



Telecom Regulatory Authority of India

Recommendations

on

Promoting Local Telecom Equipment Manufacturing

New Delhi

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Telecom Regulatory Authority of India

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Chapter1: Introduction

- 1.1 Economic growth and prosperity of a nation depends upon its progress in each sector of economy i.e. Agriculture, Industry, and Services. As per Economic Survey of 2017-18, share of these sectors in Gross Value Added (GVA) in the Indian economy at basic price at current prices (2011-12 Series)¹ are 17.1, 29.1, and 53.9% respectively. Industry sector includes manufacturing also. The share of the manufacturing in GVA in the Indian economy is 16.7% only. Target is to increase this share up to 25%.
- 1.2 In the growth of the services sector share in the India economy, the growth of ICT(Information and Communication Technology) services has played a significant role. The underlying infrastructure for ICT services are telecommunication networks. The telecom services sector in India has undergone a high pace of growth since mid 1990s and is, at present, one of the fastest growing telecom markets in the world. It has played a significant role in the socio-economic development of India. As per the latest report published by TRAI², as on 31 March 2018, there are 1,206.22 million telecom subscribers (wireless and wire-line) in the country. As per industry estimates³, the Indian telecom sector accounted for 6.5% of India's GDP(Gross Domestic Product) while providing direct and indirect employment to four million people in 2015. In spite of development of telecommunication services sector at a rapid pace during the last two decades, there are a number of challenges before telecom industry that need to be overcome.

¹ http://eaindustry.nic.in/key_economic_indicators/Key_Economic_Indicators.pdf

² https://www.trai.gov.in/sites/default/files/PIReport27062018_0.pdf

³ <https://www.investindia.gov.in/sector/telecom>

1.3 The telecom industry primarily comprises of Telecom Service Providers, Telecom Equipment (telegraph) manufactures and suppliers, and passive infrastructure providers. Telecom Equipment (telegraph) manufactures and suppliers can be further classified into Consumer end equipments (i.e. Handset, Customer Premises Equipment(CPE) etc), and Network equipments manufacturers and suppliers. Growth of the telecom industry is summation of the growth of the each subset of the telecom industry mentioned above.

1.4 While, during the last two decades, the telecom services and passive infra sectors have shown a robust growth which can be ascertained from growth in number of subscribers, revenues of service providers, and coverage of telecom services up to the remotest corners of the country, telecom equipment (telegraph) manufacturing has not grown on similar pace. In fact, most of the demand for telecom equipment (telegraph) has been met through imports. Following data on imports and exports of telecom equipment has been collated from Directorate General of Commercial Intelligence and Statistics⁴:

Commodity	Import/ Export	2014-15 (mn USD)	2015-16 (mn USD)	2016-17 (mn USD)	2017-18 (mn USD)
Telecom Instrument	Export	1073.26	875.72	1035.99	1201.74
	Import	14697.33	15402.65	16560.80	21847.92
Electronic Instruments	Export	1900.90	1962.80	2016.07	2039.13
	Import	5408.97	5888.50	6068.78	6921.09
Electronic	Export	1880.45	1842.05	1791.92	2137.23

⁴ <http://www.dgcisanalytics.in/dgcis/EXIM-Analytics>

Components	Import	5383.28	7115.42	8439.56	10182.17
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Note: *Telecom Instruments includes specific instruments like Cross Talk Meters, Gain Measuring meters, Optical Time Domain Reflecto meters etc required for the telecom industry. Electronic Instruments are general purpose measuring instruments that have employability in various industries.*

It can be inferred from above that the import of telecom instruments and electronic instruments is far greater than the exports of such items from India.

- 1.5 Large portion of demand for telecom equipments comprises of network equipments like the Switches, Routers, Base Trans-Receiver Stations, Multiplexing equipments, Antennae etc. These telecom equipments are costly and mostly imported, a need therefore exists to encourage local manufacturing of telecommunication networking equipments to reduce imports, and create self reliance and job opportunities in India. Further, the reliance on imported Handsets and CPEs is also very high.
- 1.6 The Central Government has, on 1 July 2015, launched an all-inclusive program namely 'Digital India'. The vision of Digital India programme is centered on three key areas – Digital Infrastructure as a Utility to Every Citizen, Governance and Services on Demand, and Digital Empowerment of Citizens. Digital India program *inter-alia* aims to provide the much needed thrust to Broadband Highways, Universal Access to Mobile Connectivity, Public Internet Access Programme, Electronics Manufacturing, and IT(Information Technology) for jobs.
- 1.7 India being one of the fastest growing economies in the world and the second most populated country on the planet is also the most vibrant market for smart-phones and consumer premises equipments. The

Government has launched a Phased Manufacturing Program⁵(PMP) on 28-04.2017 to promote local manufacturing of cellular mobile handsets and reduce imports. The objective of this program is to progressively increase the domestic value additions for establishment of robust cellular mobile handsets manufacture eco-system in India.

1.8 The successful rollout of this program has reduced the country's dependence on import of fully finished cellular mobile handsets. However, due to inadequate investment in Research and Development (R&D) of cellular mobile handsets and limited availability of the local components in the country, the value addition in manufacturing of cellular mobile handsets in the country is still very low.

1.9 The Government and the Industry over the years have taken several measures to promote local electronic items manufacturing, boost self reliance, and create jobs. Some of the schemes provided by the Government to promote local electronic items manufacturing are tabulated below:

S.No	Scheme	Salient Point
(a)	Modified Special Incentive Package Scheme(MSIPS)	Provides capital expenditure subsidy of 20-25%.
(b)	Duty Differentials- Tax and Tariff concessions	To provide protection against imported products, special differential excise duty regime for mobile handsets, customer premise equipments, tablets etc.

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http://meity.gov.in/writereaddata/files/Notification_PMP_Cellular%20Mobile%20Handsets_28.04.2017.pdf

(c)	Preferential Market Access(PMA)	Applicable to central government and ministries, under this scheme, 9 generic products and 23 Telecom products have been identified for PMA.
(d)	Merchandise Exports from India Scheme(MEIS) & Service Exports from India Scheme(SEIS)	Export benefit of 2% under MEIS and SEIS has been provided to certain IT goods in the Foreign Trade Policy, 2015-19.
(e)	Electronic Manufacturing Cluster Scheme	Provides 50% of the cost of upgrading infrastructure and logistics as grant in aid from Government.

1.10 Further, the Government has consistently emphasized on promoting local R&D, and telecom equipment manufacturing through the multiple National Telecom Policies notified during the last two decades. In the annual budget for the FY 2018-19⁶, several incentives were announced to promote local manufacturing of Point of Sale and other digital payment devices, Light Emitting Diodes - an important component in consumer electronics, solar cells and modules, and populated printed circuit boards of mobile phones. Besides this, a Rs 10,000 Crore outlay has been provided for expansion of telecom infrastructure to connect 2.5 Lakh villages under the Bharat-Net project. Rs 3,073 Crore have been allocated to Department of Science and Technology (DST) for undertaking Research and Development (R&D) projects in Artificial Intelligence (AI), Machine to Machine learning (M2M), Internet of Things (IoT), Big- Data Analytics etc. These efforts would assist in developing the eco-system for telecom equipment manufacturing.

⁶ <http://pibphoto.nic.in/documents/rlink/2018/feb/p20182101.pdf>

- 1.11 The functions of Authority include making recommendations on, either *suo-motu* or on a request from the licensor, type of equipment to be used by the service providers after inspection of equipment used in the network, and on measures for the development of telecommunication technology and any other matter relatable to telecommunication industry in general. Accordingly, earlier, the Authority issued its recommendations on “Telecom Equipment manufacturing Policy⁷” to Department of Telecommunication on 12 April 2011.
- 1.12 During the past seven years, in the telecom sector, there have been considerable developments in the technology and exponential growth in the subscriber base. India is poised to be the world leader in the adoption of Artificial Intelligence (AI), Internet of Things (IoT), 5G, and Big Data Analytics. Most of the future technologies would also ride on the telecom networks hence rapid adoption and deployment of these technologies would require a robust local telecom manufacturing support to reap the benefits of early mover. Indian local telecom manufacturing industry over the past has not been growing at a pace required to support the service providers as well as the consumers in spite of several initiatives taken by both i.e. the government as well as the industry.
- 1.13 Therefore, the Authority, on *suo-motu* basis, with the objective of realistically assessing India’s true potential in equipment manufacturing and to arrive at the recommendations to the Government that would enable Indian telecom equipment manufacturing sector to transition from an import-dependent sector to a global hub of indigenous manufacturing, issued a consultation paper (CP) on "Promoting Local

⁷ http://www.trai.gov.in/sites/default/files/11AprRecommondation_12Apr11.pdf

Telecom Equipment Manufacturing⁸” on 18th September 2017. Written comments on the CP were invited from the stakeholders. An Open House Discussion (OHD) was also conducted on 14th March 2018 at New Delhi.

- 1.14 Based on the written submissions of the stakeholders and the discussion in the OHD the issues have been examined in depth and recommendations have been framed.
- 1.15 The issues relating to local telecom equipment manufacturing raised in the CP, responses received from the stakeholders, analysis, and the recommendations have been covered in Chapter 2. The responses were widely divergent and the Authority has taken a holistic view of the different facets of promoting local telecom equipment manufacturing to arrive at the recommendations. The summary of recommendations has been provided in Chapter 3.

⁸ https://traf.gov.in/sites/default/files/CP_on_Manufacturing_18_09_17.pdf

CHAPTER 2: ISSUES AND ANALYSIS

2.1 The Authority with a view to identify the bottlenecks for the Local Telecom Equipment Manufacturing Sector, recommend measures required to promote telecom equipment manufacturing in the country, and develop India into a global manufacturing hub for telecom equipment had raised the following issues in the Consultation Paper(CP):

- a) Reasons for poor performance of Local Telecom Equipment Manufacturing sector in spite of numerous initiatives undertaken by the Government and the Industry?
- b) Effectiveness of the existing PMA (Preferential Market Access) Policy and suggest changes, if any?
- c) Additional policy measures need to be undertaken to boost innovation and productivity of the Local Telecom Equipment Manufacturing sector?
- d) Adequacy of the existing mechanism of Standardization, Certification and Testing of telecom equipment to support Local Telecom Equipment Manufacturing and suggest a framework to address shortcomings, if any?
- e) Issues due to ITA (Information Technology Agreement) which need to be addressed for promoting Local Telecom Equipment Manufacturing?
- f) Sufficiency of the current fiscal initiatives to promote Local Telecom Equipment Manufacturing and suggest changes, if any?
- g) Sufficiency of existing Patent Laws to address the issues of local manufacturers, and suggest measures to be taken and amendments in the patent laws, if any, to promote Local Telecom Equipment Manufacturing sector?
- h) Dispute resolution mechanisms for disagreement on licensing of patents/ payment of royalty to licensor of Standard Essential Patents

(SEPs) on the basis of FRAND (Fair, Reasonable, And Non Discriminatory) terms and conditions?

- i) Need to adopt the export oriented/ promotion approach for growth of Local Telecom Equipment Manufacturing sector and measures to be undertaken to create environment for foreign investments?

2.2 Responses received from the stakeholders in the form of comments, counter-comments and submissions during the open house discussions on the questions listed above have been segregated under the following heads:

- (A) Reasons for poor performance of Telecommunication Equipment Manufacturing
- (B) Institutional mechanism
- (C) Skilled Manpower
- (D) Research, Innovation, and Development
- (E) Patent Framework and Resolution of Disputes
- (F) Standardization, Testing and Certification
- (G) Manufacturing and Productivity
- (H) Fiscal Incentives
- (I) Market Access
- (J) Specific Level of Incentives

2.3 The reasons for poor performance of Local Telecommunication Equipment Manufacturing sector have been analyzed, and to redress the reasons for poor performance, the Authority's recommendations on promoting the Local Telecommunication Equipment Manufacturing have been formulated.

2.4 For the purpose of these recommendations, reasons for poor performance of Local Telecommunication Equipment Manufacturing sector as suggested by the stakeholders have been categorized into two broad

categories. First category summarizes the issues which are common to Electronic System Design and Manufacturing (ESDM) sector, and these issues need to be addressed by the concerned Ministries/ Departments of the Government on priority. Solutions of these issues are necessary but not sufficient for growth of indigenous Telecom Equipment Manufacturing (TEM) sector. Second category summarizes the issues which are specific to TEM sector. For redressal of this category issues, domain knowledge relating to the telecommunication technology, networks, and services is required. These recommendations concentrate on redressal of second category issues.

A. Reasons for poor performance of local Telecom Equipment - Manufacturing (TEM)

a. Issues common to Electronic System Design and Manufacturing (ESDM):

2.5 Respondents have identified the following primary reasons for the poor performance of ESDM in the country:

- (a) There is a disadvantage of approximately 15% in terms of costs in comparison with the developed countries: The stakeholders have submitted that primarily the higher cost of Capital, Power, and Infrastructure etc in the country contribute to this disadvantage. The stakeholders have submitted that slow turnaround time at the Customs and Ports are the other reasons.
- (b) Inverted duty structures: stakeholders have submitted that in some cases, the duties applicable on Imports of components/raw-material are higher than the finished products.
- (c) Lack of ancillary industry like semiconductors fabrication and packaging: Most of the stakeholders are of the view that barring

few low-end commodities like sheet metals, plastics, wires etc the ecosystem required to support local telecom equipment manufacturing is almost non-existent in India. Most of the semiconductor components are required to be imported for manufacturing of electronic equipments.

- (d) Lack of fiscal incentives for ESDM sector to compensate for relatively higher costs and late entry disadvantage: Few stakeholders have submitted that India does not have adequate eco-system to promote ESDM, MNCs(Multi National Companies) on the other hand over a period of time have developed standards and technologies; achieved large foot-prints for their products in the world; achieved economies of scale and market presence which may be very difficult for our local telecom equipment manufacturers to match. They submitted that consumers and the Service providers may also have their preferences and brand loyalties which may be difficult to change by home grown products resulting in lower demands and higher cost of production for these products. In the absence of adequate fiscal incentives, the revival of local telecom manufacturing industry would be a distant dream.

2.6 Manufacturing of goods and services is dependent upon three factors of production i.e. Land, Labor and Capital. Cost of capital for Telecom manufacturers in India as per the E&Y survey⁹ is approximately 13-14%. Further, the labor cost is higher while the productivity of labor is lower as compared to China. Poor connectivity, shortage of land, higher cost of power and other infrastructural issue result in higher costs of factors of production. As per the World Bank Logistic Performance Index (LPI)

⁹ [https://www.ey.com/Publication/vwLUAssets/ey-cost-of-capital-india-survey-2017/\\$FILE/ey-cost-of-capital-india-survey-2017.pdf](https://www.ey.com/Publication/vwLUAssets/ey-cost-of-capital-india-survey-2017/$FILE/ey-cost-of-capital-india-survey-2017.pdf)

Report 2016¹⁰, Indian manufacturer is disadvantaged at approximately 15% due to higher costs and the issue requires Governmental intervention. India's cost disadvantage mainly is in logistics and related infrastructure, compared to some other developed countries and China. According to 2016 LPI results, India scores 3.17 in customs clearing – 15 basis points behind China (3.32). India has a score of 3.34 in infrastructure – 15 basis points behind Israel (3.49), has a score of 3.36 in international shipments – 15 basis points behind Finland (3.51), has a score of 3.39 in logistics competence – 15 basis points behind Qatar (3.54), has a score of 3.52 in tracking and tracing – roughly 15 basis points behind China (3.68), and has a score of 3.74 in timeliness – roughly 15 basis points behind Hungary (3.88). These 15-basis points lag translates into a proportionate 15% disadvantage in costs related to logistics and allied infrastructure. This disadvantage finally affects the country's competitiveness adversely – compared to these developed countries and China. In view of the foregoing, it is found that there is an inherent disadvantage of approximately 15% to the Indian Manufacturer. Initiatives taken by the Government to promote local manufacturing have been discussed in chapter 1, however the responses received from the stakeholders suggest that some additional measures have to be undertaken to promote local electronic equipment manufacturing in the country. Till the time these issues are addressed compressively, the Authority is of the view that this cost disadvantage could be compensated through sector specific financial incentives.

- 2.7 In most of the cases, the issue of inverted duty cycle has been addressed by the government by raising the BCD (Basic Custom Duty) on various imported items while at the same time reducing the BCD on the raw

¹⁰ https://lpi.worldbank.org/sites/default/files/International_LPI_from_2007_to_2016.xlsx

materials required for manufacturing items like Mobile Handsets, OFC (Optical Fiber Cable) etc.

2.8 For the robust local electronic equipment manufacturing sector, it is essential to have the ancillary industry in place. The ancillary industry includes fabrication units, components manufacturers, PCB (Printed Circuit Board) designers and manufacturers, SMT (Surface Mount Technology) units, batteries manufacturers etc. As brought out earlier, the Government has taken several measures to promote ancillary industries with an aim to revive the electronic equipment manufacturing in the country. In case of Mobile Handset manufacturing, it has yielded some results also. However semiconductor fabrication and packaging units, and components manufacturing in the country is still not there. Facilities for multilayer PCB manufacturing are also limited.

2.9 As discussed earlier, these are common issues and are therefore not confined to telecom sector alone. However, for growth of the telecom equipment manufacturing sector in the country, redressal of these issues is necessary. Therefore, these issues need to be redressed by the concerned Ministries/ Departments of the Government on priority.

b. Issues specific to the TEM sector:

2.10 In summary, following issues specific to TEM sector have been identified by a large number of respondents:

(a) Inadequate monitoring and facilitation for manufacturing of telecommunication equipment in the country: the stakeholders are of the view that presently, issues related to electronic/ telecom manufacturing are being addressed by various ministries/departments like MeitY(Ministry of Electronics and Information Technology), DoT(Department of Telecommunication),

DIPP(Department of Industrial Policy and Promotion), DST (Department of Science and Technology) etc. Though the intent of each ministry/department is to promote manufacturing of electronic/ telecom equipments, the stakeholders are of the view that involvement of several ministries/departments often results in duplicity in efforts, policies and controls resulting in ambiguity and delays thereby impeding the commercial production of locally designed equipments. Moreover, telecom equipment manufacturing requires, in addition to the general knowledge about electronic equipment manufacturing, knowledge of telecom technology and standards. They suggested that there should be a central agency/body from the government that should be responsible for monitoring and facilitation of design, development, and manufacturing of telecom equipments in India.

- (b) Rapid changes in Technology: As per some of the respondents who primarily comprised of the MNCs there is a distinction between the Consumer electronics (Mobile Hand Sets) Industry and the Enterprise (Network) Telecom Industry. While the Consumer Electronics is characterized by higher demands (Volume), low maintenance, lower self life, less complexity and cost; the Enterprise (Network) Telecom Industry is characterized by lower demands (only Business to Business (B2B)), high maintenance, longer self-life and high complexity. Therefore, across the world, the handset manufacturers are far more in number as compared to the enterprise (network) telecom equipment manufacturers. They further submitted that due to high complexity in Enterprise Telecom Equipments, the need for R&D (Research and Development) investments is very high. Moreover, since the technology changes at a very rapid pace, the telecom equipment manufacturers establish their manufacturing plants at selected

locations to optimize their investments, logistics requirements, manpower etc to service/ sell their products to as many B2B clients as possible. Local telecom equipment manufacturers however have disagreed with the submissions made by the international agencies and manufacturers. They have submitted that as per recently published ELCINA (Electronic Industries Association of India) report¹¹, India's electronics industry is worth \$140 billion in 2017 and is projected to grow to \$400 billion by 2022. They are of the opinion that high-capacity telecom networks will form the future backbone of Digital India fuelling massive demand for these products in the next few years. They further submitted that India can design and manufacture high value complex telecom networking equipments provided a suitable ecosystem is created in the country and emphasis is given to innovation, research and development. Stakeholders representing local telecom equipment manufacturers submitted that TEMC (Telecom Equipment Manufacturing Council) should proactively identify items based on upcoming technologies and government should leverage manufacturing of such equipments to achieve the advantages of prime-mover.

- (c) Lack of market access for indigenous manufacturers: Some stakeholders have submitted that the Telecom Service Providers (TSPs) are legally not bound to buy or to give preference in buying networking telecommunication equipment from indigenous manufacturers; also, the Preferential Market Access (PMA) policy is applicable only for the non-commercial procurement by the Government and the PSUs. They are of the opinion that the Government should institute measures so that locally

¹¹ <http://elcina.com/publication.php>

manufactured telecom equipments are procured by the Government license holders and other entities to promote local telecom equipment manufacturing. On the other hand, a stakeholder has submitted that PMA policy should not be made applicable to private TSPs.

- (d) Inadequate local market size: Large number of stakeholders reiterated the issue of inadequate local market size which deters the entrepreneurs in undertaking telecom equipment manufacturing in the country. The respondents are of the view that the demands are skewed in favour of imported telecom equipments from MNCs. Since the MNCs have well established products and supported by credit finance agencies; they are able to achieve economies of scale, earn higher revenues due to large volumes resulting in higher entry barrier for the local telecom equipment manufacturers. The stakeholders also submitted that due to poor market presence and lesser acceptance of indigenously manufactured products, the manufacturers find it difficult and financially unviable to put in place end to end repairs/maintenance network/facilities for their products. They urged that Government should facilitate in promoting the local telecom equipment manufactures by creating suitable provisions in the existing frameworks.
- (e) ITA related issues: Some stakeholders submitted that all new products be treated as non-ITA1 and be subjected to highest import duties without infringing on WTO obligations. Further, they submitted that India should not sign the ITA-2 with expanded product coverage. Also, import of telecom equipments of the new technology products under “others” category be prohibited. They are of the opinion that populated PCB and modules of all equipment not included in ITA-1 should attract highest import duties to prevent manipulation by importing finished products as

SKD (Semi Knock Down) kits. Lastly, they submitted that stricter enforcement of anti-dumping and anti-circumvention rules with regard to telecom product imports would be beneficial in long term.

- (f) Non-availability of financing options for indigenous manufactures: few stakeholders cited the example of Sinosure, which is state owned enterprise of China, which works in the domain of contract financing and export credit insurance; it also promotes Chinese manufactured goods in various parts of the world through its local offices in each country. These stakeholders have submitted that Indian manufacturers face difficulties in selling indigenous products due to non-availability of similar financing facilities in India. The stakeholder submitted that India should also develop similar organisation/framework to promote exports of locally manufactured products.
- (g) Need for better co-ordination between Academia, Research, and Innovation for leveraging the vast manufacturing potential of our country: Large number of respondents are of the view that India has a vast pool of talent and young population who are capable of taking the Indian manufacturing industry to the pinnacle provided favorable eco-system for the growth of manufacturing industry is created in the country. They submitted that India needs to develop a strong, coordination framework for research, innovation, design and development of indigenous products that are better than any such products manufactured elsewhere in the world. Mechanism have to be put in place for enhancing innovation, active creation and filing of patents as well as ensuring high conversion rates of patents into commercially successful products.
- (h) Clarification in National Standardization Agency: Some stakeholders submitted that there are multiple agencies like the BIS, TEC etc who have come out with various standards which

have to be complied with by the telecom equipment manufacturers. They submitted that compliance with multiple standards from different authority's results in cost escalations, compliance burdens as well as delay in commercialization of the product. They were of the opinion that there should be a single agency which specifies the various standards that the end product should comply.

- (i) Patents licensing and resolution of disputes: many stakeholders representing local telecom equipment manufacturers submitted that one of their major concerns is the opaque system of patenting and licensing. They submitted that firstly, there was no facility to know the number of patents that would be forming part of their products, secondly, there was no methodology of knowing the rates of royalties beforehand, and thirdly, the manufacturers are drawn into legal suits once their product is successful and profitable. The stakeholders have submitted that Government should initiate steps so that the manufacturers have clarity before getting into the businesses; also there should be a dispute resolution mechanism as IPR related cases have long pendency's in the courts.

2.11 These issues have specific relationships with telecom sector domain knowledge and technology. The redressal of these issues requires close coordination among stakeholders in the telecom sector which include DoT, Licensees, equipment manufacturers, academia doing research in the domain of telecom technology and products, Standard Development Organisations (SDOs), international multilateral institutions working in the field of telecommunications, financial institutions engaged in project and credit financing/ insurance activities etc. For redressal of these issues at policy level and facilitation of telecom equipment

manufacturing in the country, a nodal department of the Government has to take initiatives and ownership.

2.12 In view of the above, issues specific to telecommunication sector have been discussed and deliberated in the subsequent paragraphs. On the basis of analysis of each issue, the Authority's recommendations have been formulated.

B. Institutional Mechanism:

2.13 In the past two decades, telecom (ICT) technologies have seen rapid advances with an aim to provide enhanced ICT services to the consumers. During the same period, Indian telecom service providers have swiftly adopted the new technologies which have resulted in operational efficiencies and improved affordability for consumers. The Government's intent to encourage and adopt new technologies is echoed through the flagship program 'Digital India' and in the yearly budget allocations and the impetus given to telecom sector. India, being the world leader in the ICT services sector, wants to take advantage of the rapidly evolving technologies; and accordingly emphasis on R&D in Artificial Intelligence, Internet of Things, Machine to Machine learning and other state of the art technologies is being given both by the Government as well as the Industry. For rapid adoption of these technologies and delivery of ICT services using these technologies, continuous investments in the telecommunications networks and devices would be necessary. With the Fourth Industrial Revolution already unfolding, the telecommunications networks and devices would become backbone for the Industrial and Knowledge economy of the country. Having the self reliance in such critical area of economy is not only necessary from economic point of view but also be necessary from the national security perspective. For self reliance in the telecommunications

sector, investments in the research and development of telecommunication technologies and products, and indigenous manufacturing of telecommunication equipment is of vital importance.

- 2.14 The demand for telecom equipments for core and access networks as well as sensors and devices may further multiply in future thanks to programs like Digital India, Smart-cities, Industry 4.0 etc; it would therefore be prudent to identify the key focus areas and the equipment profiles required in future where India can take a leading position in manufacturing of such products for the world.
- 2.15 In order to promote rapid development in all aspects of telecommunication including technology, production, and services, on 11.03.1989, the Government setup Telecom Commission¹². As per the resolution dated 15.03.2016, notified in the Gazette of India, the Telecom Commission is composed of Chairman, four full time members i.e. Member (Finance), Member (Production), Member (Services) and Member (Technology); and the four part-time members i.e. Secretary (Ministry of Electronics and Information Technology), Secretary (Department of Economic Affairs), Secretary (Department of Industrial Policy and Promotion) and Chief Executive Officer, NITI Aayog¹³.
- 2.16 Accordingly, till late 90s, the progress of telecommunication equipment manufacturing in the country was monitored by Telecom Commission through Member (Production). This resulted in design, development, and manufacturing of telecommunication equipments for fixed line networks as well as consumers in the country. In fact the indigenously developed

¹² http://www.dot.gov.in/sites/default/files/2016_05_26%20Res%20Policy-I.pdf?download=1%3Cbr%20/%3E

¹³ <http://www.dot.gov.in/sites/default/files/Res%20Policy-II.pdf>

C-DoT technology telecom exchanges for fixed line networks were exported to many countries. After liberalisation and privatisation of the telecom sector, perhaps more emphasis may have been given to the development and roll-out of telecom services vis-à-vis indigenous design, development and manufacturing of telecommunication equipment resulting in the phenomenal growth of the telecom services sector. Further, the investments in the R&D and manufacturing space did not keep pace with the rapid developments in the telecommunication technologies during the last two decades. Now having considerable progress been made in the development of telecommunications services and emergence of telecommunication infrastructure as backbone for economy as well as national security, it is now equally important to promote the local telecom equipment design, development, and manufacturing to not only meet our domestic equipment requirements but also export these equipments to other countries.

2.17 In view of the foregoing, for ensuring the focussed attention in DoT on manufacturing of telecom equipment within the country, the Authority recommends that the progress of telecommunication equipment manufacturing in the country should be monitored in DoT at least at the level of Member, Telecom Commission. For a 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.

2.18 In pursuance of the objectives of National Telecom Policy 2012, for promoting R&D, Manufacturing and Standardization of Telecom Equipment in the country, the Government constituted Telecom Equipment Manufacturing Council (TEMC). It consists of experts from Telecom Service Providers, Telecom equipment manufacturing industry,

Government, Academia and R&D Institutions. Since a framework in the form of TEMC does exist, it can proactively identify the key thrust areas for telecom technologies and products so that the larger objective of “Net Zero Imports of Telecommunication Equipments” can be achieved by 2022. Key areas should also be identified where-in Indian manufacturers can contribute significantly in the global supply chain. A program similar to the Phased Manufacturing Program for cellular mobile handsets should also be rolled out for other telecom equipments also. TEMC should identify the telecom equipments for which the phased manufacturing program has to be rolled-out.

2.19 As per the economic survey 2017-18¹⁴, Investment in Indian R&D has consistently increased over the years from Rs 24,117 Crores in 2004-05 to approximately Rs 1,04,864 Crores in 2016-17. However as a fraction of GDP the expenditure on R&D has stagnated between 0.6 to 0.7 % over the past two decades; which is less as compared to the developed economies (US: 2.8%, China: 2.1%, Israel: 4.3%, Korea: 4.2%). It has also been reported that most of the investment in R&D in India is done by the government whereas in the developed economies substantial expenditure by private entities is done along with the government. Academic institutions play a vital role in R&D in case of developed economies where as similar participation in case of India is less. As per the economic survey 2017-18, the conversion ratio from research to filing of patent of academic institutions in India is very poor as compared to developed nations. There is therefore a need to encourage active participation of industry and academia in R&D. To boost the R&D in telecom sector, TEMC (Telecom Equipment Manufacturing Council) had

¹⁴ <http://www.indiaenvironmentportal.org.in/files/file/economic%20survey%202017-18%20-%20vol.1.pdf>

proposed setting up of Telecom Entrepreneurship Promotion Fund (TEPF), Telecom Research & Development Fund (TRDF), and Telecom Manufacturing Promotion Fund (TMPF) with total outlay of Rs 17,500 Crs during the 12th five year plan. However, the same have still not been set up.

2.20 In view of the foregoing, the Authority recommends that to the begin with the TRDF with an initial outlay of at least Rs 1000 Crores should be setup to promote research, innovation, standardisation, design, testing, certification, and manufacturing of indigenous telecom equipments. This should be further augmented on annual basis for at least next 5 years to attain self reliance in the space of telecom networking and user equipments. Subsequently, setting up of TEPF and TMPF 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.

2.21 It is necessary to setup an institutional mechanism for effective disbursal and utilisation of these funds. This institutional mechanism should be capable of evaluating the proposals in the areas already being identified by TEMC, and monitoring the effective utilisation of the funds. Accordingly, a multi-disciplinary Telecom Equipment Development Board (TEDB) on the lines of the Technology Development Board (TDB), which works under the Chairmanship of Secretary, DST should be constituted in the DoT, under the TEC, for executing speedy and comprehensive decisions related to funding and incentivisation of design, development, and manufacturing of telecommunication equipment in the country. This board would be responsible for administration and disbursal of funds from TRDF. It should also be responsible for facilitating innovation, R&D, and setting up of testing labs for the telecom sector in the country.

2.22 In view of the foregoing, the Authority recommends:

- (a) The progress of telecommunication equipment manufacturing in the country should be monitored in 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.**
- (b) India should aim to achieve the objective of 'net zero imports of telecommunication equipments' by 2022. For this purpose, Telecom Equipment Manufacturing Council (TEMC), a Council already constituted for promoting R&D, Standardization, and Manufacturing of Telecom Equipment in the country, and consisting of experts from Telecom Service Providers, Telecom Equipment Manufacturing Industry, Government, Academia, and R&D Institutions, should identify and recommend specific areas of priorities.**
- (c) 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 TEPF and TMPF 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.**
- (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 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 disbursement of funds from TRDF.

C. Skilled Manpower

2.23 As discussed earlier, availability of land, labour, and capital are prerequisites for growth of the industrial sector. Similarly, availability of skilled manpower is an important factor for the growth of the telecom equipment manufacturing sector also. The issue has been highlighted by many stakeholders in their submissions wherein they had submitted that the existing curriculum at most of the academic institutions is not geared up to prepare a workforce for the telecom equipment manufacturing sector of the future. Also, telecom sector has its own characteristics like rapid changing technologies and faster obsolescence. Further, it requires constant updating of the curriculum and close coordination between academia and industry. Stakeholders have also submitted that the Government has made strides in creating an environment that fosters ease of doing business in India as a result large numbers of foreign manufacturers are setting up their manufacturing facilities in India. Establishment of these manufacturing facilities would result in creation of employment opportunities for the India's youth. To reap the benefit of such initiatives, the youth have to be empowered with the skill sets essential for employment in these manufacturing units.

2.24 Some stakeholders have submitted that Electronic Manufacturing Clusters (EMCs) are being setup by the Government to promote electronic equipment manufacturing sector. As discussed earlier, telecom equipment design and manufacturing requires additional resources in the form of domain knowledge and technology experts. Accordingly, some of these clusters can be identified for design, development, and manufacturing of telecom equipments and termed as Telecom Products Development Clusters (TPDCs). Academic institutes having focused attention in the domain of electronics and communications engineering should be setup in close proximity of these TPDCs so that the students and researchers in these institutes can have the practical exposure and opportunities to participate in addressing the current issues and future needs of the society. Initiatives of such nature would result in the overall growth of these areas as well as prepare a long-term work force that can be gainfully utilized for boosting the telecom equipment manufacturing sector.

2.25 Department of Telecommunication, on 28.06.2013, constituted two Advisory groups on Skill development for telecom sector. These Advisory groups recommended for skill gap study in coordination with NSDC¹⁵ with a view to identify the skill-gaps in the telecom sector and suggest measures to bridge these gaps. It also recommended for developing a comprehensive skill development for the telecom sector. Skill gap study was undertaken under the aegis of NSDC in the year 2014. Need for development of skilled workforce for the telecom sector and the suggested path for the same was further emphasized in the minutes of the meeting of Apex Body committee on skill development in telecom sector, on

¹⁵

http://www.dot.gov.in/sites/default/files/6%20Recommendations%20of%20Advisory%20Groups_1.pdf

07.09.2016¹⁶. Department of Telecommunication released its Skill Plan¹⁷ on 27.10.2016. The plan brought that, by 2021-22, there would be a requirement of approximately 13,80,000 skilled workforce for telecom equipment manufacturing sector alone.

2.26 In view of the above, the Authority recommends that for ensuring the adequate supply of telecommunication technology professionals to the telecommunication equipment manufacturing sector, the Universities/ technical institutes offering specialization in telecommunication technologies and system design should be setup/ identified near the Telecom Products Development clusters. Also, Telecommunication Technology and Systems Design Labs should be setup in these Universities/ technical institutes in collaboration with Telecom Equipment Manufacturers and Telecom Service Providers. Further, the skill development resources of the public centre entities already identified by DoT should be fully utilised as per skill plan already in place.

2.27 **In view of the foregoing, the Authority recommends :**

(a) For ensuring the adequate supply of telecommunication technology professionals to the telecommunication equipment manufacturing sector, the Universities/ technical institutes offering specialization in telecommunication technologies and system design should be setup/ identified near the Telecom Products Development clusters.

(b) Telecommunication Technology and Systems Design Labs should be setup in these Universities/ technical institutes in

¹⁶ http://www.dot.gov.in/sites/default/files/2016_09_14%20MoM-Skill.pdf

¹⁷ http://www.dot.gov.in/sites/default/files/2016_10_27%20SDP-Skill_0.pdf

**collaboration with Telecom Equipment Manufacturers and
Telecom Service Providers.**

D. Research, Innovation, and Development:

- 2.28 Research, Innovation, and Development are the pillars for growth of the indigenous telecom equipment design and manufacturing sector. Most of the respondents are of the opinion that investment in R&D in India is abysmally less when compared with the global market leaders of the telecom manufacturing sector. As per the respondents representing MNCs, close to 6-13% of total turnover is spent on R&D by global players as against 0.00008% by Indian handset manufacturers and mere 1.8% by telecom equipment manufacturers.
- 2.29 Few respondents submitted that India has a large pool of talented youth and entrepreneurs who can be force-multipliers of India's growth in future. They are of the opinion that the processes and permissions required for running pilot projects, developed by our citizens, should be simplified and made more enabling. As per them, the Government should undertake measures for encouraging collaboration with the foreign MNCs also for development of pilot projects in the country; such initiatives would have long terms benefits in terms of transfer of technology as well as creation of avenues for higher research.
- 2.30 One of the stakeholder is of the view that to promote innovation, design and development; the Government should incentivize setting up of incubation centers and create an ecosystem that would act as a breeding ground for technologies and products of the future. He also submitted that these incubation centers would facilitate in commercialization of the proto-types developed in these incubators.

2.31 Manufacturing of telecommunication equipments requires compliance of standards to ensure interoperability and seamless interface with other telecom equipments in the network.

2.32 For greater impetus to research and development in the country, there is a need to encourage the presence and participation of Indian entities including academia, manufacturers, and service providers in deliberations at international organizations like IEEE, 3GPP, One M2M, ITU, and ETSI etc. This would not only encourage R&D within the country but also foster inclusion of indigenous developed technologies into the international standards. To incentivize such participations, the Government should announce a scheme to reward the persons or entities whose innovations become part of the international standards.

2.33 As per Allocation of Business Rules, as amended from time to time, Department of Telecommunications (DoT), Ministry of Communications, is the nodal Department responsible for formulating Policy Frameworks aimed at accelerating growth of the telecommunication in the country. The main functions of DoT relating to policy formulation and development of telecommunication are listed below:

- (a) Policy, Licensing and Coordination matters relating to telegraphs, telephones, wireless, data, facsimile and telematic services and other like forms of communications;
- (b) Promotion of standardization, research and development in telecommunications;
- (c) Promotion of private investment in Telecommunications;

(d) Financial assistance for the furtherance of research and study in telecommunications technology and for building up adequately trained manpower for telecom programme, including:-

(i) Assistance to institutions, assistance to scientific institutions and to universities for advanced scientific study and research; and

(ii) Grant of scholarships to students in educational institutions and other forms of financial aid to individuals including those going abroad for studies in the field of telecommunications.

2.34 Lack of ecosystem and complex processes can be an impediment in innovation, design and development of homegrown telecom technologies and products. Government should therefore institute measures to ensure that such impediments are removed to foster the environment of innovation, research and development in the country. The Authority therefore recommends that processes and permissions required for running pilot projects should be simplified and made more enabling. Government should also undertake measures for collaboration with the foreign MNCs for development of pilot projects for long terms benefits in terms of transfer of technology as well as creation of avenues for higher research. Further, the Government should incentivize setting-up of incubation centers and create an ecosystem that would act as a breeding ground for technologies and products of the future.

2.35 **In view of the foregoing, the Authority recommends :**

(a) Participation of indigenous research institutions, telecom service providers, and telecom equipment manufacturing companies in deliberations at international organizations like

IEEE, 3GPP, One M2M, ITU, and ETSI etc. should be encouraged. This would provide a platform for learning and innovation, and it would help in increasing India's contributions in standards development. To encourage such participation, the Government should announce a scheme to reward the persons or entities whose innovations become part of the international standards.

(b) Permissions for trials of new technologies/ products and running pilot projects should be simplified. It should be encouraged for multinational companies also as it would lead to knowledge transfer.

(c) For promoting new age tech start-ups in telecom equipment design and manufacturing sector, Government should incentivize setting-up of incubation centers.

E. Patent Framework and Resolution of Disputes

2.36 In response to the issues related to the sufficiency of the existing patent laws and distribution of royalties on FRAND basis, responses received from the Associations, MNCs and the Local telecom equipment manufacturers are quiet divergent. While the international organizations and the MNCs submitted that the provision in IPR related legislations are adequate and do not require any change; the local telecom equipment manufacturers are of the view that the provision in IPR related legislations are inadequate and require to be strengthened.

2.37 Most of the local telecom equipment manufacturers submitted that the existing patent laws have worked against the local manufacturing companies in Telecom/Mobile Handset industry. As per them, once a local TEM achieves success/ sufficient market share he is either forced to pay royalties as per the demand of the patent holders or drawn into

legal suits by the patent holders not known to the manufacturer earlier. Such incidents create market uncertainty and discourage entrepreneurs from getting into the manufacturing industry.

- 2.38 Some local telecom equipment manufacturers stated that there is no Authority in India or abroad to state the number of patents in any telecom/mobile handset products and quantum of royalty applicable for them. As a result, the royalties payable are not known at the start of project.
- 2.39 One stakeholder submitted that globally there are large numbers of legal cases being defended on IPR related issues; therefore, there is a need to actively monitor such developments and share the same with the stakeholders for the benefit of the manufacturing industry.
- 2.40 The foreign associations and Companies have advocated that the best way for resolving IPR-FRAND licensing issues is through mutual negotiations, ADR (Alternate Dispute Resolution) mechanisms, and lastly courts. No where have they recommended any Governmental initiatives/involvement in resolving these issues. Whereas associations of indigenous telecom equipment manufacturers have strongly advocated for the Government involvement right from specifying the various standards to be adopted for qualifying licenses, to information on SEPs, Patents, Royalties involved, to defending their cases, to monitoring the developments on the international levels.
- 2.41 Few stakeholders are of the opinion that sector-specific approach to addressing FRAND disputes may not be advisable and India should not create a special mechanism for FRAND disputes resolution. Further, they submitted that overemphasis on controlling and regulating SEP licensing will bring down the collaborative standard setting ecosystem as it may

push the sector towards established entities propelling their proprietary standards in a market with no competition.

2.42 DIPP (Department of Industrial Policy and Promotion) is responsible for overseeing issues and law related to IPR in India. DIPP had issued a consultation paper¹⁸ on ‘Standard Essential Patents and their availability on FRAND Terms’ on 01 March 2016 to seek comments from the stakeholders and make its recommendations to the Government. The consultation paper was primarily focused to address issues related to telecom manufacturing sector. DIPP is yet to publish its policy guidelines post the consultation process. Since the issues related to SEP, their licensing, and payment of royalty are already under active consideration of the DIPP, the Authority at this juncture recommends that the ibid policy guidelines be published at the earliest.

2.43 From the responses received from the various stakeholders on the resolution of disputes related to royalty distribution, it has been observed that International Associations and Companies have advocated that the best way for resolving disputes relating to licensing of IPR on FRAND terms and conditions is through mutual negotiations, ADR (Alternate Dispute Resolution) mechanisms, and lastly the courts. In this regard, it is pertinent to refer Chapter 9¹⁹ of the Economic Survey 2017-18 of India, which has covered the issues related to pendency of court cases relating to businesses in India. As per the Survey, the average pendency of business related cases in Economic tribunals is 3.8 years and in High Courts it is nearly 4.3 years. Higher pendency may be attributable to the factors identified in the Economic Survey, but the overall impact of

¹⁸ http://dipp.nic.in/sites/default/files/standardEssentialPaper_01March2016_0.pdf

¹⁹ http://mofapp.nic.in:8080/economicsurvey/pdf/131-144_Chapter_09_ENGLISH_Vol%2001_2017-18.pdf

delays is higher costs of doing business and multiple litigations. To ease out the burden on the Courts and Tribunals the system of ADR should be adopted as it would help in promoting the ease of doing business in the country.

- 2.44 One of the most prominent issues faced by the telecom equipment manufacturing sector is the lack of availability of information relating to applicable patents, SEPs forming part of the standards, patent holders, and the approximate royalty payment required for licensing of such patents, at a central place. This issue has been highlighted by many stakeholders. To redress information asymmetry relating to applicable patents and facilitate dissemination of other essential information for growth of the indigenous telecom equipment design and manufacturing sector, the government should create a centralized portal for promoting indigenous TEM. It should have facility for self declaration, by the patent holders, of the Standard Essential Patents (SEPs) forming part of the standards, the compliance of whose is necessary for interoperability and certification of a particular telecom product. The details of such necessary standards for a particular telecom product are specified in the Essential Requirements (ERs) notified by TEC. The responsibility of maintaining TEM portal should be of TEC, as it is the authority on telecom standards, testing and certification, in the country.
- 2.45 Another important issue relating to information gap is availability of the details of various entities active in the space of indigenous telecom equipment design and manufacturing. This could be addressed to large extent by registering the details of such entities on TEM portal. Accordingly, TEM portal should also have the facility for listing of registered telecom product design, manufacturing, marketing, and System Integration (SI) companies along with their products so that information about the all entities in the ecosystem become available at

central place. This would facilitate in unbundling of the challenges and attain economies of scale for individual categories.

2.46 Another issue is, many times, our researchers/ innovators are either not aware of the patent registration framework or they find the process of filing of patents to be lengthy and confusing resulting in filing of very few home grown patents²⁰. In order to address such limitations, the Government has established the Rajiv Gandhi National Institute of Intellectual Property Management, as a National center of excellence, for training, management, research, education in the field of Intellectual Property (IP) Rights. The main objectives of this institute is to cater to the need of training of Examiners of Patents, Designs, Trademarks and Geographical Indications, IP professionals, IP managers, imparting basic education to user communities, government functionaries, and stake holders involved in creation, commercialization and management of intellectual property rights, facilitate research on IP related issues including preparation of study reports and policy analysis of relevance to Government. Further, the details relating to patent registration and protection policies are available on Controller General of Patents, Designs, and Trademarks website <http://www.ipindia.nic.in>. To further address this particular knowledge gap, the patent information cells could be created in leading Universities/ technical institutions to be identified for promoting research, innovation, and development of telecom technology and systems designs. The officials manning these cells should be trained in the above referred National Institute of IP management.

²⁰ <https://timesofindia.indiatimes.com/business/india-business/us-firm-filed-100-more-patents-in-india-than-all-top-labs-together/articleshow/65110947.cms>

2.47 In view of the foregoing, the Authority recommends:

- (a) DIPP has already initiated the consultation with stakeholders for development of policy framework for the rights and obligations of SEP holders, and for licensing of patents on FRAND terms and conditions. This consultation process is especially focused on telecom sector. For promoting the indigenous telecom equipment manufacturing in the country, these policy guidelines should be finalized at the earliest.**
- (b) Patent's licensing dispute resolution is quite time consuming and costly process in the country. It discourages entry of SMEs and technology startups in this sector. Alternate Dispute Resolution Framework for time bound resolution of patent licensing disputes should also be institutionalized in the country.**
- (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 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.**
- (d) To expand understanding about patent filing policies and 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 systems designs.**

F. Standardization, Testing, and Certifications

- 2.48 Large number of stakeholders from the Multi-National telecom manufacturing companies and International organizations are of the opinion that the existing mechanism of Standardization, Certification and Testing of Telecom Equipment being followed in India is adequate and there should be no changes in this framework. They submitted that harmonization between International and Local standards, and testing and certification mechanisms are essential. Further, imposing unique indigenous standards and local testing requirements could adversely affect India's digital ecosystem. They also submitted that adoption of self-certification mechanism by the manufacturing company would be preferable.
- 2.49 The local telecom equipment manufacturers however submitted that India should have its own standards, testing, and certification systems that are best suited to the Indian needs. They stated that the current Testing and Certification system lacks clarity, it is inadequate, cumbersome and slow hence the need of the hour is to re-examine the entire system. They are of the opinion that lack of mandate to comply with the national standards (TEC ERs) is a major drawback of the existing certification and testing system. They have also submitted that on many occasions, public agencies quote specific qualitative requirements (QRs) in the tender documents, which may neither be essential for the functionality nor available in the indigenously designed and manufactured telecom products. Such practices are detrimental for the growth of local telecom equipment manufacturing sector.
- 2.50 Some respondents are of the view that the telecommunication is a critical information infrastructure hence it is important to ensure its safety and security. Telecom equipments may have embedded malware/spyware

which could be detrimental to the national security, hence these respondents suggested that testing and certification of telecom equipments should be carried out by a government body, preferably the TEC.

- 2.51 Few stakeholders suggested that Government should incentivize setting up testing laboratories and infrastructure in the country which match international standards and practices. Further, they stated that mandatory testing and certification of the telecom equipment in the country should be started at the earliest.
- 2.52 Some respondents stated that there is a need for creating a robust testing and certification infrastructure in the country. They suggested that laboratories required for testing and certification can be set up by the private entities; however, setting of these labs should be incentivized by the Government. Also, these labs should be accredited with the TEC.
- 2.53 National Critical Information Infrastructure Centre (NCIIP) has identified Telecommunications as a Critical Information Infrastructure under Section 70 of the IT Act, 2000 as breakdown of telecommunication services would adversely affect the country. Safety and security of the telecom infrastructure and equipments is therefore of paramount importance. As per the data breach investigation report²¹, several incidents of data breach due to embedded malicious hardware and software have been reported in the recent past.
- 2.54 DoT, vide its notification²² dated 05 September 2017 had notified that *“Any telegraph which is used or capable of being used with any telegraph established, maintained or worked under the license granted by the*

²¹ https://www.verizonenterprise.com/resources/reports/2017_dbir_en_xg.pdf

²² <http://tec.gov.in/pdf/Whatsnew/eGazetteNotif.pdf>

Central Government in accordance with the provisions of section 4 of the Indian Telegraph Act, 1885, shall have to undergo prior mandatory testing and certification in respect of parameters as determined by the telegraph authority from time to time” with permissible exceptions under the law. Testing and Certification of the imported telecom may be carried out by TEC or any other government accredited lab as per the procedure mentioned in the TEC document²³. To address the security concerns emanating from the telecom equipments, stringent pre-market testing and security certification as per the TEC guidelines should be carried out. Mandatory testing and certification of the telecom equipments in the country should be started at the earliest.

2.55 As per the Procedure for Mandatory Testing & Certification of Telecommunication Equipment²⁴, “The scope of certification would cover all types of telecom equipment to be sold in India or to be connected to Indian telecom network after the date of effect of this procedure”. Since India is the second largest telecom market in the world, the volume of telecom equipments is also large. Testing and certification of these telecom equipments would require large number of testing labs. Setting up of such large number of testing labs would require huge resources in terms of land, capital, equipment and manpower. To expedite setting up of testing lab infrastructure facilities in the country, the Government should encourage setting up of such facilities by private entities. These facilities should be accredited with the TEC.

2.56 Since telecom networks operate globally by interconnecting with other networks in the world, any initiative of developing country specific protocols, standards and certification mechanisms is likely to impede the

²³ <http://tec.gov.in/pdf/Whatsnew/Final%20MTCTE%202017%20Procedure.pdf>

²⁴ Ibid

growth of telecom sector in India. The testing and certification mechanism should therefore be harmonized with the globally accepted standards. The Government should institute mechanisms of mutual recognition of Indian testing and certification labs with the international testing and certification labs. Also, TEC should harmonize testing and certification with global standards and test procedures.

2.57 TEC is the nodal agency to notify the Indian standards for the telecom manufacturing sector. Further, to organize the existing entities involved in the testing and certification of telecom equipments, TEC should be made responsible for the regulation and accreditation of telecom product testing and certification agencies in the country.

2.58 **In view of the foregoing, the Authority recommends:**

- (a) **TEC should be made responsible for regulation and accreditation of telecom products testing and certification agencies in the country.**
- (b) **Mandatory testing and certification of the telecom equipments in the country should be started at the earliest.**
- (c) **To expedite setting up of testing and infrastructure facilities in the country, the Government should incentivize setting up of such facilities by private entities. These facilities should be accredited by the TEC.**
- (d) **The Government should institute mechanisms of mutual recognition of Indian testing and certification labs with the international testing and certification labs. Also, TEC should harmonize local testing and certification procedures with global standards and test procedures.**

G. Manufacturing and Productivity

2.59 Promoting manufacturing and enhancing the productivity of the existing telecom equipment manufacturing entities is one of the most important motivations for the consultation paper. The reasons for poor performance of the telecom equipment manufacturing sector, as cited by the respondents, are covered in part A of this chapter.

2.60 One of the stakeholders representing the local telecom equipment manufacturers suggested categorizing domestic equipment manufacturing under three segments based on real value addition with IPR creation. He suggested that suitable incentives should be granted to build the domestic eco system and restrict the import of the products. The classifications of telecom equipments suggested by him are as follows:

- (a) Import of product / Trading: These are those products that are manufactured by a foreign entity and whose Brand ownership, Hardware and Software Technology, Value addition are executed in any country other than India.
- (b) Assembly: These are those products whose technology (Hardware, Software) ownership is held outside India and there is a very low level assembly value addition carried out in India
- (c) Domestically manufactured Products: These are essentially those products/equipments whose technology ownership (Hardware and Software) is held in India. Companies manufacturing these products should have their R & D registered in India for at least 3 years with Department of Scientific and Industrial Research for the product which is being claimed to be designed in India. The product/equipment should comply with the value addition norms prescribed under the PMA. The product/equipment should fully

comply with respective TEC GRs. Lastly, Commercial benefits of IPR should be accrued in India

2.61 He further suggested imposing different Basic Customs Duty (BCD) on import of inputs for each of these segments for e.g. 35% for import of products / Trading (including that of foreign technology/ system software through Indian entity in garb of domestic IPR), 25% for Assembling and no duty in case the product is manufactured locally with value addition above a threshold. He also submitted that the local telecom equipment manufacturers who manufacture products specific to Indian conditions should be incentivized.

2.62 As submitted by the stakeholders, classification of telecom equipments into various categories is essential for imparting requisite impetus and targeted incentivisation. The telecommunication equipments/products marketed in the country can be classified into following categories:

(a) Fully finished imported products: This category of products are manufactured by foreign registered companies using hardware designs and software technologies developed outside India and have high level of value addition outside India.

(b) Indigenous products: This category of products are designed and/or manufactured in India by the companies registered in India. Since the ambit of such products would be large, there would be a need to create more granularities in this classification as mentioned below:

(i) Made in India Products – Using designs of foreign registered companies, this category of products are manufactured in India by companies registered in India. Such products have imported sub-systems, which use HW and SW technology

developed outside India and have very low level of value addition in India.

(ii) Designed in India Products: Products designed by India registered companies but manufactured outside India.

(iii) Designed and Made in India Products – Products designed and manufactured by the India registered companies in India.

2.63 India is a signatory of ITA-1²⁵ hence 217 ICT items along with all their parts/subparts used in the manufacture of these items have been allowed to be imported at zero percent duty. The description of these 217 ICT items under ITA-1 is very generic/broad based. As per the data available on Exim-Analytics²⁶ tool of Directorate General of Commerce Intelligence and Statistics, India has been permitting import of several high value telecom equipments under the HS (Harmonized System) code 8517 irrespective of their inclusion under ITA-1 since the description of items under ITA-1 is broad based. The category "Others" included in the list of items under ITA-1 is ambiguous and could be exploited by the foreign manufacturers to import their items in India with applicable exemptions under ITA-1; this incidentally may have worked to the disadvantage of the local telecom equipment manufacturers as stated by them. In the past two decades, due to paradigm shift in technologies as well as convergence of multiple technologies, the product design and portfolio has undergone complete change; hence list of items included in ITA-1 may have become irrelevant in the present.

2.64 In order to address the issues concerning the imports of telecom products at zero percent duty rates under the ITA provisions, an experts

²⁵ http://meity.gov.in/writereaddata/files/Information_Technology_Agreement_1996.pdf

²⁶ [http://www.dgcisanalytics.in/dgcis/EXIM-Analytics#/home?_g=\(\)](http://www.dgcisanalytics.in/dgcis/EXIM-Analytics#/home?_g=())

group comprising of the telecom, trade, taxation, and legal professionals could be constituted to identify the telecom products, which are not covered under the provisions of ITA-1. For immediate push to development of indigenous telecom equipment manufacturing industry, this group can suggest suitable level of tariffs on import of such telecom products which are not covered under ITA. Simultaneously the design and manufacturing of such non-ITA telecom products in the country should be incentivized. Once the eco-system for design and manufacturing of such non-ITA telecom equipments in the country matures, manufacturing of the telecom products covered under the provisions of ITA should also be encouraged.

2.65 In order to have coordinated push for growth of indigenous telecom equipment manufacturing sector, keeping in view the demand of various types of telecom products and capabilities developed locally, TEMC should identify key technologies and products where in the local telecom equipment manufacturing sector can concentrate and develop world class expertise and products. This would enable the Indian telecom equipment manufacturers to not only fulfill the local demand but develop export market also. It would also help in achieving economies of scale at the earliest.

2.66 The Electronic Manufacturing Cluster (EMC) Scheme²⁷ is notified by the Government on 22.10.2012, while the Guidelines²⁸ for operationalisation of EMC Scheme were issued on 15.04.2013. The EMC Scheme is aimed at promoting the electronic products manufacturing in the country. As brought out earlier, the telecom equipment manufacturing is a specialized field within EMC and needs to be focused specifically. The

²⁷ <http://meity.gov.in/writereaddata/files/Notification-EMC-Gazette.pdf>

²⁸ http://meity.gov.in/writereaddata/files/EMC-Guidelines_Final.pdf

telecom industry being one of the most dynamic and technology intensive, manufacturing of telecom products requires professionals of telecom domain also. As such, for design and manufacturing of telecom equipments knowledge of ESDM as well as telecom technology is essential. In view of the foregoing and as suggested by one of the stake holder also, 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.

- 2.67 Some local telecom equipment manufacturers submitted that large private and government System Integrators such as TCIL, L&T, ECIL etc should be incentivized through tax breaks or other benefits to purchase and offer Indian telecom products in their international telecom projects.
- 2.68 Indian PSUs have undertaken several high value projects for establishing telecom networks in the friendly foreign countries. Deploying indigenous telecom products by these agencies in their projects would not only help in projecting the Indian technical prowess but would also facilitate in promoting the local telecom equipment manufacturing sector. It is therefore recommended that to promote deployment of indigenous products in the telecom networks, capabilities of local System Integrators like TCIL, ITI and other private entities should be harnessed by extending suitable incentives.
- 2.69 Availability of capital, soft-loans, contract financing, and credit default insurance are important for promoting the productivity of existing units and promoting the manufacturing in the telecom equipment sector. Countries like China have state owned organizations like Sinosure²⁹ which looks after the capital and insurance requirements of Chinese

²⁹ <http://www.sinosure.com.cn/en/Sinosure/Profile/index.shtml>

manufacturers in various sectors. India also has in place ECGC Ltd., a Government of India enterprise, with similar objectives but probably the extent of support it extends to the telecom equipment manufacturers may not be the same as Chinese companies get in their country. In order to address the concerns relating to non-availability of financing options for promoting the sales of the indigenous telecom products, as suggested by some of the stakeholders, 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:

- (a) Venture capital in the form of equity and soft loans;
- (b) Project finance;
- (c) Contract financing options;
- (d) Credit default insurance.

2.70 In view of the foregoing, the Authority recommends:

(a) All telecom products meant for use in the telecommunication network or by consumer and marketed in the country should be classified in following categories:

i) Fully finished imported products: This category of products are manufactured by foreign registered companies using hardware designs and software technologies developed outside India and have high level of value addition outside India.

ii) Indigenous products: This category of products are designed and/or manufactured in India by the companies registered in India. Since the ambit of such products would be large, there would be a need to create more granularities in this classification as mentioned below:

- (aa) **Made in India Products** – Using designs of foreign registered companies, this category of products are manufactured in India by companies registered in India. Such products have imported sub-systems, which use HW and SW technology developed outside India and have very low level of value addition in India.
 - (ab) **Designed in India Products**: Products designed by India registered companies but manufactured outside India.
 - (ac) **Designed and Made in India Products** – Products designed and manufactured by the India registered companies in India.
- (b) In order to address the issues concerning the imports of telecom products at zero percent duty rates under the ITA provisions, an experts group comprising of the telecom, trade, taxation, and legal professionals should be constituted to identify the telecom products, which are not covered under the provisions of ITA-1.
- (c) For immediate push to development of indigenous telecom equipment manufacturing industry, the experts group should also suggest suitable level of tariffs on import of such telecom products which are not covered under ITA.
- (d) Indigenous design and manufacturing of telecom products not included in ITA-1 should be incentivized. Once the eco-system for design and manufacturing of such telecom equipments in the country matures, manufacturing of the telecom products covered under the provisions of ITA-1 should also be encouraged.

- (e) **TEMC should identify key technologies and products where in the local telecom equipment manufacturing sector can concentrate and develop world class expertise and products.**
- (f) **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.**
- (g) **To promote deployment of indigenous products in the telecom networks, capabilities of local System Integrators like TCIL, ITI and other private entities should be harnessed by extending suitable incentives.**
- (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.**

H. Fiscal incentives

2.71 In response to the question related to the effectiveness of fiscal incentives; stakeholders representing MNCs, International Business Organizations have stated that a special incentive should be provided to producers of indigenously manufactured products with total annual turnover of less than Rs.1000 Crore, by deferring the payment of GST by them for a period of 5 years at a nominal rate of interest. They further submitted that deduction of R&D expenditure while computing taxes

may be allowed for companies where gross contribution on account of local IPR/value addition is greater than 40%.

- 2.72 One stakeholder submitted that a 10-year tax holiday, on the lines of software industry, for producers of domestic manufactures telecom products whose total annual turnover is less than Rs. 1000 Crore should be granted.
- 2.73 Some of the local telecom equipment manufacturers are of the opinion that there is a need to address the issue of inverted duty structure, since duty on the final product is zero, duties on inputs used should also be brought down to zero. They further submitted that prior to 2015; all DSIR (Department of Science and Industrial Research) certified R&D organizations were given a 200% weighted R&D deduction for tax purposes. This incentive has been reduced to 150%. It should be restored to 200% weighted R&D deduction for the next 5 years.
- 2.74 One of the respondents from a local telecom equipment manufacturing company submitted that the present capping of 50% of the cost of project on R&D (Including manpower) should be enhanced to 75% of the project cost under the MSIP (Modified Special Incentive Package) policy.
- 2.75 Some of the respondents representing local telecom equipment manufacturers submitted that Government should give export incentive @5% through Government schemes to compete in the global market.
- 2.76 Presently, the Government has extended several fiscal incentives to promote the local telecom equipment manufacturing industry. The present tariff structure applicable to electronics manufacturing industry is as follows:

(a) Peak rate of Basic Customs Duty (BCD) is 10%.

(b) GST applicable on mobile handsets is 12% while for other electronic items it is 18%.

(c) BCD of 0% is applicable on the 217 items listed under ITA-1.

(d) BCD has been increased from 10% to 15% on Mobile Handsets, IP Camera, Network Video Recorder (NVR) and from 10% to 20% on Set Top Boxes for Televisions, Color Televisions and Light LED Lamps. Vide Notification No.91/2017-Customs and Notification No.92/2017-Customs both dated 14.12.2017.

(e) BCD on raw materials required for manufacturing of Optical Fiber cable(OFC) has also been removed vide notification No 6/2017-Customs, dated 2nd February, 2017.

It can be seen from the above that Government has been taking steps to promote local equipment manufacturing by simplifying the taxation structure and announcing fiscal incentives from time to time.

2.77 Issues related to taxation, deferring of payment of GST, and modifications of provisions under various schemes would have wider ramifications on Government's revenue and require further due diligence. The nature and level of fiscal incentives would also depend upon the type of structure for promoting indigenous telecom equipment design and manufacturing finally being put-in-place by the Government. Accordingly, on acceptance of these recommendations by the Government, the Authority would revisit the issues relating to exact nature and level of fiscal incentives required.

I. Market Access

2.78 For providing preference to indigenously manufactured electronic products as a part of procurement process for the electronic products that have security implications for the country, and are to be utilized in

Government own use while ensuring that no commercial resale is involved, PMA policy was introduced by the DeitY, Government of India on 10.02.2012. In furtherance of the PMA Policy cited above, on 5.10.2012, the Department of Telecommunications laid down the policy for providing preference to indigenously manufactured telecom products in the Government procurement for its own use and not with a view to commercial resale or with a view to use in the production of goods for commercial sale. DeitY revised its PMA policy on 23.12.2013. Revised PMA policy of DeitY has the provisions for issuing detailed guidelines for operationalising the policy and governance mechanism to oversee the implementation of the policy. DeitY issued the detailed guidelines³⁰ for providing preference to domestically manufactured electronic products in government procurement on 16.11.2015. In pursuance of the PMA policy issued by DoT on 5.10.2012 and the guidelines dated 16.11.2015 issued by DeitY, value addition criterion for preference to domestically manufactured telecom products in Government procurement has been notified by DoT on 11.01.2017. As the PMA policy has been in vogue for the past six years, the Authority with a view to examine the effectiveness of this policy raised the issue in the consultation paper to seek response from the various stakeholders.

2.79 In response to the effectiveness and need for the PMA policy, stakeholders representing International Associations and MNCs are of the view that PMA is not recommended as forced localization policies will limit the flexibility of the Government agencies in procurements. They are of the opinion that PMA distorts the economy and reduces economic competitiveness resulting in lower economic growth, reduced innovation, and stunts job creation. They suggested that the PMA policy should include substantial transformation rules for value addition as per global

³⁰ http://meity.gov.in/writereaddata/files/R_G_U_16_11_2015.pdf

norms and provide deemed domestic manufacturing credits to qualify for PMA in lieu of exports. Also, OEMs should be granted a deemed domestic manufacturing credit for 100% of their manufacturing volume – independent of product, export/ domestic consumption. OEMs (Original Equipment Manufacturers) should be able to use this credit to supply imported portfolio products against PMA contracts.

- 2.80 Large number of stakeholders from domestic equipment manufacturers, Associations representing the local manufacturers submitted that the PMA policy needs to be more objective and auditable and it should be enforced across Central, State institutions and Government Licensees. Further, they are of the opinion that assembled products should not qualify under PMA. The local telecom manufacturers submitted that self certification of PMA compliance by industry should be abolished and Verification of the Local Value Addition by third parties be considered. They also suggested that the PMA policy should be periodically reviewed so that the existing system of self certification for value addition in not misused by the suppliers/vendors.
- 2.81 One of the respondents submitted that the procuring agencies on many occasions may not be aware of the domestic manufactured telecom equipments; hence there is a need to create a portal under the aegis of TEC where details of domestic telecom design and manufacturing industries can be view by the procuring agencies at the time of procurement/framing of tenders.
- 2.82 One telecom service provider stated that TSPs should not be brought under the ambit of PMA as it would restrict deployment of state of art telecom equipment, which in turn would adversely impact the quality of services of the end users.

2.83 The local telecom equipment manufacturers have raised their concerns about the security of the telecom infrastructure in their submission. They submitted that telecom equipments are highly sophisticated systems and any post-facto security testing/screening/audit may not be effective. They stated that telecom equipments received ex-import may be implanted with spyware/malware in hardware and/or software, which is impossible to detect; such practices result in interception of sensitive information on networks or cause catastrophic damage to critical equipment. Hence, most of the developed countries permit only domestic or trusted suppliers in their security sensitive networks. Further, most of the telecom products listed under PMA form critical equipments of national telecom infrastructure. Also, most of these products have also been broadly identified as telecom products with security risks in independent studies such as the U.S-China Security and Economic Review Commission report on the telecom sector published in January 2011³¹. Telecom networks globally, irrespective of whether they are owned by the private sector or government entities, intersect and communicate with each other. This is the reason why countries like U.S have been persuading large private telecommunication companies to stop using products from certain countries perceived to be threats to national security³². Therefore, the domestic telecom equipment manufacturers have proposed extension of PMA to both public sector companies and government licensees.

³¹https://www.uscc.gov/sites/default/files/Research/FINALREPORT_TheNationalSecurityImplicationsofInvestmentsandProductsfromThePRCintheTelecommunicationsSector.pdf

³² [https://intelligence.house.gov/sites/intelligence.house.gov/files/documents/huawei-zte%20investigative%20report%20\(final\).pdf](https://intelligence.house.gov/sites/intelligence.house.gov/files/documents/huawei-zte%20investigative%20report%20(final).pdf)

2.84 Local Telecom Manufacturers have submitted that the PMA policy is applicable to only the central Government and the PSUs which results in lower demands in terms of volumes. A large portion of telecom equipments is deployed by the telecom service providers who are not covered under the PMA. Due to lower demands, the local telecom equipment manufacturers find it difficult to reach economies of scale thereby resulting in lower revenues. Since the revenues are low, they are unable to establish repair and maintenance network that can support the telecom equipment during its life cycle. They therefore submitted that PMA should be extended to private telecom operator through a change in license conditions. They suggested that TSPs may be incentivized for using locally manufactured telecom equipments as follows:

- (a) Private TSPs who spend 50% or more of their telecom equipment capex on domestic products can be incentivized by providing up to 20% rebate on their annual license fee.
- (b) Private TSPs who procure less than 50% of their telecom equipment capex from domestic product companies (where such a product is available) may compensate by paying an additional 10% as telecom R&D cess to Government of India, which can then be used to stimulate the domestic telecom product ecosystem in the country.

2.85 The detailed guidelines³³, issued on 16.11.2015, on providing preference to domestically manufactured electronic products in government procurement are intended for promoting the Domestically Manufactured Electronic Products (DMEP) by undertaking procurement for central ministries, centrally funded projects etc from the manufacturing companies registered in India and engaged in manufacturing in India

³³ http://meity.gov.in/writereaddata/files/R_G_U_16_11_2015.pdf

including Contract Manufacturers. Twenty Four telecom and network products are listed in these guidelines for preferential market access. Besides giving preferential market access to the listed items, other aims of these guidelines included reduction in Imports, employment generation, infrastructure creation, creating a sustainable ecosystem for manufacturing in the country and becoming an export hub in future.

- 2.86 As per some of the stakeholders, on many occasions the specification requirements are framed in such a manner to that only international products qualify in the tenders thereby putting the local manufacturers at a disadvantage. To address such issues, for procurement of telecom products, it could be suggested to various Departments of the Government that while drafting the tenders they may align the specification requirements with TEC GRs. Further, a Nodal Officer should be appointed in DoT/TEC to look into the cases related to lack of implementation of PMA policy.
- 2.87 Targets for Value addition (25% in 1st year to 45% in the 5th year of the Bill of Material (BoM)) are notified under the PMA guidelines³⁴. The formula for calculation of Value Addition (VA) has been stated in the policy document. The responsibility for calculation of VA has been entrusted to each assessing agency before procuring the DMEP (Domestically Manufactured Electronic Product), this may result in variation in the VA values. Assembling of imported components does not entail domestic manufacturing or any substantial VA. It is possible that many equipment providers who merely carryout assembling of sub-parts may be exploiting the self certification norms listed in section 7 of the PMA policy to exhibit and satisfy VA norms. Such practices could be detrimental to the growth of telecom manufacturing industry in the

³⁴ http://meity.gov.in/writereaddata/files/R_G_U_16_11_2015.pdf

country. Concerns raised by local telecom equipment manufacturers in regard to value addition norms and certification mechanism merit consideration. Therefore, 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..

2.88 National Critical Information Infrastructure Centre (NCIIP) has identified Telecommunications as a Critical Information Infrastructure under Section 70 of the IT Act, 2000 as breakdown of telecommunication services would adversely affect the country. Safety and security of the telecom infrastructure and equipments is therefore of paramount importance. As per the Data Breach Investigations Report³⁵, several incidents of data breach due to embedded malicious hardware and software have been reported in the recent past. To address the security concerns emanating from the telecom equipments bought ex-imports, stringent pre-market testing and security certification as per the TEC guidelines should be carried out. Since the public telecommunication services are delivered by public sector as well as private sector TSPs, the PMA policy should be made applicable for all public telecom networks to address the national security concerns. Further, the PMA policy issued by DoT in the year 2012 requires immediate review as the needs for items specified under the policy may have got changed over the years; and the norms for value addition within the country, specified under the PMA policy need to be matched with the actual capabilities available in the indigenous market.

³⁵ https://www.verizonenterprise.com/resources/reports/2017_dbir_en_xg.pdf

2.89 As per the **condition 23.1** of the **Unified Licence**³⁶, “For providing the Service the Licensee shall utilize any type of equipment and product that meet TEC standards, wherever made mandatory by the Licensor from time to time. In the absence of mandatory TEC standard, the Licensee may utilize only those equipment and products which meet the relevant standards set by International standardization bodies, such as, ITU, ETSI, IEEE, ISO, IEC etc.,; or set by International Fora, such as 3GPP, 3GPP-2, IETF, MEF, WiMAX, Wi-Fi, IPTV, IPv6, etc. as recognized by TEC and subject to modifications/adaptation, if any, as may be prescribed by TEC from time to time”. Similar provisions also exist for the Customer Premises Equipment (CPE) under **condition 31** of the Unified License. It can be inferred from these conditions that presently it is not mandatory for the service providers to procure telecommunication equipments from the local telecom equipment manufacturers. India is the second largest telecom market in the world³⁷ and has the third largest number of Internet users, therefore India does has a vast domestic market that can be served by indigenous telecom products. As per the IBEF report³⁸, there are over 62,443 uncovered villages in India; the rural tele-density in India as of April 2018 was 43.90 % of the total subscriber base; hence the potential for growth of telecom sector in India is very large. Since a large quantity of the telecom equipments are still to be deployed in public networks, TSPs should be encouraged for deploying indigenous telecom products, beyond the quantities to be mandated under the PMA, by giving them graded incentives. This would not only reduce the import bill of the country but also promote indigenous manufacturing of telecom products which would not only address the concerns relating to national

³⁶ http://dot.gov.in/sites/default/files/2016_03_30%20UL-AS-I.pdf?download=1

³⁷ <https://www.ibef.org/download/Telecommunications-Report-July-2018.pdf>

³⁸ *ibid*

security but have many collateral advantages also like job creation, increase in GDP besides overall well being of the economy.

2.90 In view of the foregoing, the Authority recommends:

- (a) A Nodal Officer should be appointed in DoT/TEC to look into the cases related to lack of implementation of 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.**

J. Specific level of Incentives

2.91 For promoting the design and manufacturing of indigenous telecom equipment, in series of above mentioned recommendations, the Authority has identified the entities working in the value chain which need incentives. While recommending the various kinds of incentives to these

entities, the Authority has refrained from suggesting the exact levels/ values of incentives, as it would also depend upon the final decisions of the Government on these recommendations. As has been discussed already, the telecom sector technologies and products are rapidly changing; the levels of incentives also depend upon the market conditions, when such incentives would actually be offered. Once the decisions will be made on these recommendations, the Authority, after analyzing the market conditions at that point of time, in consultation with stakeholders, would recommend the exact levels/ values of incentives to various entities.

2.92 In view of the above, the Authority recommends that on acceptance of these recommendations, for promoting the indigenous telecom products, the specific values for various kinds of incentives, proposed under these recommendations, would be recommended by the Authority separately.

Chapter 3: Summary of Recommendations

3.1 Institutional Mechanism

The Authority recommends:

(Refer paragraph 2.22)

- (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 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.**
- (b) India should aim to achieve the objective of 'net zero imports of telecommunication equipments' by 2022. For this purpose, Telecom Equipment Manufacturing Council (TEMC), a Council already constituted for promoting R&D, Standardization, and Manufacturing of Telecom Equipment in the country, and consisting of experts from Telecom Service Providers, Telecom Equipment Manufacturing Industry, Government, Academia, and R&D Institutions, should identify and recommend specific areas of priorities.**
- (c) 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.

- (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.**

3.2 Skilled Manpower

The Authority recommends:

(Refer paragraph 2.27)

- (a) For ensuring the adequate supply of telecommunication technology professionals to the telecommunication equipment manufacturing sector, the Universities/ technical institutes offering specialization in telecommunication technologies and system design should be setup/ identified near the Telecom Products Development clusters.**
- (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.**

3.3 Research, Innovation and Development:

The Authority recommends:

(Refer paragraph 2.35)

- (a) **Participation of indigenous research institutions, telecom service providers, and telecom equipment manufacturing companies in deliberations at international organizations like IEEE, 3GPP, One M2M, ITU, and ETSI etc. should be encouraged. It would provide platform for learning and innovation, and it would help in increasing India's contributions in standards development. To encourage such participation, the Government should announce a scheme to reward the persons or entities whose innovations become part of the international standards.**
- (b) **Permissions for trials of new technologies/ products and running pilot projects should be simplified. It should be encouraged for multinational companies also as it would lead to knowledge transfer.**
- (c) **For promoting new age tech start-ups in telecom equipment design and manufacturing sector, Government should incentivize setting-up of incubation centers.**

3.4 Patent Framework and Resolution of Disputes

The Authority recommends:

(Refer paragraph 2.47)

- (a) **Department of Industry Policy and Promotion (DIPP) has already initiated the consultation with stakeholders for development of policy framework for the rights and obligations of Standard Essential Patent holders, and for licensing of patents on Fair, Reasonable and Non**

Discriminatory (FRAND) terms and conditions. This consultation process is especially focused on telecom sector. For promoting the indigenous telecom equipment manufacturing in the country, these policy guidelines should be finalized at the earliest.

- (b) Patent's licensing dispute resolution is quite time consuming and costly process in the country. It discourages entry of SMEs (Small and Medium Enterprises) and technology startups in this sector. Alternate Dispute Resolution Framework for time bound resolution of patent licensing disputes should also be institutionalized in the country.**
- (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 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.**
- (d) To expand understanding about patent filing policies and 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 systems designs.**

3.5 Standardization, Testing, and Certifications

The Authority recommends:

(Refer paragraph 2.58)

- (a) TEC should be made responsible for regulation and accreditation of telecom products testing and certification agencies in the country.**

- (b) **Mandatory testing and certification of the telecom equipments in the country should be started at the earliest.**
- (c) **To expedite setting up of testing and infrastructure facilities in the country, the Government should incentivize setting up of such facilities by private entities. These facilities should be accredited by the TEC.**
- (d) **The Government should institute mechanisms of mutual recognition of Indian testing and certification labs with the international testing and certification labs. Also, TEC should harmonize local testing and certification procedures with global standards and test procedures.**

3.6 Manufacturing and Productivity

The Authority recommends:

(Refer paragraph 2.70)

- (a) **All telecom products meant for use in the telecommunication network or by consumer and marketed in the country should be classified in following categories:**
 - i) **Fully finished imported products: This category of products are manufactured by foreign registered companies using hardware designs and software technologies developed outside India and have high level of value addition outside India.**
 - ii) **Indigenous products: This category of products are designed and/or manufactured in India by the companies registered in India. Since the ambit of such products would be large, there would be a need to create**

more granularities in this classification as mentioned below:

- (aa) Made in India Products – Using designs of foreign registered companies, this category of products are manufactured in India by companies registered in India. Such products have imported sub-systems, which use HW and SW technology developed outside India and have very low level of value addition in India.**
 - (ab) Designed in India Products - Products designed by India registered companies but manufactured outside India.**
 - (ac) Designed and Made in India Products – Products designed and manufactured by the India registered companies in India.**
- (b) In order to address the issues concerning the imports of telecom products at zero percent duty rates under the ITA(Information Technology Agreement) provisions, an experts group comprising of the telecom, trade, taxation, and legal professionals should be constituted to identify the telecom products, which are not covered under the provisions of ITA-1.**
- (c) For immediate push to development of indigenous telecom equipment manufacturing industry, the experts group should also suggest suitable level of tariffs on import of such telecom products which are not covered under ITA.**
- (d) Indigenous design and manufacturing of telecom products not included in ITA-1 should be incentivized. Once the eco-system for design and manufacturing of such telecom equipments in**

the country matures, manufacturing of the telecom products covered under the provisions of ITA-1 should also be encouraged.

- (e) TEMC should identify key technologies and products where in the local telecom equipment manufacturing sector can concentrate and develop world class expertise and products.**
- (f) 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.**
- (g) To promote deployment of indigenous products in the telecom networks, capabilities of local System Integrators like TCIL, ITI and other private entities should be harnessed by extending suitable incentives.**
- (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.**

3.7 Market Access

The Authority recommends:

(Refer paragraph 2.90)

- (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.**

3.8 Specific level of Incentives:

(Refer paragraph 2.92)

The Authority recommends that on acceptance of these recommendations, for promoting the indigenous telecom products, the specific values for various kinds of incentives, proposed under these recommendations, would be recommended by the Authority separately.

List of Abbreviations

S.No.	Abbreviations	Description
1	3GPP	3 rd Generation Partnership Project
2	ADR	Alternate Dispute Resolution
3	AI	Artificial Intelligence
4	B2B	Business to Business
5	BCD	Basic Custom Duty
6	BoM	Bill of Material
7	CPE	Customer Premises Equipment
8	CP	Consultation Paper
9	DEA	Department of Economic Affairs
10	DIPP	Department of Industrial Policy and Promotion
11	DMEP	Domestically Manufactured Electronic Products
12	DoT	Department of Telecommunications
13	DSIR	Department of Science and Industrial Research
14	DST	Department of Science and Technology
15	ECIL	Electronic Corporation of India Limited
16	EMCs	Electronic Manufacturing Clusters
17	ERs	Essential Requirements
18	ESDM	Electronic System Design and Manufacturing
19	ETSI	European Telecommunications Standards Institute
20	FRAND	Fair, Reasonable And Non Discriminatory
21	GVA	Gross Value Added
22	HS	Harmonized System
23	HW	Hardware
24	IEEE	Institute of Electrical and Electronic Engineers

25	IoT	Internet of Things
26	IP	Intellectual Property
27	ITA	Information Technology Agreement
28	ITI	Indian Telecom Industry
29	ITU	International Telecom Union
30	L&T	Larsen & Toubro
31	LPI	Logistic Performance Index
32	M2M	Machine to Machine
33	MEIS	Merchandise Exports from India
34	MeitY	Ministry of Electronics and Information Technology
35	MNCs	Multi National Companies
36	MSIP	Modified Special Incentive Package
37	NCIIP	National Critical Information Infrastructure Centre
38	NVR	Network Video Recorder
39	OEM	Original Equipment Manufacturers
40	OFC	Optical Fiber Cable
41	OHD	Open House Discussion
42	PCB	Printed Circuit Board
43	PMA	Preferential Market Access
44	QRs	qualitative requirements
45	R&D	Research and Development
46	SDOs	Standard Development Organisations
47	SEIS	Service Exports from India Scheme
48	SEPs	Standard Essential Patents
49	SI	System Integration
50	SKD	Semi Knock Down
51	SME	Small & Medium Enterprise

52	SMT	Surface Mount Technology
53	SW	Software
54	TCIL	Telecommunications Consultants India Limited
55	TDB	Technology Development Board
56	TEC	Telecom Engineering Centre
57	TEDB	Telecommunication Equipment Development Board
58	TEM	Telecom Equipment Manufacturing
59	TEMC	Telecom Equipment Manufacturing Council
60	TEPF	Telecom Entrepreneurship Promotion Fund
61	TMPF	Telecom Manufacturing Promotion Fund
62	TPDCs	Telecom Products Development Clusters
63	TRDF	Telecom Research & Development Fund
64	TSPs	Telecom Service Providers
65	VA	Value addition