24 January 2022

Shri Syed Tausif Abbas,
Advisor (Networks, Spectrum and Licensing),
Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhawan
Jawahar Lal Nehru Marg
New Delhi – 110 002

Subject: Counter comments on the comments of various stakeholders on TRAI Consultation Paper 'Auction of Spectrum in frequency bands identified for IMT/5G'

Dear Sir,

This is with reference to the TRAI Consultation Paper No.08/2021 dated 30-11-2021 on Auction of Spectrum in frequency bands identified for IMT/5G.

In this regard, please find enclosed herewith Tata Communications Limited's counter comments on the comments submitted by various stakeholders for your kind perusal as Annexure.

We request you to kindly take on record and consider the same while finalizing the recommendations.

Thanking You,
Yours Sincerely,

For Tata Communications Limited,

DocuSigned by:
Praveen Sharma
3737C03BE2844CB...

Praveen Sharma
Authorized Signatory

Enclosure: As mentioned above

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Annexure

Tata Communications Limited's Counter Comments on Various Stakeholders' comments to TRAI Consultation Paper on Auction of Spectrum in frequency bands identified for IMT / 5G

At the outset, we thank Authority for providing us an opportunity to submit counter comments on this 5G Consultation Paper. Accordingly, we submit our counter comments to the response of various stakeholders as follows:

Issues related to Eligibility Conditions for Participation in Auction

Stakeholder's Comments: COAI, BIF, ASSOCHAM, FICCI, RJIO, BSNL, Airtel, VIL: All these stakeholders have suggested that the eligibility conditions for participation in the auction should not be changed and it can remain same as per the previous auctions.

VIL has further stated that additional eligibility conditions shall be put in place to ensure/encourage that the first few years of 5G rollout in India is through Operators, those who have done 5G trials, working with government, security agencies, demonstrated commitment to India use cases and in developing local ecosystem.

TCL Counter Comments:

We strongly disagree with the views expressed by these stakeholders regarding the eligibility condition to remain same as per previous auctions. It is our submission that the forthcoming auction for 5G/IMT bands cannot be treated in line with the previous auctions which were not meant for rollout of 5G technology. It is worthwhile to mention that forthcoming spectrum auction would be focused on 5G services and considering the importance of 5G in future roadmap of Enterprises, Internet Service Providers (ISPs) can emerge as a key stakeholder in proliferation of 5G services, particularly, for Enterprise segment.

The evolving demands of enterprise customers due to the ongoing technological advancements would lead to easy acceleration to industry 4.0 which will bring enormous economic and social benefits to the nation and ISPs are serious contenders for using 5G technology enabled network/services to fulfil such demands.

While ISPs were eligible to bid for BWA (4G) spectrum in the 2010 spectrum auction however ISPs have not been considered post 2010 auction and the eligibility criteria were set forth in a

manner that only Access Service providers or those who undertake to obtain Unified License with Access Service authorization were able to participate in the subsequent auctions. No reason has been given as to why ISPs were discontinued from the list of eligible bidders in the subsequent auctions.

4G and upcoming 5G services are data driven services with the network established to carry the IP/data traffic. Moreover, considering the entire bouquet of use cases of 5G would be data driven using underlying data/IP network, ISPs should be seen as an additional choice to build their 5G network and provide services. Also, we need more Operators to participate and win spectrum so that the Country has more than three wireless players that it currently has. In fact, participation of ISPs would promote competition in the market by having more players owning licensed spectrum and would lead to better services and significant value proposition for Enterprise segment who would be the initial benefactor of 5G services. More players in the market would also obviate the need of Government bringing bailout packages to avoid the situation of oligopoly. Thus, it is our submission that ISPs, whose core services are data based, cannot be left out from eligibility list of those Operators permitted to participate in the auction.

While we are also not in agreement with the views expressed by VIL that in first few years, 5G roll out in India should be through operators who have done the trials, we would like to submit that Tata Communications as an ISP has received various Experimental Licenses from DoT/WPC and conducting the POC of various 5G Use Cases in collaboration with different Enterprises. It would be unjust to deprive Tata Communications and other ISPs to be part of India's journey towards rollout of 5G services and the transformation it would bring in form of Industry 4.0.

Our disagreement is also taking into account the global evolving practice of allocation of 5G spectrum for Private 5G networks to the Enterprises directly for Industry 4.0 purposes and we believe that for effective implementation of Industry4.0 applications, allocation of spectrum to Industry directly for Private 5G network is required and for that reason we do not agree with the view that 5G roll out should be only through Operators who have done trials.

In conclusion we wish to reiterate our submission that ISPs should be permitted to participate in the forthcoming 4G/5G spectrum auction and should be allowed to use the spectrum under their UL-ISP / ISP license for the services permitted under scope of the ISP license and secondly there is need to empower industry to develop its own Industry 4.0 applications by allocating some spectrum directly to the Enterprises for developing industry specific private 5G network based applications.

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Issues related to Spectrum for Private Cellular Networks

Stakeholder's Comments: COAI, ASSOCHAM, FICCI, RJIO, Airtel, VIL: These stakeholders are of the view that TSPs/mobile operators having UL – Access Service Authorization through auction-based allocation of spectrum are best suited to serve the customers (be individual or enterprises) and meet the demand of 5G networks. As per them, Mobile operators are best suited, several enterprises are asking Operators to use their 4G spectrum assets to provide Private LTE networks, TSPs will continue to meet the enterprise requirements at aggressive and competitive tariffs, under the current policy framework.

TCL Counter Comments:

Tata Communications is neither undermining the capability of the TSPs/ Mobile Operators, nor we are against their collaboration with Enterprises or on their view that they can meet the requirement of Enterprises under current policy framework, however, we wish to submit and draw kind attention of the Authority regarding the means available and in practice at global stage to fulfil the requirements of various Enterprises so that they can swiftly transition to the industry 4.0. It is also pertinent to mention that the deployment of Private Cellular Networks is a highly customized and specific business requirement centric and distinctly different from the Public Cellular Networks.

Enterprise connectivity would require utmost customer centric approach where network's reliability, speed, latency, efficiency, density each need to be defined by the Enterprises and can vary for each Enterprises depending on their operational requirement. For example, 5G network for a manufacturing plant with large assembly line would be completely different from the one being used by an educational institution for R&D. It would immensely be difficult for a Telecom service provider to customize its network for each Enterprises and fulfil the desired network with specific values of different connectivity parameters of such enterprises. Building an Industry 4.0 Platform for various Sectors/applications is a complex and complicated project involving use of multiple technologies and platforms and 5G being a very import underlying platform customization of the same by TSP using its public network may not be Possible and /or desirable.

We are of the view that keeping in mind Government's vision of 'Make in India' and the industry 4.0, it is imperative to adopt the global practices to create the private 5G ecosystem in India for the Enterprise segments.

The inherent features of Private 5G networks such as enhanced bandwidth, unobstructed connectivity, improved security, etc., offer complete control to Enterprises over their Operational procedures, better privacy protection of process and production related data and security

advantage over a public network. They also offer opportunities to deploy customized use cases for the overall enterprises within their specified geography over the same underlaying network infrastructure due to network slicing ability with differential prioritization eventually helping to improve productivity, efficiency, costs optimization, safety and security in multifold. This will also propel innovation in ways of doing the businesses in near future.

Hence, it would be appropriate that the Enterprises/Industry should decide on its captive Private 5G network and its different parameters as per their requirement of Industry 4.0 platform/applications and establish it themselves within their factory/premises. While doing so Enterprises can collaborate with different OEMs and Service Providers to build Industry 4.0 applications. It is therefore our submission that allocation of spectrum for private networks should be done directly to the Enterprises/Industry in line with global practices which can be used for creating their own dedicated 5G network with specific value of network parameters. This would give complete control to them on their private network without any dependency on TSPs and full freedom to unleash the potential for Industry 4.0 transformation.

Given the advantages of private and dedicated 5G networks, many countries are opening the 5G spectrums for private enterprises which can be deployed within their captive campuses. Further, we are of the view that Private 5G networks for enterprises will exploit new capabilities available in the next phase of the 5G standard, known as 3GPP Release 16. Release 16 aims to enable 5G to substitute for private wired Ethernet, Wi-Fi, and LTE networks, and includes multiple capabilities designed specifically for industrial environments. It is predicted that by 2026, most companies will be likely to deploy 5G in combination with existing connectivity, including wired Ethernet networks. However, in the long term—over the next 10 to 15 years—5G may become the standard of choice in demanding environments, when flexibility is paramount, reliability is mandatory, or for installations that require massive sensor density.

The NDCP 2018 also supports such initiatives in the mission under Propel India as follows:

To harness the power of emerging digital technologies, including 5G, AI, IoT, Cloud and Big Data to enable provision of future ready products and services; and to catalyse the fourth industrial revolution (Industry 4.0) by promoting Investments, Innovation and IPR.

Further, NDCP 2018 also specifies earmarking of adequate licensed and unlicensed spectrum for IoT/ M2M services in one of its strategies for catalyzing investments for Digital Communication sector which is vital in achieving the goal of Accelerate Transition to Industry 4.0 by 2022.

As enterprises across industries have started exploring digital transformation opportunities, they have started evaluating technologies based on a few important criteria – affordability, reliability,

continuity, flexibility, and security. Thus, dedicated spectrum should be reserved for private networks with the enterprises having control to apply and deploy a private network in order to fulfil all the above evaluation criteria. Enterprises should be allowed to deploy the network with their in-house capabilities or with the help of System Integrators and TSPs.

Further, the industry 4.0 Platform therefore is going to be highly sector specific and application specific with telecom technology viz 5G being an underlying part on which the edifice of this automated efficient industrial set-up would be built. Industry 4.0 Platform is going to be highly customized for each of the sectors/applications including how various technologies and platforms are used including 5G technology. It is for these reasons that globally 5G spectrum is being allocated to different Industry Verticals directly as scope of implementation of Industry 4.0 is much vast and larger than provision /use of 5G services and it requires specialized efforts which would require domain knowledge of the industrial sectors and technologies /platforms involved than being a TSP simpliciter. It is our submission that Industry 4.0 cannot ride on a public network as it would require special customization and efficiencies which a public network would not be able to provide so by necessity Industry 4.0 has to ride on a private network built on 5G spectrum allocated directly to the industry.

Given the global momentum towards adoption and deployment of Private 5G networks in view of the benefits and advantages, Tata Communications reiterate its suggestion to TRAI for consideration of allocation of suitable frequencies including specifically in sub-6GHz that is in mid band 3.3-3.8GHz and mmWave bands 26-28 GHz for nominal fees to Enterprises directly, instead of creating dependency on cellular networks of Mobile operators. Enterprises should be given the choice to deploy their own private 5G network using the spectrum reserved for them or they can opt the services of mobile operators to cater their requirement. Government should facilitate the Enterprises with the option, which is as per global norms, for their transition to industry 4.0.

Stakeholder's Comments: RJIO, FICCI, COAI, ASSOCHAM: M/s RJIO has submitted that reserving the frequencies from those earmarked for IMT services would amount to willful violation of Hon'ble Supreme Court judgement dated 2nd February 2012 in CWP 423 of 2010 unambiguously enunciating that right to use such spectrum can only be alienated by a well-publicized transparent auction. This was further reiterated in Special Reference no 1 of 2012 by Hon Supreme Court of India. Similar views have been expressed by COAI.

Also, associations like COAI, FICCI, ASSOCHAM have raised the issue of level playing field and submitted that Localized captive networks will be against the principles of level playing field.

TCL Counter Comments:

Since the issues relating to spectrum allocation, which was the basis of the judgment dated 2nd February 2012 by the Hon'ble Supreme Court of India, mobile wireless technology and its applicability has significantly changed. With paradigm shifts in the technology architectures, powerful features and functionalities which have been evolved and still evolving, are opening significant opportunities for businesses, enterprises, and industry verticals. Such dynamic changes are having direct or indirect impact on socio-economic environments in the country. Moreover, the SC judgment was in respect of spectrum which was allocated for providing Mobile services to public at large and not for private captive applications. Private Captive usage is altogether different paradigm which in our view may not be covered by the SC judgment or level playing field considerations as being cited. We do not agree with the view that reserving the frequencies from those earmarked for IMT services would amount to willful violation of Hon'ble Supreme Court judgement as these would be for private /captive use not for public services and in the larger public good as it would spawn development of Industry 4.0 eco-system. Also level playing field has be between similarly situated entities which is not the case here.

It is our submission that Authorities should take into account the technological advances, global practices and need of the Industry while evolving policy framework for 5G and Industry 4.0 related issues.

With the rise of potential for private networks and their benefits towards industry 4.0 transformation, there are many players like system integrators, ISPs (Internet Service Providers) and hyperscale cloud providers who have capabilities to deploy private networks for deserving enterprises and industry verticals. Given the high spectrum prices in public auctions, these enterprises and industry stakeholders won't be able to take advantage & benefits of the evolving technologies.

With the world taking rapid strides towards digital transformation, it is important to make changes in these old policies while ensuring the foundation of transparency and level playing field is conserved. As stated in our comments, spectrum has to been seen from the lens of its 'public good' element instead of a commodity. Reserving some part of spectrum for private 5G network and allocation of the same to the enterprises for their transition to industry 4.0 applications/platform would bring the significant boost to Indian GDP, employment and contribute towards the goal of the Government to make India a trillion-dollar economy.

Stakeholder's Comments: FICCI, VIL, Airtel, BSNL, COAI, ASSOCHAM: These stakeholders have expressed the view that allocating the spectrum to Enterprises would lead to sub-optimal/inefficient utilization of the spectrum.

TCL Counter Comments:

There is no evidence of allocating the spectrum to Enterprise for private 5G networks leading to ineffective spectrum utilization, in fact, allocating certain portion of IMT bands for private cellular networks would rather enhance the overall spectrum utilization thereby creating additional value from the use of this key national resource. Further, lot of significant chunks of the band in the IMT category are unauctioned for many years, thereby creating no value or benefit. Allowing these bands for private and captive usage will increase the overall effective spectrum utilization.

Many developed countries have easily carved out some portion of the spectrum from IMT designated bands without impact on the overall availability of the spectrum. For example, UK[1]has allowed local licensing on shared spectrum basis. TRAI Consultation paper itself has published many such case studies of other countries where in separate spectrum in IMT bands has been carved out for allocation to enterprises and industry verticals at nominal or administrative costs to deploy private networks successfully.

It should be noted that since the private networks are intended to be deployed by enterprises and industry verticals for implementing their core business processes & mission critical applications, they demand highest level of availability, resiliency, quality & security, and these aspects cannot be managed through a public network which are typically stressed on these parameters to manage the massive consumer business.

We also propose that using such carved out spectrum for private networks, enterprise and industry verticals should be allowed to tie up with their choice of partners such as System Integrators, OEMs, Telecom Services providers to build their own private networks.

In view of the spectrum & coverage for private networks would be confined to the location or sites of enterprises and industry verticals, the same channel frequencies could be allocated to multiples of enterprise and industry verticals at different locations thereby ensuring optimal utilization through spectrum re-use.

We also see a major benefit for incumbent mobile services operators as they will not have to worry anymore for managing slicing of their auction spectrum between their highly stressed public networks and private networks. Earmarking certain spectrum for private 5G networks would ensure clear differentiation between the public and private networks which is a prime requirement. Hence, we rather see that the dedicated spectrum for private networks will actually compliment the public networks and will not impact any fragmentation or create any kind of scarcity in the spectrum allocated for the auctions for

[1] https://www.ofcom.org.uk/__data/assets/pdf_file/0033/157884/enabling-wireless-innovation-through-local-licensing.pdf

public networks, neither it would be utilized sub-optimally, as claimed by some of the stakeholders. One more important benefit of reserving a certain quantum of spectrum and allocating the same to Enterprises for 5G is that the same spectrum can be reused and allocated to various Enterprises thereby optimal use of the allocated spectrum will be ensured as spectrum is expected to be allocated for specific campus/ loacalised area. Since this spectrum would be used by a particular enterprise within its campus, same can also be utilized by a different enterprise whose campus is in the same city but at a reasonable distance thus it suggested to allocate same spectrum to multiple enterprises or Industry verticals at different locations to achieve optimal spectrum efficiency.

We have also observed from global deployment[2] that private networks can coexist with public networks deployed by incumbent operators without disturbing their ongoing operations. FSS operations are limited to a few geographical locations. Private networks are easily manageable to run at a safe distance from these locations. Therefore, stating that allocating the spectrum to Enterprises would lead to sub-optimal/inefficient utilization of the spectrum is misleading and not aggregable.

Stakeholder's Comments: RJIO, VIL, FICCI, COAI: These stakeholders have expressed the view that allocating the spectrum to Enterprises would lead to security, LI and privacy concerns.

TCL Counter Comments:

Mobile Wireless technologies are evolving quite rapidly and with every Standards release it is addressing security concerns of the network infrastructure, its users and the data being transacted. 5G is such a technology built on 3GPP standards which has proposed much enhanced security architecture which gives utmost protection to the network, its users and as well as data.

While there are severe concerns projected on the security issues related to public mobile wireless networks, the same cannot be made applicable to Private networks. Private Networks are captive in nature which are deployed in the industry or enterprise premises for their own captive use. These networks are standalone and not connected to any public networks and no outside device or a user which is not registered in that private network can access and use the network. Hence, unlike public network, no kind of security breach can impact national security in any way and even if there is any impact, the same would be limited to the captive enterprise networks.

[2] https://www.acma.gov.au/auction-summary-36-ghz-band-2018

At the same time, since these private networks would be built by the respective enterprises and industry verticals for their core business processes and mission critical applications, they themselves would be strengthening the security architecture at multiple levels to ensure that such security related issues and impacts and completely mitigated in a proactive manner for ensuring smooth operations of their businesses. Tata Communications Ltd also takes enterprise security seriously and suggests that a regulatory authority (e.g. CERT-In) can formulate a suitable security governance process of private networks. Its main objectives will be to govern security in private networks by taking periodic security reports from enterprises for any breach and ensuring smooth operations.

On the issue of concerns related to Law enforcement/ LI requirements, it is submitted that being captive and private network, which will not be accessed by the user as public connectivity, the issue of LI requirement does not arise for captive networks. Therefore, we are of the view that private cellular networks deployed by Enterprises for its own captive uses does not pose any threat to national security and privacy concerns.

Stakeholder's Comments: Airtel, RJIO, COAI: These stakeholders have stated that allocation of spectrum for industry 4.0/private 5G network would affect the revenue of the Government/loss to Exchequer and revenue truncation of TSPs.

TCL Counter Comments:

India has vast presence of Industries across various sectors ranging from Manufacturing, Transportation, Mining, Land & Sea Ports, Automotive, Steel, Pharma, Education, where true potential of this futuristic technology can be exploited to drive "Make in India" initiative and eventually contributing to the national GDP. TRAI should see its role beyond the telecom service providers and facilitate the roll out of telecom networks (captive) across various Industry vertical. This would also in line with the NDCP 2018 i.e. To harness the power of emerging digital technologies, including 5G, AI, IoT, Cloud and Big Data to enable provision of future ready products and services; and to catalyse the fourth industrial revolution (Industry 4.0) by promoting Investments, Innovation and IPR.

Deployment of private 5G networks for Enterprises would lead to increased efficiency and productivity based on the insights generated. Apart from the larger enterprises and industry verticals, Private 5G networks can enable small & medium size enterprises & organizations to take advantage of world-class technology and become globally competitive.

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Through deployment of Industry 4.0 initiatives and digital transformation, local enterprises and industry verticals will achieve significant enhancements in their productivity, efficiencies, revenues, quality, security and in turn boost the GDP of India to achieve 'Make-in-India' & 'Made for the World' mission. In view of the expected achievement of global competitiveness by local enterprises and industry verticals, it will also increase our exports to other countries which will further significantly enhance associated revenues for the Government. As per GSMA report[3], 5G networks offer the potential to transform industrial sectors and deliver significant social and economic benefits in India. Over the period 2023–2040, GSMA forecast that 5G technologies will make an overall contribution of approximately $450 billion to the Indian economy (0.6% of GDP by 2040). The manufacturing sector is set to benefit the most from 5G applications (accounting for 20% of the total benefit), followed by retail (12%) and ICT (11%).

In view of the above, reserving small portion of spectrum for private networks to achieve this industrial revolution in anyway cannot be construed as a loss of revenues for mobile network operators and exchequer rather it would give tremendous boost to the Indian Economy rather than loss to the Exchequer as sought to be advocated. It will also transform the way the Industry / Enterprises are operating and such technological innovations with the help of private 5G networks will increase their operational efficiencies which will lead to more revenues to them and ultimately increase value to the Government Exchequer as well.

Further, since all the stakeholders have opined to see the 'public good' element in the use and allocation of spectrum it is our submission that allocation of spectrum to Enterprises for their captive 5G network has huge potential to create the 'public good' element and key factor in increasing the GDP of the Country. Hence, we reiterate our suggestion to reserve certain portion of spectrum for private 5G network and allocation of the same to be done directly to the Enterprises.

Stakeholder's Comments: COAI, FICCI, RJIO, Airtel: These stakeholders have stated that use of dedicated spectrum, set-asides for industry verticals, poses significant risks to wider mobile services, most notably slower 5G networks and reduced coverage etc.

TCL Counter Comments:

Setting aside spectrum for industry verticals in 5G bands poses no risk to public 5G rollout. Based on a targeted and coordinated research, the authority can allocate dedicated bands to public and non-public entities. For example, Germany reserved up to 100 MHz in the 3.7-3.8 GHz frequencies for regional/local assignments and auctioned 3400-3700 MHz frequency band for public operators.

[3] https://www.gsma.com/spectrum/wp-content/uploads/2020/11/mmWave-5G-in-India.pdf

According to data from the German Federal Network Agency[4], by the end of October 2021 more than 53 percent of the area was supposed to be covered by at least one provider with the latest 5G mobile communications standard. This data clearly indicates that setting aside a chunk of spectrum for private entities will not impact the wider success of 5G.

Instead, it needs to be ensured by TSPs that any public network do not overlap with enterprise networks deployed on specific spectrum which can affect the QoS requirements for the specific use-cases being deployed by the Enterprise possess operational challenges to Enterprises to fulfil the requirement of Industry 4.0 initiative.

Stakeholder's Comments: VIL, Airtel, COAI: These stakeholders have stated that the already unlicensed band's utilization should be audited/ascertained for seriousness of entities seeking reserved spectrum for private 5G before moving forward to further reserve spectrum. Some stakeholders have suggested to utilize only the existing unlicensed band for captive private network.

TCL Counter Comments:

We would like to submit that 5G would bring revolution to industrial use cases wherein its predecessor technology 4G/ LTE is not capable of handling such a wide variety of use cases. Use cases such as eMBB, uRLLC, mMTC can be realized with 5G technology only.

Unlicensed bands have extremely limited features and functionalities and not harmonized thereby QoS cannot be guaranteed. An enterprise running its mission critical applications cannot rely on unharmonized spectrum prone to interference and with limited functionalities.

Considering the highly confidential nature of business functions of the enterprises, it is imperative that a licensed spectrum allocation for private networks is must for the success of Industry 4.0 initiative. Enterprises should be given a choice with the latest cutting-edge technology which can be leveraged to curate their own industry specific use cases.

Hence, we reiterate our submission that certain part of spectrum from the licensed IMT bands should be reserved for private 5G network and support the industry 4.0 in line with global practices. Moreover, Industry 4.0 cannot ride on a unlicensed spectrum as it would require special customization to run mission critical applications and efficiencies which cannot be achieved with the unlicensed spectrum by Enterprise so by necessity Industry 4.0 has to ride on a private network built on 5G spectrum allocated directly to the Industry.

[4] https://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/DE/2021/20211209_5GMonitoring.html?nn=265778

Stakeholder's Comments: VIL, COAI: These stakeholders have submitted that result of reserving spectrum by Germany is not encouraging and the costs of set-aside to German society are significant, while any benefits are likely to be marginal.

TCL Counter Comments:

Germany has one of the most successful models of local spectrum allocations which considers all enterprises with varied sizes, locations, and network requirements and ensures everyone has equal access to spectrum. In 1st Quarter of 2021 itself after 5G launch, Germany received 146 applications of private 5G deployments. They also received more than 80 applications in the 2nd half of the year. It is also interesting to note that these private 5G deployments are mostly deployed by system integrators, OEMs and through telecom services providers.

Any new product takes some time to mature and get a healthy customer base. Irrespective of the industry, each product has its early adopters. Reduction in private 5G applications in Germany this year is also due to this same reason and should not be attributed to failure of the administrative allocation of spectrum for private networks. Once the early adopters display the benefits of 5G private networks, other enterprises will get confidence to adopt private networks too. Even today, around 40% CIOs in Germany are interested in deploying private 5G networks in the next 2 years, as per Telemedia publication[5]. Also, it is unfair to look at only one country to evaluate the success of 5G private networks. Other developed countries like the USA and UK have also successfully demonstrated how private 5G network policies are beneficial to enterprises.

In view of the above, Tata Communications requests TRAI to take the necessary steps to ensure that as a Country we should not be lagging behind any of these countries in order to achieve the dream of Digital India and Make in India missions and use of private 5G network to achieve the industry 4.0 is critical for these missions.

Stakeholder's Comments: ISpA, GSOA, AVIA, APSCC, GVF, Hughes Communications: These stakeholders have submitted that private 5G network can potentially cause interference to satellite communication service. One stakeholder has stated that deployment of private networks will likely preclude any future deployment of FSS earth stations nearby due to interference.

[5] https://www.telemediaonline.co.uk/80-of-cios-and-senior-leaders-plan-to-deploy-private-5g-networks-within-the-next-24-months/#:~:text=The%20most%20significant%20interest%20is,and%2024%25%20of%20American%20firms.&text=This%20attitude%20is%20strongest%20in,%25)%20and%20Japan%20(65%25).

TCL Counter Comments:

We wish to counter the above view and like to submit that the nature of private spectrum is such that it is confined to a limited geography. RF power emission is also regulated which makes it minimum or no spillage outside the stipulated boundary.

The FSS operations in India are limited to a few geographical locations. Private networks are easily manageable to run at a safe distance from these locations. For example, there are many global deployments of private networks on C band across countries which are coexisting with satellite operations. For example, Australia[6] has allowed satellite and private network operations in 3800-4200MHz. Same has been clearly highlighted in TRAI's consultation paper page no 184. So, co-existence of FSS & private networks is easily achievable without any impact to each other.

Conclusion:

In view of the promises being made by 5G technology especially for Industry / Enterprises, it is one of the most sought-after technologies which is supposed to bring a revolution in enterprise business and industry verticals. There is a strong awareness building with enterprises and industry verticals on Private Networks and According to ABI research, the private 5G market is expected to grow exponentially to reach $110 B size by 2030.

Even Indian companies are eager to deploy private 5G networks to implement Industry 4.0 initiative. Tata Communications itself have been in conversations with multiple enterprises who are interested in private 5G deployments. According to Mandale insights report 2021, Indian market for private 5G network is projected to grow up to $500 million in revenue by 2026. Total number of 5G base stations projected to be deployed in India for private 5G network are nearly 7,500 by 2026. Especially manufacturing, mining, healthcare, and logistics industries are showing a lot of interest in private 5G to overcome their operational inefficiencies and improve their bottom line.

Considering our submissions made herewith and the comments submitted on 10th January 2022, we would like to reiterate our request that some part of spectrum in sub-6GHz band (at least 100MHz) and mm-wave band (minimum 400MHz) should be reserved for private 5G networks for potential Industrial applications and to be allocated administratively under registration mechanism to the Enterprises directly (to be used within their campus) at nominal fee for private, captive and local network deployments in 5G technology in line with global practices to enable Industry 4.0.

[6] https://www.acma.gov.au/auction-summary-36-ghz-band-2018