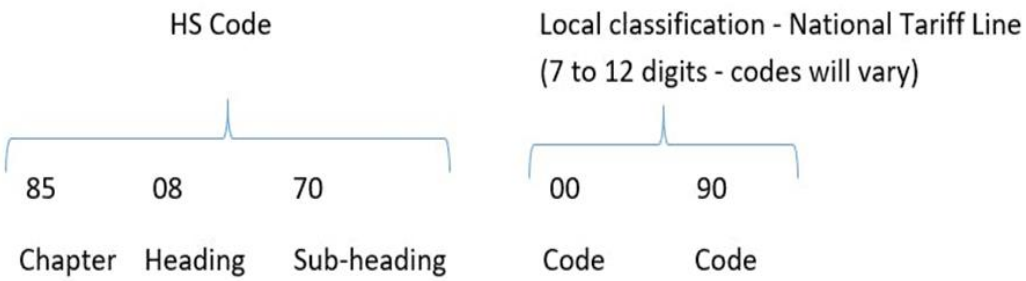
4.290 A few stakeholders state that it should be ensured that the domestically produced products are not at a cost disadvantage compared to other countries and the required/suggested fiscal and non-fiscal incentives should be provided to restore the balance. They have further suggested that anti-dumping duty, if considered, should be evaluated on case-by-case basis for various products category and not be applied indiscriminately. Products for which our country does

not have sufficient production capacity or competitive domestic supplies, no anti-dumping duties should apply because it may impact the ability of TSPs to deliver high quality network services.

Analysis of the issue and the Authority's view

4.291 To facilitate global trade, each product-line is assigned globally unique numeric Code which is called as Harmonized System (HS) Code (up to 6-digits). National administrations may add suffix digits to distinguish further amongst territorial product-lines (National Tariff line). A typical example of such nomenclature is illustrated below:

Example of HS Classification: parts of vacuum cleaners, HS code 850870



4.292 As per World Customs Organisation (WCO), tariff classification using the Harmonized System (HS) Nomenclature "*allows a world of many languages to speak with one*". It comprises more than 5,000 commodity groups; each identified by a six-digit code, arranged in a legal and logical structure, and is supported by well-defined rules to achieve uniform classification. The system is used by more than 200 countries and economies, as a basis for their Customs tariffs and for the collection of international trade statistics. Over 98 % of the merchandise in international trade is classified in terms of HSN.

4.293 The adoption of HS contributes to the harmonization of Customs and trade procedures, and trade data analysis, thus reducing the overall costs related to international trade. It is also extensively used by governments, international organizations and the private sector for

many other purposes such as class-wise determination of internal taxes, trade policies, monitoring of controlled goods, rules of origin, freight tariffs, transport statistics, price monitoring, quota controls, compilation of national accounts, and economic research and analysis. Therefore, one of WCO's priority is the maintenance of the HS and its periodic updating in light of developments in technology and changes in trade patterns. The WCO manages this process through the Harmonized System Committee. The HS Committee also prepares amendments updating the HS every 5 – 6 years, leading to the latest 7th edition of Notification of ITC (HS), 2022 [7th edition since 1988]. Consequently, Director General Foreign Trade (DGFT) India has updated its ITC (HS) 2022 listings during FY 2022-23. Moreover, the same has been further synchronised with Finance Act 2023 and Foreign trade Policy (FTP) 2023 vide Notification[162] No 08/2023 dated 29 May 2023.

4.294 In view of the concerns regarding use of import goods description as 'Other' or 'Parts', the Trade data of the recent years for telecom sector has been analysed. The emerging position is illustrated in Table 4.24 below:

Table 4.24 Proportion of Description such as 'Others', 'Parts' in India's Import basket for NATE products, as identified

Year-wise Import (in Rs. Crore)			
Description	**2020-21**	**2021-22**	**2022-23**
HS Code--Imports under the "Other "Category	778	905	658
85171190 Others	44	494	17.7
85171290 [Modified to 85171400 during 2022-23]	536	3146.5	270
85171890 Other	60	442	67
85177990 Other [New Mapping linked to 85177090]	-	-	-
85176290 Other	26,165	28,566	37,221
85177090 Other parts of Telephonic/ Telegraphic Apparatus	47,627	55,151	65,271*
85255090 Others	160	211	49
85299090 Other Parts for Other Use	15,084	11,693	12,141
90309090 Other Parts and Accessories	361	721	1,126

[162] https://content.dgft.gov.in/Website/dgftprod/bb93bb0b-f72d-41a8-a9f4-6ca6b83d9bf7/Notification%2008%20dt%2029-05-2023%20Eng-.pdf

Imports under the "Other" category as a percentage of the total import of telecom goods/equipment	**75.6 %**	**82.8 %**	**87.2 %**

Source: Compiled by TRAI using trade data published by Department of Commerce, Govt of India.

* For HS-Code 85177090, modified mapping during 2022-23 relate it to new HS Codes 85177100 & 85177990. Hence, trade data linked to 85177990 in FY 2022-23 has been added in lieu of 85177090.

It can be observed from the last-row of the table that the overall trade-imports volume related to 'Other' category aggregated for multiple HS Codes is significantly high in proportion to total imports for NATE sector. Even if the analysis is restricted to only 52 Codes as mentioned in DoT Statistics for FY 2021-22, it remains significantly high: 74.5 % (in 2020-21), 80.9 % (in 2021-22) and 85.7 % (in 2022-23). Thus, it may be stated that 'major' part of imports is not sufficiently grouped.

4.295 DGFT vide Trade Notice Nos. 37/2019-20, 46/2019-20 and 47/2019-20 has attempted to mitigate the issue of mis-declaration of HS-Code in the Bill of Entry (of imported goods). As per these Notice(s), the trade community has been cautioned against practice of loose & inaccurate manner of declaring HS-Code(s) in the Bill of Entry, failing which DGFT could resort to Compulsory Licensing provisions. The Notices also elicited submissions from the trade community about necessity of introducing new HS Codes. Complexity arrives in such cases where a multi-functional device could be mapped to two or more HS Codes. The trade community has faced these kind of issues not only in India but elsewhere as well. Often, importers resort to Advanced Rulings before actual imports. However, there have been several litigations within India and other countries over multiple representations or mis-representations.

4.296 To impart more certainty towards correct mapping, efforts are underway to standardise them further by using automation[163]/Artificial Intelligence-& Machine Learning (AI/ML) at instance of World Customs Union. India's FTP 2023 also aims to emphasize upon trade facilitation using technology interface /Process Re-Engineering and Automation.

4.297 In the meanwhile, Central Board of Indirect Taxes and Customs (CBIC) vide Circular No. 08/2023 dated 13 March 2023, has attempted to refine the mapping of two HS Codes (85176290 & 85176990) which indicate high trade-volume. Thus, 'new' 6-digit alpha-numeric codes (i.e. extended National Tariff lines from 7th digit onwards) are now required to be suffixed with the appropriate HS Code while making Bill of Entry by importers. It remains valid within domestic territory. As explained earlier, initial 'Description' for these HS Code was limited to 'Other' or 'parts' only. Table 4.25 illustrates this mapping. A complete list is placed at **Annexure-V** for ready references.

Table 4.25 Finer Mapping of NATE product-lines

(using extended digits for National Tariff line**)**

Sr.	NATE Product-lines *(to be declared under HS code 85176290 & 85176990)*	Details (including latest NATE products) **(entries correspond to 6 digit alphanumeric code)**
1	Optical transport equipment and Optical Transport Network products	Machines and apparatus covered include – i. OTN equipment; ii. Dense Wavelength Division Multiplexer (DWDM); iii. Coarse Wavelength Division Multiplexer (CWDM); iv. Elements of (i), (ii) or (iii) above: ROADM, Booster Amplifiers, Pre-Amplifiers, Inline Amplifiers, Raman Amplifiers, Mux-demux, Transponders, Mux-OADM and Regenerators, Optical Power Monitoring and Optical Line Protection equipment.
2	Combination of one or more of Packet Optical Transport	The Machines/apparatus covered under this category include

[163] https://www.wcoomd.org/en/media/newsroom/2022/april/how-ai-can-help-customs-in-automating-hs-classification.aspx

	Product or Switch (POTP or POTS)	i. Optical Line Terminal (OLT) for FTTX (GPON/ EPON/ XGSPON/ 10GEPON/ / 25GPON / 50GPON etc.); ii. Optical Network Terminal (ONT) for FTTX (GPON/ EPON/ XGSPON/ 10GEPON/ NG-PON2 / 25GPON / 50GPON etc.).
3	Internet Protocol (IP) Radios	The Machines/apparatus covered under this category include – i. Wi-Fi Access Point Equipment and Wi-Fi Controller; ii. Repeaters (RF/RF-over-Optical) & In-Building Solution (IBS)-Indoor/including active and passive Accessories (2G/3G/ 4G/5G and onwards); iii. Wireless Radio Link – (IP/Hybrid) equipment.
4	Soft switches and Voice over Internet Protocol (VoIP) equipment, namely, VoIP phones, Media gateways, Gateway controllers and Session border controllers	Card/module or sub-systems converting analog voice signal into digital packets carried over internet protocol use one or more of these products. Some examples i. Internet Protocol Private Branch Exchange (IP PBX); ii. IP Multimedia Systems (IMS); iv. Unified communication systems (UCS).
5	Carrier Ethernet Switches, Packet Transport Node (PTN) products, Multiprotocol Label Switching Transport Profile (MPLS-TP) products	The Machines/apparatus covered under these categories include i. IP-MPLS Based equipment; ii. MPLS-TP based equipment; iii. SDN Based MPLS equipment; iv. PTN products for Carrier Ethernet Network (CEN) for Access and Aggregation Network Applications
6	Combination of one or more of Packet Optical Transport Product or Switch (POTP or POTS)	The Machines/apparatus covered under this category include i. Optical Line Terminal (OLT) for FTTX (GPON/ EPON/ XGSPON/ 10GEPON/ / 25GPON / 50GPON etc.); ii. Optical Network Terminal (ONT) for FTTX (GPON/ EPON/ XGSPON/ 10GEPON/NG-PON2 / 25GPON / 50GPON etc.).
7	Internet Protocol (IP) Radios	The Machines/apparatus covered under this category include – i. Wi-Fi Access Point Equipment and Wi-Fi Controller ; ii. Repeaters (RF/RF-over-Optical) & In-Building Solution (IBS)-Indoor/including active and passive Accessories (2G/3G/ 4G/5G and onwards); iii. Wireless Radio Link – (IP/Hybrid) equipment.
8	Soft switches and Voice over Internet Protocol (VoIP) equipment, namely, VoIP phones, Media gateways, Gateway controllers and Session border controllers	Card/module or sub-systems converting analog voice signal into digital packets carried over internet protocol use one or more of these products. Some examples i. Internet Protocol Private Branch Exchange (IP PBX); ii. IP Multimedia Systems (IMS); iv. Unified communication systems (UCS).
9	Multiple Input/Multiple Output (MIMO) and Long-term Evolution (LTE) products	The Machines/apparatus covered under these categories include i. 4G(LTE) products and their Elements, namely- eNode B, RRH, CU, DU, RU, EPC, MME, SGW, PGW, HSS, IMS, Network In a Box (NIB), 4G CPE, etc.;

		ii. 5G products and its Elements, namely- gNodeB, RRH, CU, DU, RU, BBU, IMS, Network In a Box (NIB), 5G CPE, etc.; iii. 4G and 5G enabled NB IoT devices; iv. Equipment incorporating technologies beyond 5G.

4.298 This practice of formulating "several small-baskets within a large basket" may appear to address the issue for the time-being. Some stakeholders have submitted that many countries involved in global trade are using higher number of digits for HS Codes/ Tariff lines. As products evolve, the issue could be better tackled by one-time expansion of HS Code's length so that products with identifiable attributes could be properly classified and mapped with more specificity. As new product versions appear, the expanded HS Code would classify it within the framework. This would add to ease of doing business and transparency for all stakeholders.

4.299 The Authority has studied the prevailing practice in this regard. In the **United States,** a 10-digit code[164] is used to classify products for export, known as a Schedule B number, with the first six digits being the HS number. There is a Schedule B number for every physical product, from paper clips to airplanes. In the **European Union** (EU), 6-digit code is applicable. However additional digits can be determined by member-countries. For example, **Germany** uses 11-digit code[165], **Turkey** uses 12 -digit code[166]. The first six digits of this code indicate Harmonized System (HS) code, which is used within the World Customs Organization member countries, 7-8th digits indicate Combined Nomenclature Code, which is used within the European Union Member Countries, 9-10th digits indicate national subheadings which has opened because of our country's different tax applications, and 11-12th digits indicate the statistical codes. **UK** uses

[164] https://www.trade.gov/harmonized-system-hs-codes

[165] https://www.zoll.de/EN/Businesses/Movement-of-goods/Import/Duties-and-taxes/Normal-customs-clearance/Customs-Tariff/customs-tariff_node.html

[166] https://www.trade.gov.tr/customs-formalities/frequently-asked-questions/tariff

10-digits for classification. Gulf nations such as **Saudi Arabia**[167] have adopted 12-digit classification, Asian economies such as **Japan**[168] use 9-digit, **South Korea** use 10-digit and **China** use 13-digit HS classification (China has moved from 10-digit to 13-digit pattern w.e.f. 1 August 2018 where first 8-digit is the Commodity HS code of "Import and Export Tariff of the People's Republic of China" ; 9th & 10th digit are customs supervisory additional numbers, and 11th to 13th are additional numbers for inspection and quarantine).

4.300 In view of the above discussions, the Authority views that that Harmonized System (HS) and HS Codes applicable to different NATE products with varying attributes should be managed in such a way that facilitates electronic tracking of trade volume, per unit price-levels, cargo movement using harmonised labelling, survey of applicable duties/ taxes/import privileges, and enforcement of punitive /safeguard measures for ever-growing number of trade-commodities. As the classification becomes more granular, it would reduce wrong-classification due to lack of clarity/certainty and facilitate identification of mis-declaration / mis-statement with higher certainty, thereby reducing need for Advanced Rulings[169],[170],[171] and litigations[172] over classification of goods & applicable duties/taxes. Currently, there seems to be no Centralised/Standardised Grievance Redressal mechanism available to the exporters/ importers to report mis-declaration of HS Code in Bill of Entry. Henceforth, remedial actions in-time could not be taken by related Agencies such as DGFT, Customs. **The Authority recommends that**

[167] https://www.exporting-to-saudi.com/en/news/how-to-declare-your-hs-code-on-the-saber-platform
[168] https://www.customs.go.jp/toukei/sankou/code/code_e.htm
[169] https://old.cbic.gov.in/resources//htdocs-cbec/aar/caar-mumbai-ruling-40-21112022.PDF
[170] https://old.cbic.gov.in/resources//htdocs-cbec/aar/caar-mumbai-ruling-41-21112022.PDF
[171] https://121.241.246.157/resources//htdocs-cbec/aar/caar-ingram-24-2023.PDF
[172] https://cestat.gov.in/orders/file/delhi/128159

(i) DoT should take-up, the need for adopting 12-digit HS Code across all sectors, with the Ministry of Commerce and DGFT.

(ii) Automation tools based on Artificial Intelligence & Machine Language (AI/ML) should be developed to facilitate faster and more accurate procedural controls to serve end-to-end shipments.

(iii) Centralised portal for filing online Grievances against mis-declaration of HS Code should be made available to trade community on immediate basis. This portal should facilitate online handling of grievances by making access available to the relevant Ministries so that appropriate remedial actions be decided and enforced.

4.301 Another issue that can be addressed in the given context is inclusion of a few more HS Codes relating to NATE. DoT has initially identified 52 HS Codes while publishing export-import data for telecom sector for FY 2021-22. Some more additional items should be considered for inclusion to represent wholesome picture of NATE related demand & foreign trade. Hence, an indicative list of such HS Codes along with description has been illustrated in Table 4.26 below.

Table 4.26 Additional HS Codes recommended to be included under NATE(indicative)

Sr.	HS-Code (Indicative)	Current Description	Remarks
1.	85044030	Battery Chargers	Necessary accessory with Mobile Phone
2.	85076000	Li-ion Cell for battery manufacture - Cellular Mobile / Power Bank	Total Imports of Li-ion Cell in FY 22-23 has reached Rs. 23,172 Crore (may include Automotive & other Batteries). Production Linked Incentive (PLI) scheme for 'National Programme on Advanced Chemistry Cell (ACC) Battery Storage' focussing on e-Vehicles has been already launched[173] .
3	85340000	Printed Circuits	Ongoing DGTR Investigation[174] due to alleged dumping.

[173] https://pib.gov.in/PressReleasePage.aspx?PRID=1809037

[174] https://www.dgtr.gov.in/sites/default/files/PCN%20Notification...pdf

			Imports in FY 22-23 has reached Rs. 9,341 Crore (again not exclusive to NATE sector)
4.	85079090	Others	New Description may be: Printed Circuit Board Assembly (PCBA) inputs, parts or sub-parts. Imports in FY 22-23 has reached Rs. 3,019 Crore (again not exclusive to NATE sector)
5.	70022090 70140020 70022010	Other Glass Rods Optical elements Enamel Glass in Rods	Anti-Dumping measures regarding Single Mode Optical Fiber (SMOF, G.652 & G.657 compatible) supplies by a few countries- recommended by M/o Commerce to M/o Finance after DGTR Investigation[175]**.** Imports against 70022090 in FY 22-23 has reached Rs. 1,063 Crore.
6	84752100 84799090 90314900	Machine for making Optical Fibre & Preform Parts of other Machinery Other Optical Instrument& Appliances	
7	85238020 85238020 85242301 85243111 85243119 85244011 85244019 85245301 85249111 85249112 85249113 85249119	**Software** (distributed in different mediums)	Software as distinct product-line to be included by DoT
8	85256091 85256092 85256099	VSAT Terminals Other Satellite Communication Equipment Others	
9.	 85256011 85256012 85256013	Walkie Talkie set Marine radio Communication Equipment Amateur Radio Equipment	
10.	85444920 85444930 85367000	Plastic Insulated Conductors for <= 1000V Not Fitted with Connectors	

[175] https://www.dgtr.gov.in/sites/default/files/FF%20NCV%20SMOF%20CHINA%20KOREA%20INDONESIA.pdf

		Rubber Insulated Conductors for <= 1000V Not Fitted with Connectors OFC Connectors	
11.	84718000 90309090 85176290	IoT family: Analogue/Hybrid Automated Data Processing Machine Other parts & accessories	IoT Related products should be tracked. Imports against 84718000 in FY 22-23 has reached Rs. 892 Crore and against 90309090- Rs. 1,126 Crore

4.302 In order to resolve the potential issue that many of such items are not exclusive to NATE sector and hence, trade data pertaining to telecom sector cannot be specifically exhibited, DoT may specify sizing, electrical/ optical characteristics etc. to classify the relevant portion under NATE. For example, battery chargers for mobile phones may be described in terms of electric current (in Ampere) ratings. Displays used in mobile phones etc. may be described by size.

4.303 The Authority therefore recommends that **DoT should constitute a committee including representatives from M/o Commerce, DGFT for periodic update of HS Codes/ National Tariff Lines that have relevance to NATE.**

4.304 Apart from labelling requirements, another important aspect is applicable rate of border taxes i.e. Basic Customs Duty (BCD), over imported raw produce, intermediates and finished goods. Besides, Preferential tariff might be applicable as per FTAs.

4.305 These are required to be rationalized for managing global value chains as well as domestic manufacturing. For core-inputs which are not available in sufficient quantity and therefore need to be imported as per industry's requirement should draw relatively lower duties to sustain manufacturing of upstream products. However, there might be certain industrial inputs where domestic industry is not consistently dependent on global supply chains rather can contribute

to global value chains. For example, in case of Type-3 NATE products as outlined in para 1.7 (Fig 1.2) above, the country is better placed in terms of cables and optic-fiber cables. However, the situation is different in case of semiconductor devices, PCB lithography, active components etc. Therefore, duty-rationalization is also required between core-inputs and finished products. Lack of overall rationalization is likely to exhibit trade anomalies more frequently, as in case of Information Technology Agreement (ITA-1) where BCD applicable on various imported ready-to-use telecom equipment is nil.

4.306 For managing cost competitiveness at industry-level, avoiding incidental *Inverted Duty Structure (IDS*) is a crucial requirement. Inverted Duty Structure (IDS) refers to a condition where the import tax rate on inputs (used for production) is effectively higher than the tax rate on the outputs (finished) meant for direct imports. If so, indigenous production cannot be advantageous and, cannot be sustained at all. IDS based on direct comparison of respective BCD on components *vis a vis* finished products is called Nominal IDS (i.e. on *de jure* basis), imposition of other tax /duties (e.g. lower preferential rates) may sometimes lead to effective IDS (i.e. on *de facto* basis).

4.307 Beyond applicable BCD, duty inversion *in effect* could also exist because of concurrent imposition of Inter-state GST (IGST), Anti-Dumping (AD) and Counter Vailing Duties (CVD) over same imports. In addition to BCD, imported goods are subject to IGST upon domestic entry into the country at the rate prevailing for like goods. AD duties for certain duration might apply on account of product-dumping (overseas sales price of a product was found below the normal domestic price in the originating country). Sometimes Countervailing Duty is imposed upon imported goods that have benefited from the Government subsidies in the Country of Origin. Therefore, it is required that cost-studies related to foreign trade are continued to identify *de jure* or *de facto* inverted duty structure. The

Government has been attempting to rationalise border-tax structure by progressive reduction of applicable BCD on imported inputs to check trade-distortion due to IDS.

4.308 Another border-control measure is application of *Safeguards against Dumping* of overseas products in the domestic market. Dumping is said to taken place when imported goods remain available at prices lower than the domestic prices prevailing within the territory of supplier economy for a significant time i.e. transitional unplanned price fluctuations owing to global price movements, release of accumulated goods-stock due to failed companies etc. are generally observed outside the scope of dumping. Director General Trade Remedies (DGTR) under the Ministry of Commerce take-up such grievances as represented by market players or industry-associations. A quasi-judicial process is followed to determine instances of dumping and resulting imposition of anti-dumping duties for a certain time-period. For example, in one of recent cases involving imports of optical fiber of a particular classification, it has been found vide DGTR Notification of 5 May 2023 that *the landed value of imports from the subject countries is below the selling price of the domestic industry and is therefore, undercutting the prices of the domestic industry.* Consequently, Revenue notification dated 5 August 2023 has imposed Anti-Dumping duties on certain exporting countries for a period of 5 years.

4.309 In view of the above discussions, **the Authority recommends that**

(i) DoT should constitute a Committee to identify industrial inputs (raw materials, components and industrial consumables) which are not sufficiently available in the domestic market and recommend rational duties to sustain domestic NATE manufacturing.

(ii) This Committee should also identify industrial finished supplies which are sufficiently available in the domestic

market and recommend duties including safeguard provisions to counter trade anomalies.

X. Incentives/policies required for growth of telecom software products

4.310 As the world is moving towards 5G and other advanced communication technologies, software solutions are becoming hardware agnostic and therefore are required to be treated as separate products. Software development companies have extensive presence in India including R&D centre and IPR management. Considering the shift in the telecom sector towards *Software-ization*, *Cloudification*, *Network Slicing* and *Virtualization* with the evolving technologies, the country can derive unparallel advantage with software products and availability of competent software developers.

4.311 Web scale IT, a converged architectural technology with scalable and modular software approach, is characterised by use of open-source software and commodity hardware to create software-controlled infrastructure. It is well known that network slicing under 5G architecture allows to virtualize the core and run several concurrent 'services' catering to class of customers, services, or traffic, as per dynamic nature of requirements. Open and disaggregated networks can be an opportunity to transform telecom supply chains, disaggregating the component of the network and providing open software to control a multi-vendor assembly of components. Open architecture has specifically changed the way Radio Access Networks (RAN) work.

4.312 Stakeholders have stated that current PLI and PMA policy notified by DoT are limited to manufacturing of only and Software has been treated as an overlay sub-product. Considering this position, Consultation Paper sought stakeholder views on what support is needed to boost India as a hub of telecom software products. The issues as raised in the Paper are given below –

Q16. Whether the existing incentives/policies issued by DoT and MEITY do meet the requirements for the growth of telecom software products? What additional policy initiatives and enabling regulatory measures are suggested to facilitate integration of telecom equipment and software products that are made in India? What measures are required to enhance exports of such products? Please justify your response.

4.313 The stakeholders have submitted that there is a need for 100% software-based incentive scheme for telecom sector, along the steps of PLI and Design Led PLI. Stakeholders have suggested that for branding India as a 'Technology Product Nation' an export promotion fund with a corpus of Rs. 1000 crores for telecom equipment and software products should be created, which may be utilised for India brand building, hosting events, conferences and international 'buyer-seller' meets that will showcase domestic companies to national and international customers.

4.314 A group of stakeholders have submitted that according to a recent report by NASSCOM, India has 1,430 Global Capability Centre(GCC), with revenue of US $36 billion, and with a total talent base of 1.3 million employees. As India's is home to a large number of multi-functional GCC along with geographical presence of various MNCs/ OEMs, the given resource base can involve itself to participate in software value chain across geographies. Such stakeholders opine that Government should incentivize the global OEMs by providing clarity and fair guidelines on preferential market access schemes where the local content definition can be made more pragmatic to account for the fact that the silicon-based component eco-system in India is still at a highly nascent stage. Moreover, the contribution from job-creation and capacity building in R&D should be quantified towards local content and value-addition.

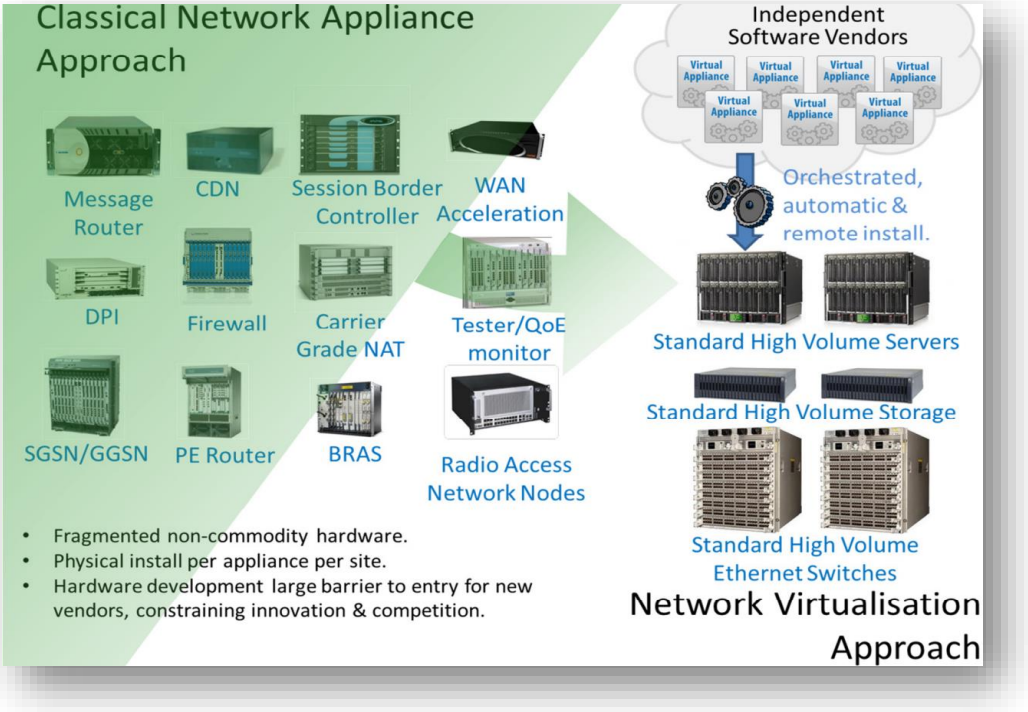
4.315 Stakeholders have also submitted that MEITY has taken various steps for promoting the software development in the country including *National Policy on Software Products* (2019), Software development and re-engineering guidelines for Cloud ready applications, Policy on adoption of open-source software for Government. of India etc. Besides, *Software Product Development Fund* (SPDF) created by MEITY have been conceptualized for the overall growth of the software product ecosystem. SPDF may help the Indian Software Product Ecosystem by investing in the complete chain of Software Product development through investment not only in start-ups but also in MSMEs and Companies. Hence, some stakeholders have sought extension of scope for SPDF to include telecom software products that may cater to the needs and preferences for 5G and future technology products, thereby bridging digital divide and promoting access of technology by all.

Analysis of the Issue and the Authority's view

4.316 In older generations of cellular technologies such as GSM and 3G, telecom networks were implemented using Physical Network Functions (PNF) which are purpose-built hardware with embedded software that provides specific networking functions. Hence, the software required to run the telecom networks was almost exclusively developed by telecom manufacturers themselves. Telecom has since evolved from legacy pure hardware play to semi-software/hardware play in LTE to current exclusive software solutions to the future cloud-native software platforms. Software Defined Networking (SDN) has helped to decouple hardware from software and execute the software in the cloud or in clusters of distributed IT servers. This allows for telecom software to be developed independently of the hardware thereby helping independent software vendors to enter a market that was previously dominated by telecom hardware manufacturers.

4.317 Network Function Virtualisation (NFV) is replacing proprietary hardware network elements (NEs) with software running on standard servers (Commercial Off-The-Shelf i.e. COTS hardware). Software Defined Network (SDN) deals with the replacement of standardized networking protocols with centralized control & programmability of network. In an advanced telecom network, common Virtualised Network Functions (VNFs) such as virtualized gateways, databases, routers, firewalls, and network address translation (NAT) services and Cloud Network Functions (CNFs) are implemented within one or more virtual machines or containers running different software and processes, on top of Commercial Off The Shelf (COTS) servers and networking equipment or cloud computing infrastructure. Figure 4.13 above illustrates the architectural transformations involved in transitioning to a Digital TSP from a traditional TSP.

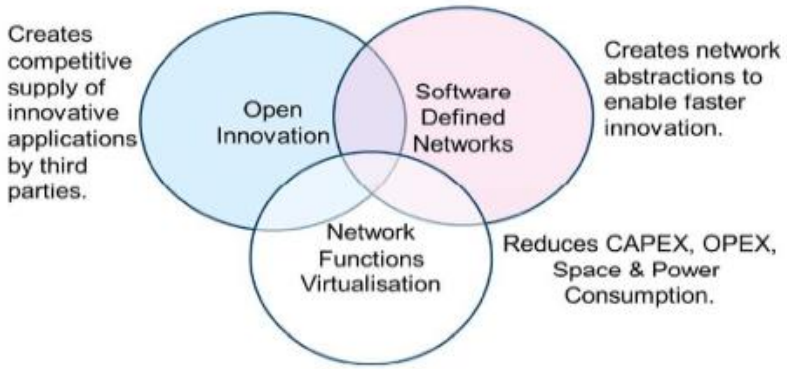
Fig. 4.13 Classical Network Approach versus Network Virtualisation Approach



Source: ETSI

4.318 Fig 4.14 illustrates Interfaces between Network Virtualisation, SDN & Open Access.

Fig. 4.14 Interfaces between Network Virtualisation, SDN & Open Access



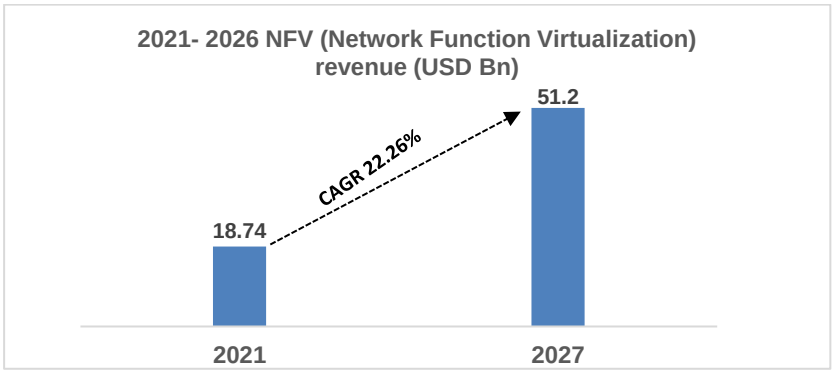
Source: ETSI

4.319 In addition to above, software is critical for provision of Operations Support Systems (OSS) which describe the information processing systems designed to help TSPs monitor, analyse, and manage telecom networks. OSS enables TSPs to oversee a variety of operational functions, such as Network Inventory, Fault management, Service provisioning, Configuration, Service assurance, and Network planning. A TSP generally deploys multiple OSS systems with each system managing a specific set of network nodes from a specific OEM. Besides, software also plays increasing role towards Automation, Orchestration and Analytics which facilitates the planning, deployment, configuration, orchestration, and assurance of networks and services. Data and analytics software help to collect data from network elements, generate analytics insights and expose data for consumers. Adoption of automation, orchestration, and analytics software help TSPs to reduce human errors in network management and operations, reduce service provisioning time, improve time-to-cash, and reduce time-to-resolve network and security issues through closed-loop network assurance.

4.320 With growing deployment of 5G networks, Cloud computing, Data Centres etc., the market for Network Function Virtualization (NFV)

was valued at US$ 18.74 billion in 2021 and is projected to reach US$ 51.2 billion by 2026, registering a CAGR of 22.26%. Since it provides a variety of network functions, such as load balancing, IP multimedia subsystems, firewalls, mobile cores, security, routing, or video, network function virtualization has been extremely beneficial for numerous businesses throughout the pandemic. Also, it lowers expenses and enhances resource management and scalability for an organization[176].

Fig. 4.15 Worldwide Telecom Network Functions Virtualization Software (NFV) Revenue Forecast

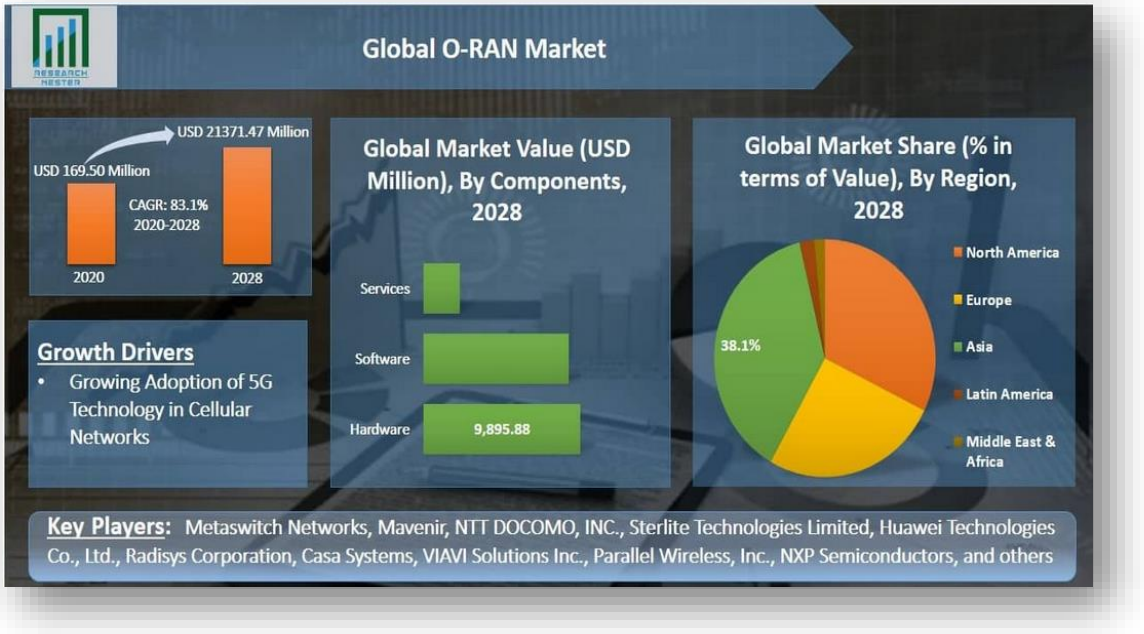


Source: https://www.marketdataforecast.com/market-reports/network-function-virtualization

4.321 The global open RAN market is expected to increase from US $ 1.1 billion in 2022 to US $ 15.6 billion by 2027, growing at a CAGR of 70.5% over the forecast period[177]. Fig. 4.16 depicts the proportion of software in the overall value chain.

[177] Open Radio Access Network (Open RAN) Market Size, Industry Share Forecast, Markets, and markets

Fig: 4.16 Global Open Radio Access Network (O-RAN) Market Forecast



Source: https://www.researchnester.com/reports/open-radio-access-network-market/2781

4.322 As per *5G Technology Trends Survey Report*[178] published by M/s JABIL and SIS International Research in late 2021, where 193 telecom stakeholders have responded, the vast majority of respondents (91%) agreed that Open RAN will create new 5G deployment and purchasing model opportunities.

4.323 India has a huge USD 227 billion-sized IT industry[179], and it has 56% market share[180] in global IT services and outsourcing. India's strengths and global reputation in software development can be leveraged to grow the telecom software development industry which can perfectly complement our efforts to develop the domestic networking and telecommunication hardware manufacturing sector. Various initiatives such as 'India 5G Alliance', field trials of open-RAN products by TSPs, introduction of domestic 4G stack in M/s BSNL's

[178] https://www.jabil.com/industries/telecommunications/5g-technology-trends-survey.html
[179] https://www.ibef.org/industry/information-technology-india
[180] https://www.ibef.org/industry/information-technology-india

network has oriented the stakeholders towards open software development in telecom domain.

4.324 Since National Policy on Software[181] Products 2019, aims to develop India as a global software product hub. The policy seeks to develop a conducive ecosystem to transform the predominantly service oriented IT/ ITES industry into a technology-oriented products industry, with an initial outlay of Rs. 1500 Crore to implement the programmes envisaged under the policy over a period of 7 years. The corpus has been divided into Software Product Development Fund (SPDF) and Research & Innovation fund. With these two divisions, the Government plans to achieve the following objectives:

(a) To achieve a ten-fold increase in the share of Indian software products in the global market by 2025.

(b) To nurture 10,000 technology start-ups in Tier-II/ Tier-III towns and generate employment for 3.5 million people by 2025

(c) To create a talent pool for the software industry, including the upskilling of 1 million IT professionals.

(d) To develop 20 sectoral software product clusters equipped with infrastructure, research, and development (R&D) and marketing support.

(e) To evolve and monitor scheme & programmes for the implementation of this policy, National Software Products Mission will be set up with participation from Government, Academia and Industry.

4.325 Under this policy, first Software products Cluster i.e. iTamil Nadu Technology (iTNT)[182] Hub in Chennai is being established as Section 8 company to nurture the deep technological innovation ecosystem that can guide, develop, implement, and support Start-ups, especially in a scaling up phase. iTNT Hub shall support 200 numbers of Start-

[181] https://pib.gov.in/Pressreleaseshare.aspx?PRID=1566747

[182] https://www.tnthub.org/

ups accelerated in technology space, preferably in deep technology/emerging technology, over a period of five years.

T-Works, incorporated in 2015 as an Innovation Hub and ecosystem enabler, is India's largest prototyping centre run by some of the best engineers, designers, and product experts in India. It has been founded by Government of Telangana, IIIT Hyderabad, Indian School of Business (ISB) and the National Academy of Legal Studies & Research (NALSAR). It uses the Triple-Helix model of innovation based on interaction and collaboration with the Industry, Academia, and the Government. It has been instrumental in development of 300 products and prototypes so far, by extending support to 250 Start-ups and MSMEs.

4.326 MEITY's *Start-up Accelerators of MeitY for Product Innovation, Development and Growth (SAMRIDH)*[183] Scheme is a part of the government's initiative to encourage software Start-ups with ground-breaking solutions via required fiscal support. It suits especially those Start-ups which look to improve their product and scale their business through Accelerator-support. The Accelerators would be selected based on the following criteria:

(a) The accelerator should have an association with the incubation business for more than three years.

(b) Accelerator under SAMRIDH must have assisted a minimum of 50 Start-ups, of which at least ten have pegged non-public investment or having targeted accelerator with a track record of running at least three cohorts with undertakings as prescribed.

4.327 In order to provide Accelerator Services, it would provide capacity enhancement, product enhancement, customer connect, investor

[183] https://pib.gov.in/PressReleasePage.aspx?PRID=1748914

connect, and internationalization connect services for six months' duration every year. Moreover, the select Accelerators may invest up to Rs. 40 Lakh in a Start-up against equity. It will also facilitate equal matching investment by the accelerator/investor. This Scheme will boost around 300 tech Start-ups via 40 cohorts.

4.328 Currently, majority of the telecom software market share is held by global telecom equipment makers. Domestic software companies face significant challenges in getting access to the market. They also lack the means and reputation to reach out to the global market and currently there are no initiatives and mechanisms to promote Indian telecom software in the global market. Software technology industry faces difficulties in obtaining funding since it requires significant investments in computing resources, providing product support, and hiring a qualified workforce, all of which translate into significant capital expenditures in very early-stage businesses. Hence, domestic players are facing challenges to raise funds, gain market access, define viable products to start off and perform risk assessments.

4.329 The Electronics and Computer Software Export Promotion Council (ESC) serves as India's apex trade promotion organization focussing on the promotion of India's exports of Electronics, Telecom, Computer Software, and IT Enabled Services (ITeS). The sectors covered by ESC include 'Electronics Hardware' and 'Computer Software and ITeS'. While telecom equipment is covered under the scope of 'Electronics Hardware', telecom software products are not covered under the scope of ESC. At current stage, telecom software products should be treated as a separate category and be included in the scope of ESC. All services provided to the existing members should also be extended to telecom software companies and the export statistics for telecom software should be monitored and published.

4.330 MEITY has notified Policy on software products, Software development and re-engineering guidelines for Cloud-ready applications, Policy on adoption of open-source software for Government of India along with establishment of *Software Product Development Fund* (SPDF). The Government has approved establishment of SPDF in the form of Fund of Funds. SPDF will participate in venture fund to provide risk capital so as to promote scaling up of market ready Software Products. The fund will fill the gap between the capital requirements of technology and knowledge based software product Start-ups enterprises and funding available from traditional institutional lenders such as banks. This scheme will create a corpus of Rs. 5000 Crore with an end target to have at latest 100 Indian software product companies having valuation of Rs. 500 Crore or employing 200 persons. The SPDF will be financially managed by a professional Financial Institution/ Asset Management Company as per SEBI guidelines.

4.331 However, no software specific scheme has been notified by DoT so far. Design led PLI Scheme notified by DoT includes software only as one of system-component for an end-user product. The valuation of this software part is included in product-valuation only if, the source code resides in India. However, for advanced communication networks, an additional incentive schemes on the lines of design led PLI for the software domain (software as identifiable product) is required. Aspects such as clear title relating to IPRs with at least 51 % beneficial ownership, and labeling requirements as trusted product could be included under the eligibility conditions. The techno-commercial trends indicate that software product valuation on aggregate basis would grow faster than that of commodity hardware. Therefore, it is crucial to harness domestic capabilities by unlocking this emerging opportunity. To realise it, it is necessary to establish (i) working definition of 'telecom software' and (ii) quicker infrastructural establishment to deal with testing of software.

4.332 For this purpose, *telecom software may be defined as set of programmable instructions, capable of self-functioning either stand alone or with other set, in conjunction with energised electronics hardware, generic or specific, to meet authorised functional requirements relating to telecommunications*.

4.333 There exists no incentive for Telecom Software Development while India witnesses one of the world's fastest roll out of 5G services on pan-India basis. R&D institutions like C-DoT and software majors like TCS are also rolling BSNL's 4G service network on open-stack basis. Several other companies including Start-ups recognised under DCIS are also developing innovative functional software. The overall product development paradigm can be quickened by making use of dedicated fund on Public Private Partnership basis. It enables India to gain time-advantage to attain competitive position in segments such as 4G/5G Virtualisation, Open RAN, Cloud Computing, Data Centre management, Industry 4.0, IoT/Smart city functionalities. For this purpose, a dedicated fund, Telecom Software Development Fund with initial committed corpus of Rs. 1000 Crore could be considered. It would be open for Private sector participation by SEBI Registered Venture Capital Funds to raise Target Corpus to minimum Rs. 3000 Crore.

4.334 Further, there is requirement of appropriate policies to allow organizations to use their intangible assets such as software and IPRs *as collateral* for securing financial support from the Banks to fund industrial capital expenses[184]. For example, in *South Korea*, IP-backed financing activity has been led by two state-owned Banks, the Korea Development Bank (KDB) and the Industrial Bank of Korea (IBK). Following their engagement, commercial lenders also have entered the intangibles finance space. KDB also runs a USD 60 million IP recovery fund provide bank guarantees to facilitate access to financing.

[184] https://www.wipo.int/sme/en/ip-backed-financing-for-policy-makers.html

4.335 Similarly, IP Financing Scheme[185] (IPFS) in *Singapore* was launched in 2014 for the companies which has IP as the core assets and lacked the tangible assets. Under this system, companies could use IP *as collateral* for the purpose of obtaining loans from the Participating Financing Institutions ("PFIs") and the risk of such IP backed loans were shared between the Singapore Government with PFIs.

4.336 In *China*, China National Intellectual Property Administration[186] (CNIPA) is essentially responsible for the organization and coordination of IPR protection work. Its aim is to act as the central registry of IP-backed financing pledges and set standards for IP pledge loans from various banks. Government bodies namely, China Bank Insurance Regulatory Commission, National Trademark Administration and the National Intellectual Property Administration jointly work on strengthening IP Pledge Financing work. Other countries such as USA, UK, Malaysia, Canada etc. have adopted similar policy-mechanisms.

4.337 Since Telecom Software *as an independent functional deliverable* is relatively un-known for public procurement purpose, it is imperative that facilitation unit in DoT should co-ordinate with other Ministries. This co-ordination should aid the industry in terms of demand-assessment against different modules of telecom software. As per DoT Notification[187] dated 29 August 2018 relating to PPP-MII Order, DoT has prepared a list of telecom products, services and works for their purchase preference from local suppliers for public procurement (Table-A). It has also identified conditions for the inputs to be qualified as Local Content (Table-B) and maximum ceiling for design as Local Content out of total Local Content (Table-C). The only entry where Software is explicitly mentioned in Table-A & C is at Serial no.

[185] https://www.wipo.int/wipo_magazine/en/2021/04/article_0001.html

[186] https://english.cnipa.gov.cn/art/2021/3/9/art_1340_157495.html

[187] https://dot.gov.in/sites/default/files/DoT%20PMA-PMI%20Policy.pdf?download=1

30 relating to '*SDN Software controllers, NVF[188] and CNF Software*'. Since list of eligible Telecom Software relevant to NATE may be extensive, it would be prudent to amend the listings accordingly. This would facilitate public procurement of Telecom Software *as an independent functional deliverable.*

4.338 Telecom Software *as an independent functional deliverable* is again not envisaged under current PLI policy notified by DoT. With increasing recognition of functional software modules for Open Radio Access Network, NVF, CNF etc., upcoming telecom networks may deploy such software modules on almost all network nodes. Therefore, case exists for consideration of including different kinds of functional telecom software modules under PLI Scheme. However, it should also specify local content norms, minimum of 50% product invoice value.

4.339 DoT's *Digital Communication Innovation Square Scheme*(DCIS) under *Champion Services Sector Scheme* (CSSS) is one of the possible on-going scheme where software product development could be inducted. As this Scheme has current tenure of 04 years i.e. from 2022-23 to 2025-26, this Scheme could cater to software innovation by Start-ups/ MSME/ Individuals by providing milestone-based incentives from DCIS fund. The grant for Start-ups is capped at Rs. 50 Lakh, for MSME at Rs. 2 Crore and can go as high as Rs. 10 Crore against technology products with the approval of Inter-Ministerial Apex Committee, chaired by Additional Secretary – Telecom, DoT. Technology innovators[189] identified under DCIS 2021 to 2023 also establish the trend for increasing recognition towards software products in telecom networks.

[188] **NVF**- Network Virtualization Function, **CNF**- Cloud-native Network Function

[189] https://dcis.dot.gov.in/assets/document/Draft_DCIS2023_Ebook_Ver5-2023.pdf

4.340 Another challenging aspect could be provision of access to networks, live or experimental, for product testing / trials. Service Providers are more focussed on operational continuity of live networks. Separate recommendations on the same after the ongoing Consultation shall be provided.

4.341 In view of the above discussions, **the Authority recommends that:**

(a) Appropriate definition of 'telecom software' should be adopted to facilitate eligibility criteria under PMA, PLI, Design-led PLI etc. A Suggested definition is given below:

"Telecom software may be defined as set of programmable instructions, capable of self-functioning either stand alone or with other set, in conjunction with energised electronics hardware, generic or specific, to meet authorised functional requirements relating to telecommunications."

This can be adopted after due consultation with the stakeholders.

(b) *Telecom software* products should be treated as a separate product-category and be included in the scope of Electronics and Computer Software Export Promotion Council (ESC).

(c) A dedicated fund, Telecom Software Development Fund with initial committed corpus of Rs. 1000 Crore should be established under Public Private Partnership mode with Target corpus of minimum Rs. 3000 Crore by seeking participation from SEBI registered Venture Capital Funds.

(d) Appropriate policy, in consultation with Department of Financial Services, should be adopted to promote the use of beneficially owned intangible assets such as *Telecom software* and related IPRs *as collateral* to secure financial support from the nationalized banks/financial institution against capital requirements of enterprises.

(e) Software valuation norms based on residing Intellectual Property Rights (IPRs) should also be specified on priority so as to facilitate funding/ credit facility.

(f) TEC should be tasked to finalize testing/certification norms for *Telecom software* products for publications at the earliest and facilities for the same be established/earmarked.

(g) DoT notified list of eligible telecom products under PPP-MII Order should be appropriately extended to include relevant telecom software on the lines of entries in Table-A & C against *SDN Software controllers, NVF and CNF Software* (Serial 30).

(h) Commercially accepted *telecom software* products should be brought in scope of DoT notified design-led PLI Scheme, where local content, as per invoice value, is not below 50%. Priority may be given to provider of *telecom software* with higher local content (if it becomes necessary while selecting beneficiaries).

(i) The scope of Digital Communication Innovation Square(DCIS) Scheme should be modified to include *Telecom software* as independent deliverable.

(j) Fund for DCIS's remaining tenure should be appropriately augmented so that at least 25% of overall grant is towards software innovations.

XI. Other issues

4.342 Apart from the issues posed in the Consultation Paper, the Authority has sought the views of the stakeholders on any other relevant issues. Hence, the following has been included in the Consultation:

Q17. Stakeholders are also requested to comment on other relevant issues, if any. What are the suggestions to overcome them?

4.343 The stakeholders have referred to the following issues:

(a) promoting Research & Development for NATE products
(b) Promoting India as a repair hub, to facilitate import of faulty equipment and its re-export
(c) Identification of significant chipsets for NATE and roadmap for their indigenous manufacturing
(d) Need for Skill Development programs

4.344 Most of the comments received against this question relates to promoting Research & Development for NATE products. The stakeholders have submitted that focus on R&D is the need of the hour. IPR royalties are biggest hurdles and bottleneck for local manufacturing and needs to be resolved. Incentives for procurement of products with domestically held IP should be thought of in parallel to efforts to enhance manufacturing capabilities. As mentioned earlier, the Authority shall take up R&D issues related to domestic NATE manufacturing separately by keeping in view various responses received from the stakeholders.

India as a repair hub

4.345 A few stakeholders have stated that NATE ecosystem should also facilitate India's role as Repair Hub where equipment once exported could be imported for fault identification, repair or calibration. The same could be re-exported after servicing involving repair or replacement of faulty parts. This would help establish country as one of the reliable source of NATE. However, concerns were expressed regarding repeat export/ import procedures.

Analysis of the Issue and the Authority's view

4.346 *Re-importation and Re-exportation of Goods:* Sometimes, indigenously manufactured goods, when exported, are returned back for various reasons including cancellation of export order or after exhibition/display etc., or after use in particular project/contract and completion of the contract etc. (such as machinery). Similarly

imported goods which may have discharged duties at the time of original importation has also to be often sent out for repair, re-conditioning etc. There are also goods that may have to be sent for special processes like electroplating, polishing or coating and re-imported. Thus, specific legal provisions[190] permit the facility of re-import and re-export of goods under Customs Act, especially Section 25A that deals with Inward processing of goods (inserted vide Finance Act of 2018) and Section 25B that deals with Outward processing of goods (inserted vide Finance Act of 2009). Section 25A provides for maximum period of one year since the date of import clearance order in case of identifiable goods due for re-exports upon repairs. Section 25B provides for the same provision in reverse direction (repairs taken up overseas).

4.347 *Duties* - Next concern may relate to payment of custom duties during re-import/ re-export. Section 26A of Customs Act makes provision for refund of import duty paid if imported goods are found defective or not as per specifications. The refund is admissible if goods are re-exported or abandoned or destroyed. Application for refund should be applied for within six months of such destruction.

4.348 *Relaxing the ageing restriction*[191]: The Department of Revenue vide Notification No.60/2018-Customs[192] dated 11 September 2018 has amended the prior Notification No.158/95-Customs dated 14 November 1995. In effect, it relaxes the ageing restriction from 3 years to 7 years for specified electronic goods manufactured in India and re-imported into India for repairs or reconditioning. The importers of goods for repairs are required to execute a bond to re-export the goods after repairs or reconditioning within one year of import. If they fail

190 https://taxinformation.cbic.gov.in/content/html/tax_repository/customs/acts/1962_custom_act/documents/Customs_Act__1962_30-March-2022.html

191 https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1883488

192 https://taxinformation.cbic.gov.in/view-pdf/1000306/ENG/Notifications

to do so, they might have to pay customs duty. While referring to Annexure to this notification, it is noted that entries specify '8517' as 4-digit HS Code primarily dealing with NATE. However, there are other HS Codes relevant to NATE as discussed earlier.

4.349 In case of repairs to be performed overseas, exporters may approach *Authorised Dealer*[193] (AD) Category-I Banks as per RBI's notification relating to Electronic Declaration Form (EDF). These Banks may consider request from exporters for granting EDF approval in cases where goods are being exported for re-import after repairs/ maintenance / testing /calibration, etc. As per norms, the exporter should produce relative Bill of Entry within 1 month of re-import of the exported item. In a case where the goods being exported for testing are destroyed during testing, banks may obtain a certificate issued by the testing agency that the goods have been destroyed during testing, in lieu of Bill of Entry for re-import.

4.350 *General Authorization for Export after Repair in India* (GAER)[194] The re-export of imported SCOMET items to the same entity abroad, after repairs done in India are allowed on the basis of a one-time GAER. GAER once issued remains valid for a period of 01 year from the date of issue, subject to subsequent post reporting(s) within 30 days from such export.

4.351 *Electronics Repair Services Outsourcing Pilot Program*[195] (ERSO)- Since June 2023, MEITY has kick-started a pilot project named Electronics Repair Services Outsourcing (ERSO) in an effort to make India the repair capital of the world. Adopting Regulatory Sandbox model,

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[193] AD Category-I Bank means a Bank (commercial, State or urban cooperative) which is an Authorized Dealer and allowed to deal in all current and capital account transactions by RBI from time to time.

[194] https://content.dgft.gov.in/Website/dgftprod/0fb962de-c373-49d5-876b-95c2c1f5482b/Public%20Notice%2031%20English.pdf

[195] https://pib.gov.in/PressReleasePage.aspx?PRID=1928643

[198] http://missionlife-moefcc.nic.in/. Mission LiFE: An India-led global mass movement to nudge individual and community action to protect and preserve the environment

[199] https://righttorepairindia.gov.in/sectors.php. It includes Mobiles, Tablets, Wireless headphones and Ear buds, laptops, Universal Charging ports/cables Batteries, Servers and Data Storage Hardware & Software, Printers

several stakeholders including Industry, MEITY, CBIC, DGFT & MoEF&CC (Ministry of Environment, Forests & Climate Change) have joined hands to liberalise the extant rules during the 03-month tenure of the Pilot. It is in line with Government's Mission LiFE (Lifestyle for Environment)[196] and Department of Consumer Affairs (DCA) Right to Repair[197] framework (includes electronics/telecom products). Five companies have joined the Pilot. After detailed assessment, modifications (as necessary) may be made in the process and policy.

4.352 As per some stakeholders, high repair costs in regions such as Europe and the United States are compelling companies to send goods overseas, affordable labour costs in India give it a relative cost advantage over China and Malaysia - some of the biggest hubs for repairs at present. Under the Pilot, the Government would:

(i) test changes to lower the time required for necessary approvals for imports and exports to a day from as much as 10 days.

(ii) ease the approval process for timely clearances with the tax authorities so that devices can easily enter India for repairs and then be shipped back quickly.

(iii) allow recycling of 5% of imported goods domestically on a trial basis. Current e-waste Management Rules prohibit companies from locally disposing non-repairable products - adding to their logistics costs as they have to be sent back

(iv) will also permit re-export of the imported electronics goods to countries different from the original one - currently it is banned under foreign trade rules

4.353 Simplification of process and policy for undertaking repair/ replacement/ calibration of domestically manufactured NATE would

help in product-evolution and enhance market presence of indigenous NATE (through Right to Repair) in all markets.

4.354 Based on discussions above, **the Authority recommends that repair/replacement/calibration activities associated with *Services After Sales* should remain an integral element of domestic NATE manufacturing ecosystem. Policy guidelines and Procedural simplification to undertake repairs for identifiable equipment should be notified at the earliest.**

4.355 So far as repair/ replacement services for imported non-domestic NATE is concerned, it would first require notification of public policy on *Repairs as Service* after consultation with stakeholders including MOEF&CC and CBIC-Customs.

Identification of significant chipsets for NATE and roadmap for their indigenous manufacturing

4.356 During consultation process, a few Stakeholders while interacting with the Authority have mentioned about deep dependence of domestic NATE industry on global supply of Integrated Circuits (especially in terms of Controllers & Processing Units of different kinds). Semiconductor based component production in the country has been under active consideration of the Government.

Analysis of the Issue and the Authority's view

4.357 *India Semiconductor Mission*[198] (ISM) is a specialized and independent Business Division within the Digital India Corporation that aims to build a vibrant semiconductor and display ecosystem to enable India's emergence as a global hub for electronics manufacturing and design. The Design Linked Incentive (DLI) Scheme[199], notified on 21

[198] https://ism.gov.in/

[199] https://d2p5j06zete1i7.cloudfront.net/Cms/2022/May/05/1651757254_notification_dli.pdf

December 2021 under ISM, aims to offer financial incentives as well as design infrastructure support across various stages of development and deployment of semiconductor design(s) for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design(s) over a period of 5 years. It includes three components:

Table 4.27 Design Linked Incentive (DLI) Scheme - Categories of support

Sr	Scheme component	Description
1	*Design Infrastructure Support for Startups / MSMEs*	i) National EDA Grid (ii) IP Core Repository (iii) Prototyping (iv) Silicon Validation
2	*Product Design Linked Incentive*	Reimbursement of 50% of the eligible expenditure subject to a ceiling of ₹15 Crore incentive per application.
3	*Deployment Linked Incentive*	Reimbursement of 6% to 4% of net sales over 5 years subject to a ceiling of ₹30 Crore incentive per application

4.358 Under current tenure, Applications are open for eligible beneficiaries since 1 January 2022 for a period of 03 years. Therefore, it is felt that key chip- sets meant as components for NATE (that are likely to be in-demand) be identified on priority. It would add to significant value addition across domestic manufacturing chain. This in turn would support more intensive participation of the industry in public procurement under PMA-MII policy and PLI Scheme.

4.359 **The Authority recommends that a dedicated multi-stakeholder Committee under DoT / TEC should be established so that it could identify key chip sets for NATE in-demand, draw the roadmap for their domestic manufacturing, and make recommendations to the Government under *India Semiconductor Mission.***

Need for Skill Development Programs

4.360 A few stakeholders have suggested that there should be a mechanism in place to develop appropriate skill-set for NATE manufacturing sector. As skill set required for this sector is essentially dynamic, the skill upgradation framework should include practising employees in addition to the potential employees. One of the stakeholders has also made a reference to relative cost disabilities associated with NATEM and suggested that non-availability of high skilled manpower (as one of the factors) needs to be adequately tackled in-time. Another stakeholder opined that there should be agile interactions involving industry, academic and R&D institutions while envisaging such skill upgradation initiatives.

Analysis of the Issue and the Authority's view

4.361 Several skill development programs for imparting elementary and advanced skill-sets relevant to Electronics sector have been implemented which are described below:

(a) Elementary Skill trainings:

(i) MEITY's *'Scheme for financial assistance to select states for skill development in ESDM sector'* was launched in November 2013. The scheme was aimed at enhancing the skilling capacities in ESDM Sector through public and private sector for students/youth after high school, ITI, Diploma, Non-engineering graduates, etc.

(ii) MEITY has notified another Scheme "*Skill Development in ESDM for Digital India*" in 2014 that provides for elementary training for youth in four modules- unskilled, semi-skilled, supervisor and master technician. Under both the schemes launched by MEITY, above 4.35 lakh candidates have been enrolled and 4.28 lakh candidates have been trained. About 3.11 lakh have been certified as on 1 March 2023**.**

(iii) Under *National Apprenticeship Promotion Scheme* (NAPS), launched in 2016, financial support is provided to establishments that undertake the apprentice training. The Government provides for 25% of prescribed stipend, capped at Rs. 1500/- per month per apprentice. Such establishments or basic training provider engaged by them, may be reimbursed at the rate of Rs. 15 per hour for a maximum of 500 training hours per apprentice. Such trainings are organised through State-level Training agencies.

(iv) Telecom Sector Skill Council (TSSC) organises four training-modules for 'service sector'. There is no training module dedicated to manufacturing skills.

(b) Advanced Skill trainings:

(i) **Chips to Startup**: MEITY's *Chips to Startup* (C2S) is an umbrella program that aims to generate 85,000 number of industry-ready manpower in the area of VLSI and Embedded System Design in five years. This program focusses on inculcating advanced skill-set amongst B.Tech., M.Tech. & Ph.D. level scholars for undertaking fabless design of IP-core/ Chip/ System-on-Chip (SoC)/ System Level Design. It involves individuals, Start-ups/MSMEs, Academia and R&D Organizations under overall co-ordination of Centre for Development of Advanced Computing (C-DAC) in association with IIT- Madras.

C2S program has adapted[200] RISC-V which is an open standard Instruction Set Architecture (ISA) based on established reduced instruction set computer principles. As compared to prevalent CISC architecture, RISC V entails no license fees, requires shorter software code, capable of reducing chip area required by 50 % and power consumption by 60 %. Leading companies such as Samsung Electronics, Google, Intel, Nvidia, Oculus, Rambus and

[200] https://www.opensourceforu.com/2023/08/rajeev-chandrasekhar-announces-india-backing-for-open-source-risc-v/

Qualcomm are undertaking design-development based on RISC V architecture in various domains such as servers, supercomputers, IoT, smart-watches and autonomous vehicles.

(ii) **Special Manpower Development:** MEITY has operated two phases of "*Special Manpower Development Programme in VLSI Design and Related Software (SMDP-I & II)*" for providing necessary resource-centres for inculcating practical skill-sets by roping in several leading technological institutions and R&D bodies. Target group of students begins from B.Tech/ B.E and goes up to Ph.D. scholars. VLSI Design Laboratories have been established at 32 institutions equipped with State-of-the-art Hardware platforms and Electronic Design Automation (EDA) Tools. Under India Chip program, these institutions have led to fabless design of 14 chips, 5 in single mode and 9 in "Multi Project Wafer (MPW)" mode.

3rd Phase of SMDP (SMDP III) has enlarged the scope of skill training to develop Working Prototype of System-on-Chip/ System/Sub-Systems using the Application Specific Integrated Circuits, ASICs/ICs developed in-house. Program named as *Special Manpower Development Programme for Chips to System Design (SMDP-C2SD)* has been operated from 2014 to 2021 with an outlay of about Rs. 100 Crore with 10 Resource centres and 50 participating institutions. Under the programme, during first 5 Year of Programme, about 52365 number of Industry ready Specialised Manpower has been generated in VLSI/ System Design Area at B.Tech, M.Tech and PhD level. Fabless designs for 162 ASICs and 15 SoCs, mostly at 180 nm, have been achieved so far.

(iii) **Design validation & fabrication support at India Chip centre:** Under C2S programme, India Chip Centre undertakes fabrication support at Semiconductor Complex Ltd. (SCL) and overseas foundries in MPW mode on behalf of designing Institutions/Start-

ups/MSMEs. It also offers design services including maintaining IP Core Repository, Design flow establishment with a specific set of EDA tools and the Fab Process Design Kit (PDK), Fab compliance validation of Designs, Packaging of Chips, Testing, Characterization in the Country in centralized manner.

(iv) **Adoption of new Academic curriculum:** Under C2S program, three other initiatives have been taken:

- **New advanced courses:** M.Tech and M.Design Programme in Electronics Product Design have been initiated by MEITY to promote designing of innovative products, rapid prototyping & development and hands-on experience with cutting edge technology and processes
- **M.Design programme/Executive development programme in Electronics Product Design:** M.Design programme/Executive development programme in Electronics Product Design has been initiated at IIT Guwahati in March 2021 to graduate 120 M.Design students and 4 PhD students in Electronics Product Design over the period of 5 years. Besides this, Executive Development Programme would be conducted for 200 Industry experts.
- **Special Manpower Development Programme (SMDP)- M. Tech. in Electronic Product Design and Skill Development:** M. Tech. in Electronic Product Design and Skill Development has been initiated at IISc Bangalore in March 2021 to train 305 Students/Faculty (125 students via M.Tech Programme, 144 Students via Short-term Certificate/Workshop and 36 Faculties vis Faculty Development Programme) over the period of 5 years.

In pursuance of India Semicon Program, M/o HRD and AICTE has recently launched[201] two new academic courses, (i) B. Tech

[201] https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1900384

Electronics VLSI Design & Technology and (ii) Diploma in integrated circuit manufacturing, which may be adopted by any affiliated institution.

International Best practices: Current Skill programs in Taiwan

4.362 Taiwan has recognised the advent of AI, 5G, Big Data and IoT leading to cross-domain design techniques under *AI Taiwan Action Plan*. Therefore, in order to inculcate cross-disciplinary digital talents to keep up with digital business requirements, "*Talent Development Program of Semiconductor Industry*" has been initiated by Bureau of Industrial Development under the Ministry of Economic Affairs, Taiwan. This program aims to enhance cross-disciplinary and practical skillsets in emerging technologies by offering customized, flexible and various corporate training classes that combine consultation, tailor-made seminars, and supply chain co-creation initiatives.

a. "*Platform for Talent Empowerment and Industry-Academic Cooperation for Semiconductor Industry*" connects industrial needs with government resources. Nearly 40 entities including leading companies, academic institutions and industry associations have joined the platform. By conducting talent and technology needs assessments, and with the introduction of a systematic approach to industry consultation and education, this platform seeks to stay on top of the talent and technology requirements and integrate teaching resources in Taiwan to provide optimized and customized corporate training programs in IC design, manufacturing, testing & packaging, smart applications and digital transformation.

b. Taiwan's Semiconductor Research Institute (TSRI) collaborates with the industrial and academic sectors and conducts international talent training to help Taiwan become an important global training base for chip design. An advanced process design environment for local master's and doctoral students to conduct

academic research using TSMC's 16-nm virtual process chip design training kit and 7-nm FinFET manufacturing services has been provided. This would allow TSRI to assist in downlinking completed chip layouts to Taiwan Semiconductor Manufacturing Company Limited[202] (TSMC) to verify the feasibility of forward-looking AI and B5G/6G designs and thereby meet industry demand. Industry academia bonding is bridging gaps by bringing industry veterans to head such training initiatives.

4.363 Contemporary trends relevant to Skill Development Programs for indigenous NATE manufacturing are briefed below:

(i) *Man-power requirement:* The current momentum in ESDM including chip-design is towards adoption of AI techniques for faster processing at each step. It tends to fuel the need for highly skilled design engineers as mundane jobs such as inspection, testing, cleaning etc. are likely to be automated in near future. Recognising this trend, Semicon India 2023 has underlined the overall requirement of having at least One Lakh skilled chip design engineers by 2028.

(ii) *Highly Calibrated Production process:* The production process involves highly calibrated industry-environment where automotive time synchronisation required should be at least of the order of 0.1 milli-second, component placement accuracy at least below 50-micron, alignment accuracy at least below 10 nm and operating temperature below 30 Centigrade & 60 % Relative Humidity.

(iii) *Wide operating temperature range required:* In reference to NATE, normal operating range for equipments is 0 to 70 Centigrade. Given high altitude areas, geological explorations, satellite communications etc. there is likely to be requirement for

[202] TSMC is world's largest dedicated independent semiconductor foundry.

equipments capable of operating in extreme– temperature range i.e. -40 to 85 C.

(iv) *Need to spur innovation:* Owing to rapidly evolving communications technologies and dynamic consumer demand, there would be continuous need to innovate fabless-design. Domestic availability of resources would spur innovation and facilitate customer-driven designs. Symbiotic relationships should be established between existing programs such as C2S and industrial requirements.

4.364 Therefore, it is imperative for provide for specific incentives for ensuring availability of highly skilled design engineers capable of under design practice in inter-disciplinary technologies such as 5G core, radio networks, IoT, AI, Cloud Computing, IPR protection, geo-spatial navigation, time stamping services etc. It would require active collaboration amongst academia and industry so that trained manpower is skilled enough in advanced process engineering, operating toolsets, conduct validation exercise etc. As digital communications are highly time-sensitive and requires to be cyber-safe, the inculcated skill-set needs to be aligned accordingly.

4.365 The Authority views that out of total pool-size of B. Tech/ M. Tech/ M. Design students who shall specialise in Electronics VLSI Design & Technology and Electronics Product Design, at least Four hundred trained engineers proficient in NATE design requirements are made available to the industry each year. Adequate resource-availability at advanced technological institutions under AICTE should be provided for fine-tuning of curriculum as per contemporary requirements, and easier access to design-lab facilities & EDA toolsets in participating institutions.

4.366 In order to provide certain level of uniformity in learning outcomes, such skill development programs should remain in conformity with

National Skills Qualification Framework (NSQF) as notified[203] by Department of Economic Affairs. It is a nationally integrated education and competency-based framework that enables persons to acquire desired competency levels qualitatively.

4.367 **Therefore, the Authority recommends that –**

(i) Government should identify top 10 AICTE affiliated advanced technical institutions that are offering advanced courses in electronics design, fabless products design & VLSI engineering and offer one time grant for resource mobilization to these institutes. This grant should be minimum Rs 20 Crore per eligible institution for 5 years' period and should be subject to certified completion of post-graduation or Doctoral fellowship course by minimum 40 students each year in electronics design, fabless products design & VLSI engineering.

(ii) The institution receiving grants as per above two schemes should be required to establish collaborations with relevant industry and domain related R&D Centres.

(iii) DoT/NTIPRIT should coordinate with AICTE so that each participating institution should follow National Skills Qualification Framework (NSQF) under the overall supervision of AICTE.

[203] https://www.education.gov.in/sites/upload_files/mhrd/files/NSQF%20NOTIFICATION.pdf

Chapter -5

Summary of Recommendations

I. PLI Scheme

The Authority recommends:

(i) the eligibility criteria of global revenues and cumulative incremental investment for the entities to qualify for availing PLI benefits should be modified as per following table-

Product category	Global revenue criteria *(in Rs. Crore)*			Minimum cumulative investment threshold *(in Rs. Crore)*	
	Non-MSME		MSME	Non-MSME	MSME
	Global	Domestic			
Core network	10,000	250	10	100	10
Access network	10,000	250	10	100	10
Customer Premises Equipment	1,000	50	10	25	5
Enterprise Equipment	1000	50	10	25	5

[Refer para 4.30]

(ii) further announcement of PLI schemes by DoT should have -

(a) an inbuilt local value addition criterion for any entity to avail the benefits of PLI. For availing any benefits under PLI scheme, DoT should prescribe that minimum 50% of the components (other than semiconductor components and bare PCBs of more than 8 layers) by value terms, used in the manufacturing of the specific end products must be manufactured in India.

(b) Two incentive slabs under the Design-led PLI Scheme. In addition to already announced 1% additional benefit,

another slab of additional 2% benefit be introduced for such product lines that yield minimum local value-addition of 75% wherein the components (other than semiconductor components and Bare PCBs of more than 8 layers) by value terms, used in the manufacturing of the specific end products must be manufactured in India.

[para 4.37]

(iii) Online publication of data on PLI-performance dashboard for PLI beneficiaries pli-telecom.udyamimitra.in should further include

(a) Exports realised by PLI-beneficiaries

(b) Incremental sales on account of Software products

(c) Incremental Exports on account of Software products

[para 4.38]

(iv) Concurrent PLI Scheme focusing on development, design and manufacturing of NATE components/ components based sub-assemblies may be introduced on the lines of Component Champion Incentive Scheme to boost domestic manufacturing of Advanced Automotive Technology (AAT) products. This concurrent PLI Scheme may include the following:

- Passive components (such as sensors, transformers, diodes-photo/laser diodes, crystals, oscillators, connectors/ cable assemblies, fuses, splitters)
- Active Components – (such as transistor/ logic based controller or regulator, amplifier, discrete circuits, switches, Transistor outline Can) in electrical/optical domains
- RF Antennae for in-building use (including Wi Fi/ Cellular access in permitted Spectral bands)

- Printed Circuit Boards (may include compatible with IoT compatible integration/ flexible PCBs for ultra-portable use/ re-cyclable PCBs)
- Sensors compatible with IoT / M2M integration
- Wearables & Hearables
- Fabless Designs with IP Core (qualifying under Designs Act,2000)
- Spatial Navigation / Telemetry aids clocked to Indian Standard Time Reference
- High Speed Data cables
- Battery Chargers / battery for portable devices & broadband access
- Hybrid power modules
- Speciality chemicals used in different stages of electronic device manufacturing

[para 4.44]

(v) basic eligibility, minimum new domestic investment criteria and the incentive-structure adopted for concurrent PLI Scheme vis-a-vis PLI scheme for telecom and networking products should be as follows:

Eligibility Criteria	PLI Scheme proposed for components	
	For non-MSMEs	For MSMEs
Global Manufacturing Revenue during Base year	Global Company - Rs. 1500 Crore Domestic Company - Rs. 100 Crore	Rs. 5 Crore
Minimum Cumulative Domestic Investment	Rs. 15 Crore	Rs. 5 Crore
Incentive structure	6 % (Year 1 &2) 5 % (Year 3 & 4) 4 % (Year 5)	7 % (Year 1 &2) 6 % (Year 3) 5 % (Year 4) 4 % (Year 5)

[para 4.46]

(vi) The Authority reiterates its recommendations on "*Regulatory Framework for Promoting Data Economy Through Establishment of Data Centres, Content Delivery Networks, and Interconnect Exchanges in India*" dated 18.11.2022 and also recommends for an early implementation of its entire recommendations.

[para 4.48]

II. Preferential Market Access (PMA) / Preference to Make in India (PMI)

The Authority recommends:

(i) Applicable Gross Revenue (Ap-GR) for a licensed service provider should be reduced on annual net basis, by an amount equivalent to the aggregate certified value of indigenous Networking & Telecom Equipment (NATE) deployed in respective telecom networks during a financial year.

(ii) For a claim to be qualified under this benefit, the product-wise local value addition criterion as specified in current PMA-PPI order, should be applicable. For those products for which the local value addition criterion has not been fixed in current PMA policy, they should qualify for claiming benefits if such products have local content of at least 50 % of its value.

(iii) To claim this benefit, the licensee should procure at least Rs 1 Crore of such NATE equipment per financial year on all-India basis.

(iv) Such benefits should be claimed by licensee only once in a year in the last quarter of the financial year.

(v) In cases where the Applicable Gross revenues may be less than the total amount spent on procuring local NATE, the

difference should be allowed to be carried forward for offsetting against Applicable Gross revenues within three subsequent years.

(vi) For settling such claims, suitable modifications should be made in the formats for submitting periodic financial statements in corresponding license authorization.

[para 4.78]

(vii) PMA/PMI should apply to all public procurements funded fully or partially by the Central Government under (a) USOF projects, (b) Participating State Government & bodies under their respective control, and (c) External Development projects aided by India.

[para 4.79]

(viii) Deviations from Public Procurement Order, should not be permitted in case of turnkey or special projects by the competent authority. In rarest of rare cases, where any deviation is permitted, it should be published on DoT's website/portal for benefit of the entire industry.

(ix) On the lines of items reserved for Purchase from Micro and Small Enterprises (MSEs), DoT should specify a reserve list of NATE for niche market segment of such Start-ups or MSEs that have beneficially owned resident Intellectual Property Rights (IPRs). For the same, DoT should devise a process to identify and register such Start-ups or MSEs.

[para 4.82]

(x) Create an online portal for receiving, handling and disposal of complaints as outlined in Standard Operating Procedure. The proposed portal would enable ease of doing business and facilitate implementation of DoT's PPP-MIII Notification 2018.

(xi) Define fix timelines (say 18 days) for giving final decision by the Committee.

(xii) Each final decision relating to the grievance received should be invariably published online on the same portal for public-use. [para 4.86]

III. Financial and fiscal incentives beyond PLI

The Authority recommends that

(i) On lines of Electronic Development Fund (EDF), a fund of funds should be created with a corpus of Rs 10,000 crore with objective to exclusively focus on promotion of NATEM in India. The fund is hereinafter referred to as Networking and Telecom Equipment Development Fund (NATEDF). For operationalizing this fund, DoT should take advantage of MEITY's prior experience in establishing EDF.

[para 4.110]

(ii) Suitable financial institution may be identified/created for managing and administering NATEDF.

[para 4.112]

(iii) On lines of the Technology Development Board (TDB), working under the Chairmanship of Secretary, Department of Science and Technology, Government of India, a multidisciplinary Telecommunication Equipment Development Board (TEDB) should be constituted in the DoT, for faster and coordinated decisions relating to funding of incentives for design, development and manufacturing of telecommunication equipment in the country. It should be responsible for facilitating innovation, R&D, testing and certification and manufacturing in the telecom sector in the

country. This board would be responsible for administration and disbursal of funds from TTDF and from TRDF (If TRDF is created in line with TRAI's earlier recommendation of 2018). Immediate corrective action may be taken to withdraw any such related responsibility from C-DOT to avoid conflict of interest.

[para 4.117]

(iv) The Authority re-iterates its earlier recommendation of 2018 that "*the progress of indigenous telecommunication equipment manufacturing in the country should be monitored in Department of Telecommunications (DoT) at least at the level of Member, Telecom Commission. For time bound progress, a dedicated unit in DoT should be made responsible for facilitation and monitoring of telecommunication equipment design, development, and manufacturing in the country*".

[para 4.123]

(v) On the lines of *Scheme for Promotion of Manufacturing of Electronic Components and Semiconductors* (SPECS), a new scheme should be introduced to partially fund the Capital expenses of manufacturing facilities with respect to domestic manufacturing of NATE and related components. The salient features of this scheme should include:

(a) Extend one-time support up to 25 % of the overall Capital expenses towards establishment of 'Plant & Machinery' for undertaking domestic production of telecom & networking equipment/ components.

(b) The eligible cost-elements should also include expenses on account of facilities for Assembly-Testing-Marking & Packaging (ATMP) and Semiconductor Assembly and Outsourced Test (OSAT) for other domestic products as

well. It may also permit such used machinery with minimum certified Residual life of 7 years to become eligible for capital support provided such machinery is not manufactured in India. It may further allow inclusion of costs due to Transfer of Technology/ Intellectual Property/ Product Standardisation-Labelling. But should exclude costs due to land acquisition & civil construction.

(c) This Scheme may have fixed tenure of five (05) years to support NATE manufacturing for both fresh capital expenses (greenfield) & augmentation of manufacturing establishment (brownfield investments) involving at least 25 % capacity augmentation, valued in terms of installed capacity.

(d) The range of overall costs thresholds should be kept from Rs. 5 Crore to Rs. 1000 Crore. Slab-wise thresholds depending upon the type of manufacturing entity should be as follows:

Sr.	Classification of manufacturing entity	Thresholds relating to Capital cost of 'Plant & Machinery' for 05 year tenure (in Rs. Crore)	Likely range of Capital-support to an eligible entity (in Rs. Crore)
1	Global entity	250 to 1000	62.5 to 250
2	Domestic entity	100 to 1000	25 to 250
3	MSME	5 to 100	1.25 to 25
4	Start-up	5 to 25	1.25 to 6.25

(e) The reimbursement of 50% of Capital support should be given once minimum committed investments have been made and declared production has actually commenced. The remaining part of Capital support should be reimbursed in 5 equal yearly instalments.

(f) The priority-list for selection of eligible applications should be based on entity's self-declaration regarding estimated increase in value-addition within its scope of manufacturing activities.

[para 4.147]

(g) At least one-fourth of the scheme outgo should be to support applicant-beneficiaries that are drawn from such MSME entities where eligible planned investment during the entire tenure of the Scheme does not exceed Rs. 50 Crore.

[para 4.148]

IV. Financial assistance to MSMEs - Interest subvention

(i) A dedicated Daughter fund for Interest Rate Subvention under NATEDF should be constituted. The maximum of subvention should be kept as 4 % in case of MSMEs for a tenure of 05 years. The maximum lending at reduced rates for Plant & Machinery should be capped to Rs. 25 Crore per entity.

[para 4.153]

Project Financing & Contract financing

Keeping in view, prior recommendation to set-up NATEDF as Fund of funds in view (vide para 4.110 above), the Authority recommends that

(i) on the lines of post-shipment credit facility available through Export Import Bank of India (EXIM), the funding requirements including credit to overseas Buyers against exports of domestic NATE, may be sourced from NATEDF.

(ii) Similarly, on the lines of pre-shipment credit available to exporter manufacturer of domestic NATE through EXIM,

the funding requirements for term loan against the contract for exports may be sourced from NATEDF.

(iii) The scope of funding should include (a) Project finance and, (b) Contract Finance

[para 4.176]

Tax relief for IPR-driven companies

(iv) A scheme that offers tax incentives in the form of 15% corporate income tax to innovative enterprises with beneficiary resident IPRs should be introduced for domestic enterprises working for NATE manufacturing. The salient features should be as follows:

Sr	Key-aspects	Related Provisions
1	**Objective**	To incentivise high technology IPR-driven investments into NATE sector by extending tax-relief against prospective Income Tax for such enterprises / companies
2	**Duration**	Initially for 3 years, extendable by another 3 years.
3	**Tax relief**	On the lines of Section 115 BAB of Income Tax Act, the incidental rate of Corporate Income Tax applicable is 15 %, subject to fulfilment of certain conditions specified therein.
4	**Essential Conditions:**	
4a	• *Body Corporate*	**(i)** Corporate bodies such as Companies, Partnerships and Joint Ventures has remained registered in India for at least one -year before are eligible;
4b	• *NATE R&D based Manufacturing*	**(ii)** The eligible enterprise should be NATE manufacturers. As outlined in CGST Act: 'Manufacture' means *the processing of raw material or inputs in any manner that results in the emergence of a new product having a distinct name, character and use activity;*
4c	• *Beneficiary resident IPRs*	**(iii)** The enterprise has obtained fully-owned Intellectual Property Rights such as software copyrights, Design rights, Patent rights resident in India during the last 3 years;
4d	• *Exclusive Production*	OR

	License/ Transfer of Technology	The enterprise has acquired exclusive production-License/ Transfer of Technology (ToT) for a minimum of 5 years;
4e **4f**	• *Regular R&D expenses and* • *Qualified R&D Manpower*	**(iv)** The enterprise has made continuous investments towards in-house R&D: (a) by allocating, at least 5% of its Annual Turnover towards in-house R&D (b) by employing at least 10% employees for in-house R&D of which minimum 30% are qualified Post-graduate and Doctorate-fellows technologists/engineers in the fields of Telecommunications, Networking, Electronics Design, Software Engineering, Material Sciences, Chemical Engineering, Instrumentation Engineering, Reliability Engineering;
4g	• *Turnover Contribution based on beneficial IPRs held*	**(v)** At least 50 % of Annual Turnover of such an Enterprise is accounted as aggregate combination of: (a) Sales Turnover due to self-manufacturing based on fully-owned IPRs OR exclusive ToT (b) Proceeds due to licensing/ royalty against domestic Electronics Contract Manufacturing (c) Services associated with NATE products manufactured via (a) or (b)
4f	• *Minimum qualifying Turnover*	**(vii)** Minimum qualifying Annual Turnover i.e. Turnover as per (v) above is: (a) Rs. 5 Crore for Small Enterprises (b) Rs. 25 Crore for Medium Enterprises (c) Rs. 100 Crore for Others
5	**Renewal**	Each enterprise desiring renewed term should be required to submit audited statement regarding its financial health and R&D investment prospects in next 3 years.

[para 4.192]

V. Promoting Start-up ecosystem

The Authority recommends that

(i) at least 15 % of NATEDF's total pool should be earmarked as Committed Public fund for *Daughter fund for innovation practice*. The Target Corpus, in Public Private Partnership ratio of 1:1, should be kept around Rs. 3,000 Crore. Only Securities & Exchange Board of India (SEBI) registered Venture Capital fund should be entitled to participate.

(ii) This fund should exclusively sustain innovation practice by giving more focus on Accelerator stage.

(iii) Venture Capital, both in equity and soft loan mode should be made available to an eligible Start-up, subject to maximum of Rs. 20 Crore during its entire innovation cycle.

(iv) DoT should completely exempt MSE/Start-ups from paying renewal fees under Voluntary Certification Scheme.

[para 4.214]

(v) The Start-ups/ MSEs identified as beneficiary for award of Ignition Grants towards for scaling-up of proven product-idea should be supported by enhancing capped amount to Rs. One Crore in current tenure.

(vi) MSEs/ Start-ups should be provided with full reimbursement of applicable membership fees towards Telecom Standards Development Organisation (TSDO) and others.

(vii) Participating MSEs/Start-ups in standard setting forum, convened by relevant national Standard Setting Organisations (SSO) or international SSOs, should be

provided appropriate support including financial assistance against actual participating expenses.

(viii) The fund-support of about Rs. 50 Crore and Rs. 100 Crore should be earmarked for reimbursement of membership fees and participation expenses respectively, to be administered by Telecom Standards Development Society, India(TSDSI) through an online portal.

(ix) TSDSI should facilitate participating MSEs/ Start-ups by providing an online portal where all eligible reimbursements are to be settled within 90 days once submitted through the portal.

(x) TSDSI should organise awareness campaign regarding standardisation process prevalent by reaching out to the Universities, R&D institutions and manufacturing units working in NATE domain. TSDSI should facilitate participating institutions seeking its assistance for product standardisation by providing a 'help' feature on the online portal recommended to be set-up above.

[para 4.219]

(xi) DoT should take-up with All India Council of Technical Education (AICTE) to introduce an elementary compulsory course (of minor-credit value) for final-year curriculum of graduating courses in technological fields especially telecommunications & networking, advanced digital communications, instrumentation, and data computing in all affiliated institutions. Such course should orient the students towards innovation and make them aware towards various opportunities extended by Central/State Government & Industry in NATEM sector and for promoting entrepreneurs. The course should cover

information on such policies as well as on schemes to support Start-ups eco-system. Content support for the recommended course should be extended by Telecom Centres of Excellence (TCoEs).

[para 4.222]

VI. Incentive structure for Telecom Product Development Clusters (TPDCs)

The Authority recommends that

(i) Telecom Product Development Clusters/ Parks (TPDCs) should be established on priority within approved Electronics Manufacturing Clusters (EMCs) or in close vicinity.

(ii) The facilities extended in any given EMC should be extended to the corresponding TPDC on *mutatis mutandis* basis. In addition, following benefits should also be extended to TPDCs:

- **(a) Provision of Power and water at reduced rates**
- **(b) Waiver of Electricity Duty**
- **(c) Reimbursement of stamp duty, conversion fee, transfer duty and registration fee**
- **(d) Providing free Right of Way for Telecom Service/Infrastructure including Indoor Building Solutions (IBS)**
- **(e) Time-bound single window clearance for Central and State level compliances**
- **(f) State of the art testing labs with plug-n-play facilities and infra-support for R&D centre.**

[para 4.240]

VII. Support required for exporters of indigenous equipments

The Authority recommends that

(i) An enterprise engaged in manufacturing of NATE products and has met export volume of US $ 15 million should be granted *Self Ratification benefit* under Advanced Authorisation Scheme (AAS) on deemed basis. Such enterprise which has met export target consistently for at least 2 years should be granted *Advance Authorization for Annual requirement* on deemed basis.

[para 4.259]

(ii) On the lines of Common Service Provider (CSP) under Town of Export Excellence scheme, EPCG Scheme benefit should be extended to Common Facility Centres (CFCs) established within Electronic Manufacturing Cluster (EMC, EMC 2.0) or in future TPDCs. Such CFCs involved as resource-centre for NATE manufacturing activities should be certified by DGFT as EPCG beneficiary.

[para 4.263]

(iii) The entitlement norms for Net Foreign Exchange earnings (NFE) in case of co-working between units, one located in Domestic Tariff Area (DTA) and, other located in Export Oriented Unit (EoU) / Electronics Hardware Technology Parks (EHTPs) / Software Technology Parks (STPs), should be defined on-priority by DoT with Ministry of Commerce.

[para 4.265]

(iv) DoT Facilitation Cell should co-opt Telecom Equipment and Services Export Promotion Council (TEPC) to undertake the set of Eligible Activities under Market Access Initiative (MAI) for benefit of domestic NATE having more export potential.

[para 4.272]

(v) DoT should notify Telecom Engineering Centre (TEC) as authority for certifying 'origin' (preferential and non-preferential) of domestic NATE products meant for exports, at the earliest.

[para 4.277]

(vi) DoT should take up the case for further liberalisation of export control regime in case of Category-8 SCOMET items related to NATE, with Ministry of Commerce. Export-authorisation on repeat basis meant for exports to the accepted list of countries should be fast-tracked using online process. Export authorisation under Global Authorisation for Intra-Company Transfers (GAICT) meant for exports beyond the accepted list of countries should also be checked-up for liberalisation to facilitate direct exports from India to a larger set of countries.

[para 4.282]

VIII. Trade facilitating measures affecting sectoral competitiveness

The Authority recommends that

(i) DoT should take-up, the need for adopting 12-digit HS Code across all sectors, with the Ministry of Commerce and DGFT.

(ii) Automation tools based on Artificial Intelligence & Machine Language (AI/ML) should be developed to facilitate faster and more accurate procedural controls to serve end-to-end shipments.

(iii) Centralised portal for filing online Grievances against mis-declaration of HS Code should be made available to trade community on immediate basis. This portal should facilitate online handling of grievances by making access available to the relevant Ministries so that appropriate remedial actions be decided and enforced.

[para 4.300]

(iv) DoT should constitute a Committee including representatives from M/o Commerce, DGFT for periodic update of HS Codes/ National Tariff Lines that have relevance to NATE.

[para 4.303]

(v) DoT should constitute a Committee to identify industrial inputs (raw materials, components and industrial consumables) which are not sufficiently available in the domestic market and recommend rational duties to sustain domestic NATE manufacturing.

(vi) This Committee should also identify industrial finished supplies which are sufficiently available in the domestic market and recommend duties including safeguard provisions to counter trade anomalies.

[para 4.309]

IX. <u>Incentives/policies required for growth of telecom software products</u>

The Authority recommends:

(i) Appropriate definition of 'telecom software' should be adopted to facilitate eligibility criteria under PMA, PLI, Design-led PLI etc. A suggested definition is given below:

telecom software may be defined as set of programmable instructions, capable of self-functioning either stand alone or with other set, in conjunction with energised electronics hardware, generic or specific, to meet authorised functional requirements relating to telecommunications.

This can be adopted after due consultation with the stakeholders.

(ii) ***Telecom software*** **products should be treated as a separate product-category and be included in the scope of Electronics and Computer Software Export Promotion Council (ESC).**

(iii) A dedicated fund, Telecom Software Development Fund with initial committed corpus of Rs. 1000 Crore should be established under Public Private Partnership mode with Target corpus of minimum Rs. 3000 Crore by seeking participation from SEBI registered Venture Capital Funds.

(iv) Appropriate policy, in consultation with Department of Financial Services, should be adopted to promote the use of beneficially owned intangible assets such as *Telecom software* and related IPRs *as collateral* to secure financial support from the nationalized banks/financial institution against capital requirements of enterprises.

(v) Software valuation norms based on residing Intellectual Property Rights (IPRs) should also be specified on priority so as to facilitate funding/ credit facility.

(vi) TEC should be tasked to finalize testing/certification norms for *Telecom software* products for publications at the earliest and facilities for the same be established/earmarked.

(vii) DoT notified list of eligible telecom products under PPP-MII Order should be appropriately extended to include relevant telecom software on the lines of entries in Table-A & C

against *SDN Software controllers, NVF and CNF Software* (Serial 30).

(viii) Commercially accepted *telecom software* products should be brought in scope of DoT notified design-led PLI Scheme, where local content, as per invoice value, is not below 50%. Priority may be given to provider of *telecom software* with higher local content (if it becomes necessary while selecting beneficiaries).

(ix) The scope of Digital Communication Innovation Square(DCIS) Scheme should be modified to include *Telecom software* as independent deliverable.

(x) Fund for DCIS's remaining tenure should be appropriately augmented so that at least 25% of overall grant is towards software innovations.

[para 4.341]

X. Other Issues

The Authority recommends that-

(i) India as a repair hub

Repair/replacement/calibration activities associated with Services After Sales should remain an integral element of domestic NATE manufacturing ecosystem. Policy guidelines and Procedural simplification to undertake repairs for identifiable equipments should be notified at the earliest.

[para 4.354]

(ii) Identification of significant chipsets for NATE and roadmap for their indigenous manufacturing

A dedicated multi-stakeholder Committee under DoT / TEC should be established so that it could identify key chip sets for NATE in-demand, draw the roadmap for their domestic manufacturing, and make recommendations to the Government under India Semiconductor Mission.

[para 4.359]

(iii) ***Skill Development***

(a) Government should identify top 10 AICTE affiliated advanced technical institutions that are offering advanced courses in electronics design, fabless products design & VLSI engineering and offer one time grant for resource mobilization to these institutes. This grant should be minimum Rs 20 Crore per eligible institution for 5 years' period and should be subject to certified completion of post-graduation or Doctoral fellowship course by minimum 40 students each year in electronics design, fabless products design & VLSI engineering.

(b) The institution receiving grants as per above two schemes should be required to establish collaborations with relevant industry and domain related R&D Centres.

(c) DoT/NTIPRIT should coordinate with AICTE so that each participating institution should follow National Skills Qualification Framework (NSQF) under the overall supervision of AICTE.

[para 4.367]

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Annexure-I

India's Export including re-export By Favourite Commodity for FY 2021-22

HS Code	Commodity	Unit	QTY	Value (INR in Crore)	Type
85171110	PUSH BUTTON TYPE	NOS	26719	2.81	1
85171190	OTHERS	NOS	964683	759.70	1
85171290	OTHER	NOS	4472688	5894.76	4
85171810	PUSH BUTTON TYPE	NOS	111912	6.52	1
85171890	OTHER	NOS	5347212	5650.76	1
85176100	BASE STATIONS	NOS	11625	15.45	2
85176210	PLCC EQUIPMENT	NOS	2628	43.55	2
85176220	VOICE FREQUENCY TELEGRAPHY	NOS	2598	2.00	2
85176230	MODEMS (MODULATORS-DEMODULATORS)	NOS	132907	29.97	1
85176240	HGH BT RTE DIGTL SUBSCRIBR LN SYSTM(HDSL)	NOS	232	5.08	2
85176250	DIGITAL LOOP CARRIER SYSTEM (DLC)	NOS	111	2.19	2
85176260	SYNCHRONOUS DIGITAL HIERARCHY SYSTEM (SDH)	NOS	12482	47.48	2
85176270	MULTIPLEXER, STATISTICAL MULTIPLEXER	NOS	19763	31.13	2
85176290	OTHER	NOS	4883747	5187.50	1
85176910	ISDN TERMINALS	NOS	160	0.50	1
85176920	ISDN TERMINAL ADAPTERS	NOS	43518	8.35	1
85176940	X25 PADS	NOS	1	0.00	1
85176950	SUBSCRIBER END EQUIPMENT	NOS	1547	0.28	1
85176960	SET TOP BOXES FOR ACCESSING INTERNET	NOS	5921	0.43	1
85176970	ATTACHMENTS FOR TELEPHONES	NOS	5828	0.35	1
85176990	OTHR APARTUS,FR CARRIER/DIGITAL LINE SYSTM	NOS	6973685	281.60	2
85177010	POPLTD, LOADED OR STUFFD PRNTD CRCUIT BRDS	KGS	380076	2969.37	1
85177090	OTHR PARTS OF TELEPHONC/TELEGRPHC APPARTS	KGS	10377162	2419.31	1
85195000	TELEPHONE ANSWRNG MCHNS	NOS	76	0.02	1
85235210	SIM CARDS	NOS	336765205	390.32	1
85255040	COMMUNICATION JAMMING EQUIPMENT	NOS	352	0.84	1
85291011	DISH ANTENNA FR COMMNCN JAMMNG EQPTMNTS	NOS	2951	0.13	1
85291012	DISH ANTENNA FR AMTR RADIO COMMNCN EQPTMNT	NOS	93	0.16	1
85291019	DISH ANTENNA FR OTHR USE	NOS	552162	33.13	1
85291021	OTHR ANTENNA FR COMMNCN JAMMNG EQPTMNTS	NOS	32138	0.89	1
85291022	OTHR ANTENNA FR AMTR RADIO COMMNCN EQPTMNT	NOS	61	50.64	1
85291029	OTHR ANTENNA FR OTHR USE	NOS	127362	38.95	1
85291091	AERIAL PARTS FR COMMNCN JAMMNG EQPTMNTS	NOS	70585	0.99	1
85291092	AERIAL PARTS FR AMTR RADIO COMMNCN EQPTMNT	NOS	11	0.52	1
85291099	AERIAL PARTS FR OTHR USE	NOS	278195	266.62	1
85299010	OTHE PARTS FR COMMNCN JAMMNG EQPTMNTS	NOS	16101	2.36	1
85299020	OTHE PARTS FR AMTR RADIO COMMNCN EQPTMNT	NOS	7765	13.74	1
85299090	OTHE PARTS FR OTHR USE	NOS	33230119	1311.11	1
85442010	CO-AXIAL CABLE	MTR	1257286	23.65	3
85442090	OTHR CO-AXL ELCTRCL CNDUCTORS EXCL CO-AXL CABLE	MTR	5790111	97.13	3
85444291	PAPER INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=10	MTR	26017	0.23	3
85444292	PLASTIC INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=	MTR	7074174	19.92	3
85444293	RUBBER INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=1	MTR	86084	1.26	3
85444299	OTHR ELCTRC CNDCTRS FITTED WTH CONNCTRS USED IN TELECOM FR <	MTR	66594094	802.41	3
85444991	PAPER INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=10	MTR	482772	2.37	3
85444992	PLASTIC INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=	MTR	101663020	230.78	3
85444993	RUBBER INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=1	MTR	28367	0.32	3
85444999	OTHR ELCTRC CNDCTRS NOT FITTED WTH CONNCTRS USED IN TELECOM	MTR	102425194	705.98	3
85447090	OPTICAL FIBRE CABLES OTHER THN LEAD ALLOY SHEATHD CABLES	MTR	143672966	524.90	3
90011000	OPTCL FIBRS,OPTICAL FIBRE BUNDLES AND CABLES	KGS	40878873	3498.74	3
85171211	MOBILE PHONES, OTHER THAN PUSH BUTTON TYPE	NOS	28140170	28304.23	4
85171219	MOBILE PHONES, PUSH BUTTON TYPE	NOS	2059202	1496.13	4
	TOTAL			**61177.57**	

INDEX	
1	Telecom parts/ Subs eqp.= Rs 19146.30 Crore
2	Network Eqp.=Rs 428.46 Crore
3	Cables= Rs 5907.70 Crore
4	Mobile phones= Rs.35695.12 Crore

India's Import including re-import By Favourite Commodity for FY 2021-22

HS Code	Commodity	Unit	Qty	Value (INR in Crore)	Type
85171110	PUSH BUTTON TYPE	NOS	2047783	59.42	1
85171190	OTHERS	NOS	61225824	493.95	1
85171290	OTHER	NOS	1173883	3146.55	4
85171810	PUSH BUTTON TYPE	NOS	641443	143.19	1
85171890	OTHER	NOS	116863223	442.73	1
85176100	BASE STATIONS	NOS	90491	834.16	2
85176210	PLCC EQUIPMENT	NOS	10650	21.01	2
85176220	VOICE FREQUENCY TELEGRAPHY	NOS	139818	13.98	2
85176230	MODEMS (MODULATORS-DEMODULATORS)	NOS	3158619	594.31	1
85176240	HGH BT RTE DIGTL SUBSCRIBR LN SYSTM(HDSL)	NOS	2863	2.45	2
85176250	DIGITAL LOOP CARRIER SYSTEM (DLC)	NOS	30989	15.45	2
85176260	SYNCHRONOUS DIGITAL HIERARCHY SYSTEM (SDH)	NOS	2131	32.30	2
85176270	MULTIPLEXER, STATISTICAL MULTIPLEXER	NOS	173745	80.85	2
85176290	OTHER	NOS	173964785	28565.69	1
85176910	ISDN TERMINALS	NOS	3415	11.99	1
85176920	ISDN TERMINAL ADAPTERS	NOS	4957	3.20	1
85176950	SUBSCRIBER END EQUIPMENT	NOS	3176226	750.09	1
85176960	SET TOP BOXES FOR ACCESSING INTERNET	NOS	98652	3.92	1
85176970	ATTACHMENTS FOR TELEPHONES	NOS	493705	2.85	1
85176990	OTHR APARTUS,FR CARRIER/DIGITAL LINE SYSTM	NOS	24822597	1993.87	2
85177010	POPLTD, LOADED OR STUFFD PRNTD CRCUIT BRDS	KGS	7150365	3979.38	1
85177090	OTHR PARTS OF TELEPHONC/TELEGRPHC APPARTS	KGS	1287324986	55151.03	1
85195000	TELEPHONE ANSWRNG MCHNS	NOS	100	0.00	1
85235210	SIM CARDS	NOS	16053780	30.99	1
85255040	COMMUNICATION JAMMING EQUIPMENT	NOS	17	21.23	1
85291011	DISH ANTENNA FR COMMNCN JAMMNG EQPTMNTS	NOS	10222	0.27	1
85291012	DISH ANTENNA FR AMTR RADIO COMMNCN EQPTMNT	NOS	43	0.01	1
85291019	DISH ANTENNA FR OTHR USE	NOS	5700407	59.00	1
85291021	OTHR ANTENNA FR COMMNCN JAMMNG EQPTMNTS	NOS	81544	3.40	1
85291022	OTHR ANTENNA FR AMTR RADIO COMMNCN EQPTMNT	NOS	14	0.01	1
85291029	OTHR ANTENNA FR OTHR USE	NOS	38670187	356.71	1
85291091	AERIAL PARTS FR COMMNCN JAMMNG EQPTMNTS	NOS	2480	0.31	1
85291092	AERIAL PARTS FR AMTR RADIO COMMNCN EQPTMNT	NOS	1309	7.93	1
85291099	AERIAL PARTS FR OTHR USE	NOS	6547423	471.26	1
85299010	OTHE PARTS FR COMMNCN JAMMNG EQPTMNTS	NOS	24637	0.40	1
85299020	OTHE PARTS FR AMTR RADIO COMMNCN EQPTMNT	NOS	807005	12.88	1
85299090	OTHE PARTS FR OTHR USE	NOS	2292344180	11692.75	1
85442010	CO-AXIAL CABLE	MTR	1361705532	314.45	3
85442090	OTHR CO-AXL ELCTRCL CNDUCTORS EXCL CO-AXL CABLE	MTR	66296763	243.10	3
85444291	PAPER INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=10	MTR	106516	1.77	3
85444292	PLASTIC INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=	MTR	16063321	119.92	3
85444293	RUBBER INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=1	MTR	53204	1.54	3
85444299	OTHR ELCTRC CNDCTRS FITTED WTH CONNCTRS USED IN TELECOM FR <	MTR	235799009	1486.34	3
85444991	PAPER INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=10	MTR	592554	5.67	3
85444992	PLASTIC INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=	MTR	44468530	167.15	3
85444993	RUBBER INSULATED CONDUCTORS USED IN TELECOM FOR VOLTAGE <=1	MTR	28450133	8.33	3
85444999	OTHR ELCTRC CNDCTRS NOT FITTED WTH CONNCTRS USED IN TELECOM	MTR	805916422	2088.20	3
85447090	OPTICAL FIBRE CABLES OTHER THN LEAD ALLOY SHEATHD CABLES	MTR	165963701	272.03	3
90011000	OPTCL FIBRS,OPTICAL FIBRE BUNDLES AND CABLES	KGS	3214771	585.38	3

85171211	MOBILE PHONES, OTHER THAN PUSH BUTTON TYPE	NOS	2005159	8023.16	4
85171219	MOBILE PHONES, PUSH BUTTON TYPE	NOS	500664	39.75	4
	TOTAL			**122356.30**	

INDEX	
1	Telecom parts/ Subs eqp.= Rs. 102858.90 Crore
2	Network Eqp.=Rs. 2994.06 Crore
3	Cables= Rs. 5293.88 Crore
4	Mobile phones= Rs. 11209.45 Crore

Source: DoT Statistics FY 2021-22

Additional HS Codes recommended to be included under NATE (indicative list)

Sr.	HS-Code (Indicative)	Current Description
1.	85044030	Battery Chargers
2.	85076000	Li-ion Cell for battery manufacture -Cellular Mobile / Power Bank
3	85340000	Printed Circuits
4.	85079090	Others
5.	70022090 70140020 70022010	Other Glass Rods Optical elements Enamel Glass in Rods
6	84752100 84799090 90314900	Machine for making Optical Fibre & Preform Parts of other Machinery Other Optical Instrument& Appliances
7	85238020 85238020 85242301 85243111 85243119 85244011 85244019 85245301 85249111 85249112 85249113 85249119	**Software** (distributed in different mediums)
8	85256091 85256092 85256099	VSAT Terminals Other Satellite Communication Equipment Others
9.	85256011 85256012 85256013	Walkie Talkie set Marine radio Communication Equipment Amateur Radio Equipment

10.	85444920 85444930 85367000	Plastic Insulated Conductors for <= 1000V Not Fitted with Connectors Rubber Insulated Conductors for <= 1000V Not Fitted with Connectors OFC Connectors
11.	84718000 90309090 85176290	IoT family: Analogue/Hybrid Automated Data Processing Machine Other parts & accessories

Annexure-II

DoT Reference to TRAI dated 8 October 2020

18-09/2018-IP
Government of India
Ministry of Communications
Department of Telecommunications
(Investment Promotion Cell)
20, Ashoka Road, Sanchar Bhawan,

New Delhi, Dated 8th October, 2020

Office Memorandum

Sub: TRAI Recommendations dated 03.08.2018 on "Promoting Local Telecom Equipment Manufacturing"- reg.

The undersigned is directed to refer to the TRAI Recommendations on the above subject. In this regard, it is to state that TRAI recommendations were placed before the Digital Communication Commission (DCC) on 19.09.2020. Many of the recommendations are already under implementation and necessary action is being taken on the rest of the recommendations as approved by the DCC.

2. Kind attention is hereby drawn on the following recommendations of TRAI and views of the DCC thereof:

(i) TRAI's recommendation No. 3.1(d):

On lines of the Technology Development Board (TDB), working under the chairmanship of Secretary, Department of Science and Technology, Government of India, a multidisciplinary Telecommunication Equipment Development Board (TEDB) should be constituted in the DoT, under the Telecom Engineering Centre(TEC), for faster and coordinated decisions relating to funding of and incentives for design, development, and manufacturing of telecommunication equipment in the country. It should be responsible for facilitating innovation, R&D, testing and certification, and manufacturing in the telecom sector in the country. This board would be responsible for administration and disbursal of funds from TRDF.

DCC's view:

DCC is of the view that CDOT is already working with this mandate and recommended to get suggestions from TRAI on further improvement in the matter.

(ii) TRAI's recommendation No. 3.4(c):

A common portal should be developed for self-declaration of Standard Essential Patents (SEP) by the patent holders in the telecom products. The portal should also have

भारतीय दूरसंचार विनियामक प्राधिकरण
महानगर दूरसंचार भवन, नई दिल्ली-2
13 OCT 2020
डायरी सं. 5413

the facility for listing of registered telecom product design, manufacturing, marketing, and System Integration (SI) companies along with their designs/products so that development of the complete ecosystem in the country can be facilitated.

DCC's view:

DCC accepted this recommendation and is of view that further details may be sought from TRAI on this.

(iii) TRAI's recommendation No. 3.6(h):

DoT should coordinate with Ministry of Finance for making available the following financing options, in line with the practices followed by other export-oriented economies, to indigenous telecom equipment manufacturers:

(i) Venture capital in the form of equity and soft loans;
(ii) Project finance;
(iii) Contract financing options;
(iv) Credit default insurance.

DCC's view:

DCC is of view that TRAI may be requested to furnish more details on this recommendation for taking up with Ministry of Finance.

(iv) TRAI's recommendation No. 3.7(e):

Telecom Service Providers should be incentivized for deploying indigenous telecom products, beyond the quantities to be mandated under the PMA. by giving them graded incentives.

DCC's view:

DCC is of view that TRAI may be requested to furnish more details on this recommendation.

3. TRAI is requested to provide the requisite suggestions/details as per DCC's view in para 2.

(Rahul Dwivedi)
Under Secretary (IP)
Tele: 2303 61774

Secretary,
Telecom Regulatory Authority of India (TRAI)
Mahanagar Doorsanchar Bhawan,
New Delhi

Annexure- III

TRAI Response to DoT Reference dated 24 August 2021

514/541

R-14/(1)/2021-BBPA

51309/2022/BB&PA

सत्यमेव जयते

भारतीय दूरसंचार विनियामक प्राधिकरण
TELECOM REGULATORY AUTHORITY OF INDIA
भारत सरकार /Government of India

भादूविप्रा
TRAI

File No.R-14/(1)2021-BBPA-Part(1) Date: 22.10.2021

To

The Secretary,
Department of Telecommunications
Sanchar Bhavan, New Delhi

Sub: TRAI Recommendations dated 03.08.2018 on "Promoting Local Telecom Equipment Manufacturing" – reg.

Ref: DoT letter no. 18-09/2018-IP dated 24th August 2021.

This is in reference to DoT letter dated 24.08.2021 vide which details of decision of DCC on TRAI's recommendation dated 03.08.2018 on "Promoting Local Telecom Equipment Manufacturing" were conveyed. It has been mentioned by DoT that many of the TRAI Recommendations have been accepted. At the outset, Authority would like to appreciate the efforts of DoT for accepting many of the recommendations. However, Authority feels that to have desired results and expected outcomes, DoT should, as a follow-up, issue necessary OMs/ guidelines on the accepted recommendations and share the same with TRAI.

2. Comments of Authority on some of the observations of DCC are provided in following paragraphs.

2.1 **DCC Views on TRAI recommendation 3.1 (a)**

S.No.	T R A I recommendations dated 03.08.18	DCC's View
	Institutional Mechanism:	
3.1	(a) The progress of indigenous telecommunication equipment manufacturing in the country should be monitored in Department of Telecommunications (DoT) at least at the level of the Member, Telecom Commission. For time bound progress, a dedicated unit in DoT should be made responsible for facilitation and monitoring of telecommunication	Monitoring is desirable and this is already being done by wing under JS(T) which works under the overall supervision of AS(T). However, this is an administrative matter and will be decided from time to time by DoT.

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(पुराना मिन्टो रोड), नई दिल्ली / (Old Minto Road), New Delhi-110002
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	equipment design, development, and manufacturing in the Country.	

TRAI's comments:

2.1.1 As envisaged in NDCP-2018, if India's contribution to global value chains is to be maximized, by focusing on domestic production, increasing exports and reducing the import burden, then several parallel initiatives needs to be taken. There are many issues involved in Promoting Local Telecom Equipment Manufacturing and TRAI recommendations of 2011 and 2018 on the subject have dealt with them in detail. Promoting telecom equipment manufacturing in India would entail many issues that need to be addressed simultaneously, inter-alia, including the following:

(i) Steps to promote research & development (R&D).

(ii) Providing funds for R&D and Developing R&D parks.

(iii) Putting in mechanisms to develop skillsets.

(iv) Address issues related to Patent framework like Rights & obligations of SEP holders.

(v) Dispute resolution.

(vi) Promoting Incubation Centres.

(vii) Addressing issues related to Testing & Certification.

(viii) Ensuring availability of Component ecosystem and setting up cutting edge technology fab facility.

(ix) Creating funds for promoting manufacturing and entrepreneurial activities and providing various fiscal and non-fiscal incentives.

(x) Creating Infrastructure for facilitating manufacturing like tech parks and extending incentives for creation of such infrastructure/manufacturing facilities.

(xi) Addressing issues related to power availability and pricing.

(xii) Implementation, monitoring and periodic review of PMA policy.

(xiii) Addressing issues arising out of Free Trade Agreements (FTAs)/Information Technology Agreements (ITAs).

(xiv) Announcing Incentive Schemes for telecom equipment parts.

(xv) Addressing Ease of doing business issues including expediting clearances, review all compliances requirements.

(xvi) Promote deployment of indigenous products in other countries through incentivizing system integrators.

(xvii) Showcase make in India startups & their products in international events and

(xviii) Upgrading the manufacturing PSUs under DoT to effectively harness strategic and operational synergies etc.

2.1.2 The Authority is of the view that for time bound and focused approach on various aspects of planning, Policy formulation, implementation, monitoring and development of whole ecosystem for manufacturing in telecom sector, a separate and dedicated unit in DoT is required. It is felt that in absence of proper institutional mechanisms and monitoring, modest progress has been made on recommendations given by Authority in 2011 and 2018.

2.1.3 As stated by DoT, the Authority understands that this is an administrative matter, However, Authority would like to draw attention of DoT towards the approach followed by certain other ministries/ department such as Ministry of Electronics and Information technology and Department of Pharmaceutical, that have shown progressive results in the direction of Make in India initiatives. For example, in MEITY, there are various officer at Addl. Secretary and Joint Secretary level who look after various aspects related to local electronic equipment manufacturing as has been detailed in table below:

S No.	Level of officer	Handles work related to
1	Addl Secretary rank	Standards and interoperability
2	JS level	Electronic Hardware and semiconductor FAB
3	JS level	software industry promotion
4	JS level	R&D in electronics
5	JS level	R&D in convergence and public broadband access, Wi-Fi, 5G
6	JS level	R&D in Information Technology and look after various skills development initiatives

In addition, there are autonomous bodies like STPI who are working on establishment and promotion of incubation centers and STQC that is working on standardization, testing and quality certification.

Similarly, in the Department of Pharmaceutical there is Pharma Bureau, a separate unit which works as advisory body and facilitator for promotion of manufacturing and investment in Pharmaceutical and medical devices and is an interface of the Department of Pharmaceutical with industry. It also coordinates with concerned Ministries of Central Government and State Government thus facilitating local manufacturing in Pharma sector.

2.1.4 Formation of separate dedicated unit not only will provide a single point interface with the industry in the respective domain but will also help in fast-tracking decisions and coordination between the Central Government and State Governments. The dedicated unit in DoT, among other things, will:-

i. facilitate in preparing clearly defined strategies for growth of telecom manufacturing industry in India,
ii. help in preparing plans for Gatishakti from Telecom point of view,
iii. help in stakeholder interactions focused on understanding & resolving industry wide issues,

iv. help in identifying policies that will unlock investment potential in sectors, pitching existing opportunities, exploring new projects/proposals,

v. help in better monitoring and coordination for Aatmanirbhar Bharat initiatives etc.

2.1.5 The Authority, therefore re-emphasizes its recommendation of having a dedicated unit in DoT which should be responsible for facilitation and monitoring of telecommunication equipment design, development and manufacturing in the country. The DoT should put in place a mechanism for periodic review at highest level of the policy and the initiatives taken in this regard for realizing the desired objectives and expected outcomes of Atmanirbhar Bharat.

2.2 DCC Views on TRAI recommendation 3.1 (c)

S.No.	T R A I recommendations dated 03.08.18	DCC's View
	Institutional Mechanism:	
3.1	(c) For promoting research, innovation, standardization, design, testing, certification and manufacturing indigenous telecom equipment, telecom Research & Research and Development fund (TRDF) with initial corpus of Rs. 1000 Crore should be created. Subsequently, setting up of Telecom Entrepreneurial Promotion fund and Telecom Manufacturing Promotion Fund should also be considered so that issued relating to private sector participation in the manufacturing of indigenous telecom equipment and market access for indigenous telecom equipment can be addressed effectively.	The Working Group for the Telecom Sector in the 12th Plan had proposed to create the following three funds with a total corpus of Rs.17,500 Crore for promoting Research and Development (R&D) and manufacturing of telecom equipments during the 12th Five Year Plan period: a) Telecom Manufacturing Promotion Fund and Telecom Manufacturing Fund (TMPF) of Rs. 10,000 Crore b) Telecom Entrepreneurship Promotion Fund (TEPF) of Rs. 2500 Crore c) Telecom Research and Development Fund (TRDF) of Rs. 5,000 Crore This was reiterated in NTP 2012 also. However, the cabinet on 10th December, 2014 approved a proposal of DeitY (Department of Electronics and Information Technology) to establish an Electronic Development Fund (EDF). The EDF is a Venture Capital Fund in the nature of 'Fund

		of Funds' to participate in professionally managed "Daughter Funds" which in turn will provide risk capital to companies developing new technologies in the area of electronics including telecommunications, nano-electronics and Information Technology. The EDF also help attract venture funds, angel funds and seed funds towards R&D and innovation in the specified areas. Setting up of EDF is one of the important strategies which would enable creating a vibrant ecosystem of innovation and research and development. Since the EDF would also take care of R&D and manufacturing of telecom products, the proposal to set up three separate funds was not acceded by the Government. Digital Communications Innovation Square under Champion Services Sectors Scheme (CSSS) has been approved which provides financial assistance for R&D, product development and incubation. However, the matter may be taken up with the Ministry of Finance for budgetary support.

TRAI's comments:

2.2.1 Financing plays a very significant role in R&D promotion and, keeping this in view, TRAI recommended for TRDF fund both in 2011 recommendations and 2018 recommendations on equipment manufacturing. EDF has very limited scope for telecommunication equipment and therefore, the Authority feels that EDF alone will not take care of R&D and manufacturing of telecom equipment. The Authority feels that for promoting research, innovation, standardization, design, testing, certification and manufacturing of indigenous telecom equipment for 5G use cases, subsequent generation technologies like 6G, and further expansion of wireless technology, Telecom Research & Development fund (TRDF) with initial corpus of Rs. 1000 Crore should be created. Subsequently, setting up of Telecom

Entrepreneurial Promotion fund and Telecom Manufacturing Promotion Fund should also be considered.

2.3 **DCC Views on TRAI recommendation 3.1 (d)**

S.No.	T R A I recommendations dated 03.08.18	DCC's View
	Institutional Mechanism:	
3.1	(d) On lines of the Technology Development Board (TDB), working under the Chairmanship of Secretary, Department of Science and Technology, Government of India, a multidisciplinary Telecommunication Equipment Development Board (TEDB) should be constituted in the DoT, under the Telecom Engineering Centre (TEC), for faster and coordinated decisions relating to funding of and incentives for design, development, and manufacturing of telecommunication equipment in the country. It should be responsible for facilitating innovation, R&D, testing and certification and manufacturing in the telecom sector in the country. This board would be responsible for administration and disbursal of funds from TRDF.	It may not be worthwhile to create multiple organizations. CDOT is already working with this mandate. TRAI may be requested to give suggestion on further improvement in the matter.

TRAI's comments:

2.3.1 As per Authority's recommendations dated 03.08.2018, TEDB would be responsible for administration and disbursal of funds from TRDF. The Authority vide letter dated 26.4.2021 had already reiterated that the responsibility of disbursing and administering funds from TRDF cannot be given to an organization which itself is involved in R&D and therefore is one of the stakeholders. Further, the mandate of CDOT does not empower it to administer and disburse R&D funds. DoT should therefore consider TRAI's recommendation and constitute a Telecom Research & Development fund (TRDF) with initial corpus of Rs. 1000 Crore and also constitute multidisciplinary Telecommunication Equipment Development Board (TEDB)

who would be responsible for administration and disbursal of funds from TRDF.

2.4 **DCC Views on TRAI recommendation 3.2 (b)**

S.No.	T R A I recommendations dated 03.08.18	DCC's View
	Skilled Manpower	
3.2	b) Telecommunication Technology and Systems Design Labs should be setup in these Universities/ technical institutes in collaboration with Telecom Equipment Manufacturers and Telecom Service Providers.	Efforts in this regard have already been made by DoT Telecom Centres for Excellence (TCoE) Scheme was started in IITs. However, the results have been mixed. This can be further discussed with Telecom Equipment Manufacturers and Telecom Service Providers.

TRAI's comments:

2.4.1 The Authority is of the view that any initiative like formation of Telecom Centers of Excellence, will yield result only when there is continuous monitoring, review, and course correction. As has been discussed in detail above, in absence of a dedicated unit in DoT to look after manufacturing aspects of telecom equipment, policy initiatives may not yield desired results. Therefore, the Authority emphasizes the need for setting up of such unit at higher level and continuous monitoring at DCC level. DoT's response indicates that Telecom Centres of Excellence has yielded mixed results. The above recommendation of the Authority is related to setting up of telecommunication technology and system design labs. The Authority feels that efforts should be made to set up facilities in collaboration with telecom equipment manufacturers. A parallel can also be drawn from MeitY policy on Technology Incubation and Development of Entrepreneurs (TIDE scheme) whereby collaboration with several top institutes have been done by the MeitY.

2.5 **DCC Views on TRAI recommendation 3.3 (b)**

S.No.	T R A I recommendations dated 03.08.18	DCC's View
	Research, Innovation and Development:	
3.3	(b) Permission for trials of new technologies/ products and running pilot projects should be simplified. It should be encouraged for multinational companies	This is an ongoing process. Continuous efforts are being made by DoT in this regard. A committee constituted under the Chairmanship of Prof. Abhay Karandikar, Director, IIT Kanpur had already submitted its

	also as it would lead to knowledge transfer.	recommendations on Technology trials including 5G trials and also on Experimental Spectrum. Based on these recommendations, DoT issued OM No. R-14016/01/2019-NT(Pt) dated 23rd July, 2019. Further, the Committee is working on Rccommendations and Guidelines for setting up of Spectrum Regulatory Sandboxes.

TRAI's comments:

2.5.1 The Authority is of the view that a detailed information for stakeholders should be prepared and put in public domain covering the specifics of the procedure for applying for permission, the authority for granting such permission and timelines for giving the permission. The public domain announcement should clearly mention that such permission for trials will be available for all future technologies.

2.6 **DCC Views on TRAI recommendation 3.3 (c)**

S.No.	T R A I recommendations dated 03.08.18	DCC's View
3.3	(c) For promoting new age tech start-ups in telecom equipment design and manufacturing sector, government should incentivize setting up of incubation centers.	.This recommendation of TRAI is already under implementation. .Promoting establishment of testbeds, incubators, innovation centres etc. in collaboration with industry and academia is one of the strategies envisaged under the NDCP-2018 for enabling next generation technologies and services through investments, innovation, indigenous manufacturing and IPR generation. ."Digital Communication Innovation Square (DCIS) sub-scheme under CSSS also has subcomponent for strengthening of existing incubators/ innovation infrastructures/ Academic institutions/ Industry Institutions or programs.

TRAI's comments:

2.6.1 The details of incubation centers for telecom products and incentivization to start-ups may be shared with Authority. Further DoT may identify certain incubation centers for development of 5G use cases.

2.7 **DCC Views on TRAI recommendation 3.4 (a), 3.4 (b) and 3.4 (d)**

S.No.	T R A I recommendations dated 03.08.18	DCC's View
	Patent Framework and Resolutions of Disputes:	
3.4	(a) Department of Industry Policy and Promotion (DIPP) has already initiated the consultation with stakeholder for development of policy framework for the rights and obligations of Standard Esscntial Patent holders and for licensing of patents on Fair, reasonable and NonDiscriminatory (FRAND) terms and conditions. This consultation process is especially focused on telecom sector. For promoting the indigenous telecom equipmcnt manufacturing in the country, these policy guidelines should bc finalized at the earliest.	Action regarding this recommendation of TRAI is related with DPIIT.
3.4	(b) Patent's licensing dispute resolution is quitc time consuming and costly process in the country. It discourages cntry of SMEs (Small and Medium Enterprises) and technology startups in this sector. Alternatc Dispute Resolution Framework for time bound resolution of patcnt licensing disputes should also be institutionalized in the country.	Action regarding this recommendation of TRAI is related with DPIIT.
3.4	(d) To expand understanding about patent filing policies and	Action regarding this recommendation of TRAI is related with DPIIT.

	procedures, the patent information cells should be created in leading Universities/ technical institutions to be identified for promoting research, innovation, and development of telecom technology and system designs.	

TRAI's comments:

2.7.1 Authority is of the view that DoT being the nodal ministry should coordinate with DPIIT for implementation of these recommendations and share the status with TRAI for ensuring necessary landholding and support.

2.8 **DCC Views on TRAI recommendation 3.4 (c)**

S.No.	T R A I recommendations dated 03.08.18	DCC's View
	Patent Framework and Resolutions of Disputes:	
3.4	(c) A common portal should be developed for self-declaration of Standards Essential Patents (SEP) by the patent holders in the telecom products. The portal should also have the facility for listing of registered telecom product design, manufacturing, marketing, and System Integration (SI) companies along with their designs/products so that development of the complete ecosystem in the country can be facilitated.	The recommendation on TRAI may be accepted. Further details may be sought from TRAI on this.

TRAI's comments:

2.8.1 Necessary recommendations will be made separately after fresh consultation with stakeholders on the issue.

2.9 **DCC Views on TRAI recommendation 3.6 (h)**

S.No.	TRAI recommendations dated 03.08.2018	DCC's View
3.6	(h) DoT should coordinate with Ministry of Finance for making available the following financing options in line with the practices followed by other export-oriented economics, to indigenous telecom equipment manufactures: • Venture capital in the form of equity and soft loans; • Project finance; • Contract financing options; • Credit default insurance	TRAI may be requested to furnish more details on this recommendation for taking up with Ministry of Finance.

TRAI's comments:

2.9.1 Necessary recommendations will be made separately after fresh consultation with stakeholders on the issue.

2.10 DCC Views on TRAI recommendation 3.7 (d) and 3.7 (e)

S.No.	TRAI recommendations dated 03.08.18	DCC's View
3.7	(d) PMA policy should be made applicable for all public telecom networks to address the national security concerns.	PMI policy is the subject matter related with DPIIT. PMI policy at present is applicable to Government organization/PSUs. GFR has already been amended to impose restrictions based on national security concerns.
3.7	(e) Telecom services providers should be incentivized for deploying indigenous telecom products beyond the quantities to the mandated under the PMA by giving them graded incentives.	TRAI may be requested to furnish more details on this recommendations.

TRAI's comments:

2.10.1 DCC has desired that TRAI may be requested to furnish more details on recommendations 3.7(e). In this regard kind attention is drawn towards the recommendation 3.7(d) i.e. "PMA policy should be made applicable for all public telecom networks to address the national security concerns." It is pertinent to mention here that the recommendation 3.7(e) on graded incentive beyond the quantities mandated under the PMA flows from recommendation 3.7(d). Therefore, DoT is requested to convey its decision on making PMA Policy applicable for all public telecom networks.

3. This is issued with the approval of Authority.

(V. Raghunandan)
Secretary, TRAI

Annexure-IV

Attributes relevant to inter-working amongst units

Subject	SEZ Unit	EOU Unit	DTA Unit
Area of operations / Setting Up	Can be set up only at **designated sites** notified as SEZ	Can be set up **anywhere** in India	Can be set up **anywhere** in India
Authority / approval for setting up	**Approval required** under the SEZ law	**Approval required** under the FTP	**No approval** required
Imports	All imports are **exempt** from payment of all types of **customs duties** (BCD, Social Welfare Surcharge-SWS, IGST, Cess, etc)	All imports are **exempt** from payment of all types of **customs duties** (BCD, SWS, IGST, Cess, etc)	Imports are allowed on **payment of** applicable **customs duties** (However, benefit of the AA and EPCG Schemes can be availed)
Procurement from DTA	All procurements which are required for authorized operations are allowed **without payment of applicable GST** (under Letter of Undertaking or on payment of GST (of which refund can be obtained)	**Applicable GST is payable** on such procurements (of which Input Tax Credit is available)	**Applicable GST is payable** on such procurements (of which Input Tax Credit is available)
DTA Clearances	All DTA clearances are allowed on **payment of applicable customs duties** (BCD, SWS, IGST, Cess, etc). Bill of entry required to be filed by the importer or the SEZ unit (on behalf of the importer)	All DTA clearances are allowed on **payment of applicable GST.** Additionally, benefit of BCD exemption availed on imported inputs used in the manufacture of finished product cleared in DTA is required to be surrendered / paid along with interest.	**Applicable GST** is payable on such clearances. Only tax invoice required to be issued.

Annexure-V

Extract from CBIC Circular No. 08/2023 Dated: 13.03.2023 regarding alpha-numeric code/identifier

Technology Related Descriptions of Telecom Equipment:

Vide CBIC Circular No. 08/2023 Dated: 13.03.2023, following an alpha-numeric code/identifier as provided in this Annexure are required to be additionally declared in Bill of Entry by the importer with effect from 01.04.2023.

Identifier	Product/equipment against tariff heading 85176290 or 85176990.
A	**Wrist wearable devices (Commonly known as smart watches)**
MAA001	WWD-smart watches
B&D	**Optical Transport Equipment & Optical Transport Network (OTN) Products in item & (d) of notification**
TEB001	OTE-ROADM
TEB002	OTE-Booster Amplifiers
TEB003	OTE-Pre-Amplifiers
TEB004	OTE-Inline Amplifiers
TEB005	OTE-Mux-Demux
TEB006	OTE-Transponders
TEB007	OTE-Muxponders
TEB008	OTE-Raman Amplifiers
TEB009	OTE-OADM
TEB010	OTE-Regenerators
TEB011	OTE-Optical Power Monitoring
TEB012	OTE-Optical Line Protection
TEB999	OTE-Others
C	**Combination of one or more of Packet Optical Transport Product or Switch (POTP POTS) in item (c) of notification**
(C1)	**Optical Line Terminal**
TEC101	OLT-GPON
TEC102	OLT-EPON
TEC103	OLT-XGSPON
TEC104	OLT-10GEPON
TEC105	OLT-NG-PON2
TEC106	OLT-25GPON
TEC107	OLT-50GPON
TEC199	OLT-Others
(C2)	**Optical Network Terminal/Unit**
TEC201	ONT-GPON
TEC202	ONT-EPON
TEC203	ONT-XGSPON
TEC204	ONT-10GEPON
TEC205	ONT-NG-PON2
TEC206	ONT-25GPON
TEC207	ONT-50GPON
TEC299	ONT-Others
E	**Internet Protocol Radios in item (e) of notification**

TEE001	IPR-WiFi Access Point Equipment
TEE002	IPR-WiFi Controller
TEE003	IPR-Repeaters (RF/RF-over-Optical) & In-Building Solution (IBS)-Indoor/ Outdoor including Active and passive Accessories (2G/3G/4G/5G and onwards)
TEE004	IPR-Wireless Radio Link (IP/Hybrid equipment)
TEE999	IPR-Others

F	**Soft switches and Voice over Internet Protocol (VoIP) equipment in item notification**
TEF001	VoIP-VOIP Phones
TEF002	Media Gateways
TEF003	Gateway Controllers and Session Border Controllers
TEF004	Internet Protocol Private Branch Exchange (IP PBX)
TEF005	IP Multimedia Subsystems (IMS)
TEF006	Unified Communication Systems (UCS)
TEF007	Card / Module or Subsystem converting analog voice signal into digital packets that are carried over internet protocol that uses one or more of these products [other than IP PBX, IMS,UCS]
TEF999	VoIP –Others

G	**Carrier Ethernet Switches, Packet Transport Node (PTN) products, Multiprotocol Switching Transport Profile (MPLS-TP) products in item (g) of notification**
TEG001	IP-MPLS based Equipment.
TEG002	PTN based Equipment.
TEG003	MPLS-TP based Equipment.
TEG999	Others

H	**Long-Term Evolution (LTE) (4G based) and Multiple Input/Multiple Output (MIMO) item (h) of notification**
(H1)	**Long-Term Evolution (LTE) (4G based)**
TEH101	4G-RRH
TEH102	4G-RU
TEH103	4G-BBU
TEH104	4G-CU
TEH105	4G-DU
TEH106	4G-eNodeB
TEH107	4G-CPE
TEH108	4G-EPC
TEH109	4G-IMS
TEH110	4G-Network In A Box (NIB)/ Compact LTE System
TEH111	4G-SGW
TEH112	4G-PGW
TEH199	4G-Others

(H2) Multiple Input/Multiple Output (MIMO) (5G based)

TEH201	5G-RRH
TEH202	5G-RU
TEH203	5G-BBU
TEH204	5G-CU
TEH205	5G-DU
TEH206	5G-gNodeB
TEH207	5G-CPE
TEH008	5G-5GC
TEH209	5G-IMS
TEH210	5G-Network In A Box (NIB)/ Compact System
TEH299	5G and Next Generation products-Others

Z	**Others**
MAZ999	all goods other than those covered in (a) to (h) of Sl.no 20 Of notification 57/2017-customs amended by notification No. 02/2019-Customs dated 29.01.2019

List of Acronyms

Sr.	Acronyms	Description
1	***3GPP***	3rd Generation Partnership Project
2	**4G**	Fourth-generation wireless technology
3	**5G**	Fifth-generation wireless technology
4	**AAT**	Advanced Automotive Technology
5	**AI**	Artificial Intelligence
6	**AICTE**	All India Council for Technical Education
7	**AIFs**	Alternative Investment Funds
8	**BCD**	Binary Coded Decimal
9	**BSNL**	Bharat Sanchar Nigam Limited
10	**CAGR**	Compound Annual Growth Rate
11	**CAPEX**	Capital Expenses
12	**CAROTAR**	Customs (Administration of Rules of Origin under Trade Agreements) Rules, 2020
13	**CBIC**	Central Board of Indirect Taxes and Customs
14	**CCIIAC**	Central Capital Investment Incentive for Access to Credit
15	**CDNs**	Content Distribution Network
16	**C-DOT**	Centre for Development of Telematics
17	**CGMSE**	Credit Guarantee Fund Scheme for Micro and Small Enterprises
18	**CGS**	Credit Guarantee Scheme
19	**CNFs**	Cloud Network Functions
20	**COTS**	Commercial-off-the-shelf
21	**CPE**	Customer Premises Equipment
22	**CSSS**	Champion Services Sector Scheme
23	**CVD**	Counter Vailing Duty
24	**DCIS**	Digital Communication Innovation Square
25	**DESH**	Development of Enterprise and Service Hubs
26	**DGFT**	Directorate General of Foreign Trade
27	**DGTR**	Director General Trade Remedies
28	**DISHA**	Digital Saksharta Abhiyan
29	**DoT**	Department of Telecom
30	**DPIIT**	Department for Promotion of Industry and Internal Trade
31	**DSIR**	Department of Scientific and Industrial Research
32	**DTH**	Direct To Home
33	**ECGC**	Export Credit Guarantee Corporation of India Limited
34	**ECLGS**	Emergency Credit Line Guarantee Scheme
35	**ECTA**	Economic Co-operation Trade Agreement

36	**EDF**	Electronic Development Fund
37	**EDGE**	Enhanced Data for Global Evolution
38	**EHTP**	Electronics Hardware Technology Park
39	**EMC**	Electromagnetic Compatibility
40	**EO**	Export Obligation
41	**EoU**	Export Oriented Unit
42	**EPCG**	Export Promotion Capital Goods Scheme
43	**EPZ**	Export Processing Zone
44	**ERP**	Effective Rate of Protection
45	**ESC**	Electronics and Computer Software Export Promotion Council
46	**ESDM**	Electronics System Design and Manufacturing
47	**EU**	European Union
48	**EXIM**	Export-Import Bank of India
49	**FFS**	Fund of Funds
50	**f**	Free On-Board
51	**FTA**	Free Trade Agreement
52	**FTP**	Foreign Trade Policy
53	**FWA**	Fixed Wireless Access
54	**GDP**	Gross Domestic Product
55	**GMPCS**	Global Mobile Personal Communications by Satellite
56	**GPON**	Gigabit Passive Optical Network
57	**GSM**	Global System for Mobile communication
58	**GSMA**	GSMA (Groupe Speciale Mobile Association)
59	**HNTE**	High and New Technology Enterprise
60	**HPC**	High Performance Computing
61	**HS Codes**	Harmonized System Codes
62	**HSPA**	High Speed Packet Access
63	**ICEA**	India Cellular & Electronics Association
64	**IDS**	Inverted Duty Structure
65	**IEEMA**	Indian Electrical & Electronics Manufacturers' Association
66	**IES**	Interest Equalisation Scheme
67	**IGST**	Inter-State GST
68	**IIoT**	Industrial Internet of Things (IIoT)
69	**IIT**	Indian Institute of Technology
70	**IoT**	Internet of Things
71	**IPR**	Intellectual Property Rights
72	**ISDN**	Integrated Services Digital Network
73	**ITA-1**	Information Technology Agreement 1996
74	**IXP**	Internet Exchange Point
75	**LC**	Local Content
76	**LOC**	Lines of Credit
77	**LTE**	Long Term Evolution
78	**M2M**	Machine-to-machine

79	**MEITY**	Ministry of Electronics and Information Technology
80	**MGS**	Multiplier Grants Scheme
81	**MSIPS**	Modified Special Incentive Package Scheme
82	**MSME**	Micro, Small & Medium Enterprises
83	**NaaS**	Network-as-a-Service (NaaS)
84	**NATE**	Networking and Telecom Equipments
85	**NATEM**	Networking and Telecom Equipments' Manufacturing
86	**NB-IoT**	Narrowband IOT (Internet of things)
87	**NBM**	National Broadband Mission
88	**NFV**	Network Function Virtualisation
89	**NG-PON**	Next Generation Passive Optical Network
90	**OEM**	Original Equipment Manufacturer
91	**OFC**	Fiber-Optic Cable
92	**ONT**	Optical Network Terminal
93	**OSS**	Operations Support Systems
94	**OTN**	Optical Transport Network
95	**OTT**	Over The Top
96	**PCB**	Printed Circuit Boards
97	**PCBA**	Printed Circuit Boards Assembly
98	**PLI**	Production-Linked-Incentive
99	**PMA**	Preferential Manufacturing Access
100	**PMN**	Private Mobile Network (PMN)
101	**PNF**	Physical Network Functions (PNF)
102	**PoC**	Proof-of-Concept
103	**R&D**	Research and development
104	**RAN**	Radio Access Network
105	**RAN**	Radio Access Network
106	**RBI**	Reserve Bank of India
107	**RFID**	Radio-frequency identification
108	**RoDTEP**	Remission of Duties or Taxes on Export Products
109	**RPC**	RODTEP Policy Committee
110	**SAMRIDH**	Start-up Accelerators of MeitY for Product Innovation, Development and Growth
111	**SCOMET**	Special Chemicals, Organisms, Materials, Equipment and Technologies
112	**SDH**	Synchronous Digital Hierarchy
113	**SDN**	Software Defined Networking
114	**SD-WAN**	Software Defined Wide Area Network
115	**SDG**	Sustainable Development Goals
116	**SEBI**	Securities and Exchange Board of India
117	**SEP**	Standard Essential Patents
118	**SEZ**	Special economic zone
119	**SGST**	State Goods & Services Tax
120	**SKD**	Semi Knock Down
121	**SoE**	State Owned Enterprises

122	**SPDF**	Software Product Development Fund
123	**SPE**	Software Product Ecosystem
124	**SPECS**	Scheme for Promotion of Manufacturing of Electronic Components & Semiconductors
125	**STB**	Set Top Box
126	**TCOE**	Telecom Centre of Excellence
127	**TEC**	Telecom Engineering Centre
128	**TDB**	Technology Development Board
129	**TEDB**	Telecommunication Equipment Development Board
130	**TEPF**	Telecom Entrepreneurial Promotion Fund
131	**TIDE**	Technology Incubation and Development of Entrepreneurs
132	**TIPS**	Tech Incubator Program for Start-up
133	**TMF**	Telecom Manufacturing Fund
134	**TMPF**	Telecom Manufacturing Promotion Fund
135	**ToT**	Transfer of Technology
136	**TPDC**	Telecom Product Development Clusters
137	**TRAI**	Telecom Regulatory Authority of India
138	**TRDC**	Telecom Research and Development Corporation
139	**TRDF**	Telecom Research and Development Fund
140	**TSP**	Telecom Service Provider
141	**TSuM**	Telecom Start-ups MSMEs Mission
142	**TTDF**	Telecommunication Technology Development Fund
143	**USOF**	Universal Service Obligation Fund
144	**UT**	Union Territory
145	***VoIP***	Voice Over Internet Protocol
146	**VSAT**	Very Small Aperture Terminal
147	**WCDMA**	Wideband Code Division Multiple Access
148	**Wi-Fi**	Wireless Fidelity (IEEE)

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