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**STANDING COMMITTEE ON COMMUNICATIONS AND INFORMATION TECHNOLOGY (2021-22)**

**SEVENTEENTH LOK SABHA**

**MINISTRY OF COMMUNICATIONS**
**(DEPARTMENT OF TELECOMMUNICATIONS)**

# [Action Taken by the Government on the Observations/Recommendations of the Committee contained in their Twenty-first Report (Seventeenth Lok Sabha) on 'India's preparedness for 5G']

**THIRTY-SIXTH REPORT**

**LOK SABHA SECRETARIAT**
**NEW DELHI**

***March, 2022/Chaitra, 1944 (Saka)***

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**Presented to Lok Sabha on 30 .03.2022**

**Laid in Rajya Sabha on 30.03.2022**

**LOK SABHA SECRETARIAT**
**NEW DELHI**

*March, 2022/Chaitra, 1944 (Saka)*

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## COMPOSITION OF THE STANDING COMMITTEE ON COMMUNICATIONS AND INFORMATION TECHNOLOGY (2021-22)

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20. Dr. T. Sumathy (A) Thamizhachi Thangapandian
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**Rajya Sabha**

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23. Shri John Brittas
24. Dr. Subhash Chandra
25. Shri Y. S. Chowdary
26. Shri Ranjan Gogoi
27. Shri Suresh Gopi
28. Shri Syed Nasir Hussain
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30. Shri Jawhar Sircar
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| 1. Shri Y.M. Kandpal | - | Joint Secretary |
| 2. Dr. Sagarika Dash | - | Director |
| 3. Shri Shangreiso Zimik | - | Deputy Secretary |

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Committee constituted w.e.f. 13 September, 2021 *vide* Para No.3184 of Bulletin Part-II dated 9 October, 2021.

## INTRODUCTION

I, the Chairperson, Standing Committee on Communications and Information Technology (2021-22), having been authorised by the Committee, present this Thirty-sixth Report on Action Taken by the Government on the Observations/Recommendations of the Committee contained in their Twenty-first Report (Seventeenth Lok Sabha) on 'India's preparedness for 5G' of the Ministry of Communications (Department of Telecommunications).

2. The Twenty-first Report was presented to Lok Sabha and also laid on the Table of Rajya Sabha on 8th February, 2021. The Department of Telecommunications furnished their Action Taken Notes on the Observations/Recommendations contained in the Twenty-first Report on 25th October, 2021.

3. The Report was considered and adopted by the Committee at their sitting held on 28 March, 2022.

4. For facility of reference and convenience, Observations/Recommendations of the Committee have been printed in bold in Chapter-I of the Report.

5. An analysis of Action Taken by the Government on the Observations/Recommendations contained in the Twenty-first Report of the Committee is given at Annexure-II.

**New Delhi;**

**28 March, 2022**
**7 Chaitra ,1944 (Saka)**

**DR. SHASHI THAROOR,**
**Chairperson,**
**Standing Committee on Communications and Information Technology.**

## CHAPTER I

## REPORT

This Report of the Standing Committee on Communications and Information Technology deals with the action taken by the Government on the Observations/Recommendations of the Committee contained in their Twenty-first Report (Seventeenth Lok Sabha) on 'India's preparedness for 5G' relating to the Ministry of Communications (Department of Telecommunications).

2. The Twenty-first Report was presented to Lok Sabha/laid in Rajya Sabha on 8th February, 2022. It contained 26 Observations/Recommendations.

3. Action Taken Notes in respect of all the Observations/Recommendations contained in the Report have been received from the Department of Telecommunications and are categorized as under:

(i) Observations/Recommendations which have been accepted by the Government

Rec. Sl. Nos.: 1,2,8,9,11,12,15,16,17,19,21,22,24 and 25

Total - 14

Chapter-II

(ii) Observations/Recommendations which the Committee do not desire to pursue in view of the replies of the Government

Rec. Sl. No.: Nil

Total - Nil

Chapter-III

(iii) Observations/Recommendations in respect of which replies of the Government have not been accepted by the Committee and require reiteration
Rec. Sl. Nos.: 3,5, 6,7,10,13 and 14

Total - 07

Chapter-IV

(iv) Observations/Recommendations in respect of which the replies of the Government are of interim in nature
Rec. Sl. Nos.: 4,18,20, 23 and 26

Total - 05

Chapter-V

4. **The Committee trust that utmost importance would be given to implementation of the Observations/Recommendations accepted by the Government. The Committee further desire that Action Taken Statement on the Observations/Recommendations contained in Chapter-I and final action taken replies to the Observations/Recommendations contained in Chapter-V of this Report should be furnished to them at an early date.**

5. The Committee will now deal with action taken by the Government on some of their Observations/Recommendations.

**(Recommendation Sl. No. 3)**

**5G Deployment Around the World vis.-à-vis. Position in India**

6. The Committee, in their original Report, had recommended as under:

> "The Committee have been informed by TRAI that globally 118 operators in 59 countries have deployed 5G network. Currently, the 5G network covers around 7 per cent of the world population. It is expected that 20 per cent of the world population will be covered by the year 2025. Major countries where 5G technology have been launched are USA, Canada, UK and European Union, Asia pacific countries like China, Japan, South Korea, Thailand, Australia, New Zealand and Philippine etc. In Middle East, UAE, Oman, Saudi Arabia, Qatar, Kuwait, Bahrain have also launched 5G. In Africa, 5G has been launched in South Africa. Mostly, 5G has been launched partially in these countries. Countries in Asia Pacific like South Korea, Japan and China have witnessed sizeable growth in 5G developments and possibly they are ahead of the curve. The Committee are given to understand that so far China has already developed more than 5 lakh 5G base stations covering around 7-8 per cent of their population. Regarding status of deployment of 5G in India, the Department have informed that 5G High Level Forum has given its report titled 'Making India 5G Ready' to the Government in August, 2018. 5G Hackathon had been organized and the Department have shortlisted 100 use cases for further development. 30 out of 100 use cases will be demonstrated along with TSPs to learn 5G use cases and roll out challenges. However, Cellular Operators Association of India (COAI) has informed the Committee that even though the report of the 5G HLF has been released by the Department of Telecommunications in August, 2018 minimal implementation instructions have been issued so far. Spectrum issues which are at the heart of 5G are yet to be resolved. The TSPs, have submitted that spectrum bands for 5G are yet to be identified and made available to them. The current reserve price of spectrum is one of the highest in the world, which needs to be rationalized taking into account per capita income and reserve price benchmarks of other countries, 5G trial applications have been

submitted by the TSPs in the month of January, 2020, however, till date the guidelines for trials have not been made clear and there is no set date for commencement of these trials. When asked about the timeline for the rollout of 5G, the Secretary, DoT informed the Committee during its hearings that in India 5G technology will initially ride on 4G technology. In the initial years, the core will be 4G and the radio access network will be 5G. First it will not be rolled out pan India, but in selected areas where the demand would justify the Capex. The Committee have been informed that by the end of calendar year 2021 or beginning of 2022, there will be some roll out in India in some specific uses, because 4G should continue in India for at least another 5-6 years. From the foregoing, the Committee are inclined to conclude that sufficient preparatory work has not been undertaken for launching of 5G services in India. As such, India has not moved beyond the modest beginning stage as compared to other countries in the world. The Committee's concern about this observation is enhanced by the fact that while 2G was deployed globally in 1991, it was deployed in India only in 1995; 3G was deployed globally in 1998 but deployed in India ten years later, i.e. in 2008. Similarly, 4G services were launched in India 7 years after their global launching in 2008. This reflects very poorly on our planning and execution. Now when many countries are swiftly moving towards 5G technology, India is likely to witness its deployment only by the end of 2021 or early part of 2022, that too partially. So, it is very likely that after missing the 2G, 3G and 4G bus, India is going to miss on 5G opportunities, unless time-bound action is taken in core areas where Governmental intervention is required. It is disappointing to note that the Department have hardly learnt from the past delays as the vision for 5G which was reflected in the constitution of the HLF and Expert Committees has not been transformed into action on the ground is not reflected in the policies formulated by the Government. The Committee trust that the Government will take expeditious action on the pending recommendations of TRAI. The Government are yet to take action on many of the recommendations of TRAI on issues which have direct bearing on 5G deployment (outlined in subsequent pages).While expressing their displeasure over the laid back approach, the Committee recommend that the Department review all their policies relating to 5G, identify the areas which need concerted action and fast track their action so that a conducive eco-system for 5G deployment is developed soon and India is not left behind the race for 5G. The Committee desire that the Department should conduct a thorough study of the experience gained by other countries in successfully rolling out 5G for better understanding the complexities involved in the process. The Committee further desire that the Department apprise them of the reasons for delay and explain why India has not been able to catch up and keep pace with comparable countries in rolling out 5G services. The Committee may be kept informed of the progress made as well as hurdles that in the Government's view impede such progress."

7. The Department of Telecommunications, in the Action Taken Note, have stated as under:

> "To ensure early and pervasive deployment of 5G Services in the Country, the department has taken following initiatives.
>
> (a) The Government has setup 'Indigenous 5G Test Bed' a multi-institute collaborative project lead by Indian Institute of Technology, Madras. The test bed is likely to enhance national capability in telecom technology, develop indigenous Intellectual Property and give fillip to Indian telecom manufacturers;
>
> (b) The Government has setup 5G Use case lab to develop India specific 5G use cases in Banking & Financial sector at Institute of Development and Research in Banking Technology, Hyderabad.
>
> (c) Department of Telecommunications (DoT) has granted permission to Telecom Service Providers namely, M/s Bharti Airtel Ltd., M/s Reliance JioInfocomm Ltd., M/s Vodafone Idea Ltd. and M/s Mahanagar Telephone Nigam Limited during May-June 2021 for conducting 5G Technology trials with different technology/ Original Equipment Manufacturers (OEM) partners, such as Nokia, Ericsson, Samsung and C-DOT, for a period of 6 months at various locations across the country. The spectrum assigned for these trials is in 700MHz, 3.5GHz, 26/28 GHz, 60GHz (V band) & 76 GHz (E band) frequency bands as per TSPs' requirements.
>
> In addition, Reliance JioInfocomm Ltd. will also be conducting trials using its own indigenous technology.
>
> (d) The Government has also notified Production Linked Incentives Schemes for Telecom and Networking Products manufacturing and large-scale electronic manufacturing that includes Mobile phones, 4G/5G telecom products, internet of things etc.
>
> (e) The Department has identified 5G spectrum and TRAI recommendation has been sought.
>
> (f) The 5G spectrum is likely to be auctioned during next year.
>
> In regard to the observations of the Committee on the pending recommendations of TRAI, it is submitted that DoT follows a Standard Operating Procedure (SOP). As per the SOP, all TRAI recommendations are thoroughly examined by the concerned divisions of DoT and the implications & impact of each recommendation are analysed further by a Standing Committee chaired by Additional Secretary (Telecom). Thereafter, the report of the Standing Committee is placed before Digital Communications Commission (DCC) for final consideration. Subsequently, necessary instructions/Guidelines, etc. are issued and if necessary, the recommendations are referred to the Cabinet for approval."

## Comments of the Committee

8. **Expressing concern over delay in launching of 5G services, the Committee had desired to know the reasons as to why the country had not moved beyond the modest beginning stage in rolling out of 5G services. The Department instead of spelling out the reasons for delay and why the country has failed to keep pace with comparable countries have again described few of their early initiatives such as setting up of 'Indigenous 5G Test bed', 5G Use Case lab to develop India specific 5G Use Case in banking and financial sector, piecemeal permissions granted to TSPs for conducting 5G technology trials for a period of 6 months, etc. which are already in the knowledge of the Committee. The Action Taken Reply of the Department is also silent on the recommendation of the Committee to study the experience gained by other countries for better understanding of the complexities involved in rolling out 5G services. The Committee's main concern is that delay in rolling out of 5G will deprive the country of taking advantage of various benefits of 5G when other countries of the world have made noticeable progress in deployment of the technology. It is high time that 5G should be rolled out in India in some specific Use Cases, however, the Committee do not see any progress in that direction. The Committee, therefore, reiterate that the Department need to review all their policies relating to 5G so that the country is not left behind in the race for 5G. The Committee also reiterate that the Department should conduct a thorough study of the experience gained by other countries in successful rolling out of 5G and apprise them of the hurdles that impede the fast roll out of 5G services in the country. The Committee hope that the Department will continue to make sincere efforts so as to create a conducive environment for rolling out of 5G services. The Committee further desire that TRAI may be impressed upon to expedite their recommendations on 5G spectrum so that 5G auction can be held at the earliest.**

**(Recommendation Sl. No. 5)**

**Availability of Adequate Spectrum**

9. The Committee, in their original Report, had recommended as under:

"The Committee note that the 5G ecosystem is currently available in three bands, lower band, Mid Band 3300 MHz to 3600 MHz and millimetre wave band (26 GHz and 28 GHz) for 5G deployment. Globally seven operators have deployed 5G in lower band, 82 operators have deployed in mid band and more than 8 operators have deployed in mmWave band. However, India at present does not have sufficient spectrum earmarked for 5G in any of these bands. Department of Space and Defence are seeking spectrum in the bands identified for 5G. The Committee have been informed by COAI that to make India 5G ready at the earliest, the Government need to allocate at least 100 MHz per operator in 3.5 GHz, at least 400 MHz per operator in mmWave (26,28,37 GHz) and at least 2x10 MHz per operator in each of these bands in Sub-GHz (600 MHz & 700 MHz). This is without taking into consideration the requirement of the operators in E&V band. In 3.5 GHz, which is basically the mainstream spectrum for 5G, almost every operator across the globe has 100 MHz. However, in case of India out of 300 MHz, 25 MHz are required for satellite uses. About 100 MHz between 3.3 and 3.4 GHz has been demanded by Defence. If this is deducted, only 175 MHz is available. The Committee note that the Department are deliberating with Department of Space (DoS) and the Ministry of Defence (MoD) for making sufficient spectrum available for 5G IMT services. The Department have stated that they have received very positive response and expressed the hope that the issue will be resolved. With regard to mmWave spectrum, the same is yet to be earmarked in India. The average 4G spectrum per operator in India is around one-fourth of the global average. According to submission made by one of the TSPs, we have four times more people and four times less spectrum which means that spectrum available to one person is 1/16th of the global average. The Committee are fully aware of the extreme shortage of spectrum in the country. Availability of 175 MHz only in 3300 MHz to 3600 MHz band will mean that approximately 50 MHz or so spectrum per operator could be allocated, which is far below the global average. The Committee note that not allocating right amount of spectrum will not only deprive the customers of good quality of services but also lead to severe under utilization of investment made as the equipment installed cannot be optimally utilized. The Committee are of the view that the issue of allocating the right amount of spectrum as demanded by the industry needs to be addressed by the Department if India is to have the real benefits of 5G. In this regard, the Committee recommend that the Department need to have fruitful deliberation with Department of Space and Ministry of Defence and an understanding must be reached at the earliest for identification of adequate spectrum for 5G services. The Department should also expedite the implementation of OFC based network for Defence services. Efforts should be made to earmark and allocate mmWave band for 5G in consultation with TRAI."

10. The Department of Telecommunications, in the Action Taken Note, have stated as under:

> In this regard, it is to state that the Committee of Secretaries (CoS) Chaired by Cabinet Secretary deliberated on usage of certain frequency bands in 26 GHz, 28 GHz, 3300-3600 MHz, 526-698 MHz, V Band, etc. Other Ministries/ Departments including Department of Space and Ministry of Defence also participated in the meetings. The CoS, among others, has recommended for the following:
>
> (i) Millimetre wave spectrum in 24.25 GHz to 28.5 GHz range would be made available for IMT/ 5G services.
>
> (ii) In the mid-band, the frequency range 3300 MHz to 3670 MHz would be made available for IMT/ 5G services pan India except at few locations in which Department of Space and other departments are using the spectrum.
>
> (iii) In the Low band, the suitable parts of frequency range 526-698 MHz would be made available for IMT/ 5G services.
>
> (iv) The V Band (57- 66 GHz) would be made available for Wi-Fi/ Public Wi-Fi, fixed links etc.

**Comments of the Committee**

11. **The Committee had recommended the Department for fruitful deliberation with the Department of Space & Ministry of Defence for an understanding on identification of adequate amount of spectrum for 5G services, more particularly earmarking and allocation of mm wave band for 5G. The Committee note that the matter has since been discussed by the Committee of Secretaries (CoS) in the presence of Department of Space and Ministry of Defence. The CoS has made certain recommendations with regard to millimetre wave spectrum in 24-25 GHz to 28.5 GHz, mid-band in the range of 3300 MHz to 3670 MHz, low band in frequency rank of 526-698 MHz and v band in the frequency of 57-66 GHz. The Committee desire that the Department in co-ordination with TRAI consider these recommendations on their merit and inform the Committee of the outcome/decision in the matter of spectrum allocation. The Department have also not hinted anything on the implementation of OFC based network for Defence services as recommended by the Committee. The Committee, therefore reiterate that the OFC based network for Defence services should be implemented expeditiously.**

**(Recommendation Sl. No. 6)**

**Audit of Spectrum**

12. The Committee, in their original Report, had recommended as under:

> "The Committee note that TRAI as back as 2015 have recommended that there is an urgent need for audit of all allocated spectrum both commercial as well as spectrum allocated to various PSUs/Government organizations. However, Government's decision in the matter is still awaited. The Committee are of the view that audit of spectrum is essential for detecting under utilization of this precious natural resource and also to assess the adequacy and operating effectiveness on management control framework in order to make its utilization more efficient. It is deplorable that the Department have neglected such an important recommendation of TRAI, which is both future oriented and has serious implications for technological advancements. The Committee would like the Department to explain as to why spectrum audit as recommended by TRAI has still not been carried out so far by DoT and come out with specific reasons/compulsions which has forced the Department not to undertake such an exercise. The Committee desire that early decision on spectrum audit may be taken on a priority basis and the findings of the audit may be shared with the Committee."

13. The Department of Telecommunications, in the Action Taken Note, have stated as under:

> "In this regard, it is intimated that DoT is taking action for Audit of Spectrum. Audit has been started by the C&AG.
> Further, various Ministries/ Departments, State Governments and Union Territories have been requested to conduct self-assessment of their spectrum holding and submit half-yearly reports in January and July each year."

**Comments of the Committee**

14. **The Committee had desired that audit of all allocated spectrum, both commercial as well as spectrum allocated to various PSUs/Government Organizations as recommended by TRAI in 2015 may be taken on priority basis and the findings be shared with the Committee. The Committee had also desired that the reasons for neglecting such an important recommendation of TRAI on spectrum audit may be furnished to them. The Department have informed that they have started taking action for audit of spectrum and audit has been started by C&AG. Further, various Ministries/Departments, State Governments and Union Territories have been requested to conduct self-assessment of their spectrum holding and submit half-yearly reports in January and July each year. While the**

**Committee express some satisfaction that need for spectrum audit has been acknowledged by the Department and they have initiated some action in that direction, the Committee express unhappiness that the Department have not spelt out the reasons for not conducting the spectrum audit as recommended by TRAI all these years. The Committee need not emphasise that audit of spectrum will not only help in better utilization of this precious resource but also make its utilization more efficient and skilful. The Committee deplore that such an important recommendation of TRAI has been overlooked by the Department. At the same time, the Committee feel that requesting various Ministries/Departments, State and UT Governments to conduct self-assessment of their spectrum holding will not suffice as there is a need for engaging some specialized agencies for centralised audit of spectrum. Since spectrum is a scarce natural resource, the Committee reiterate their earlier recommendation that audit of all allocated spectrum both commercial as well as spectrum allocated to various PSUs/Government Organizations be conducted at the earliest and the findings shared with them.**

**(Recommendation Sl. No.7)**

**Issues Relating to High Spectrum Price in the Country**

15. The Committee, in their original Report, had recommended as under:

> "COAI has informed the Committee that TRAI had recommended Rs.492 crore per MHz as reserved price for spectrum in 3300 MHz to 3600 MHz for 5G which is far higher than the auctioned spectrum price in other countries. Comparison of unit pricing of 5G spectrum with other countries indicates that it is 7 times costlier than UK, 14 times costlier than Australia, 35 times costlier than Spain and 70 times costlier than Austria. Bharti Airtel has informed the Committee that the price recommended by TRAI is exorbitantly high and ranges from 3-70 times of the market determined price of the spectrum in other countries in absolute terms and is 16 times of the price in relative terms. They are of the view that there is a need to strike a balance between the Government's expectation to generate revenue from the auction and growth of the sector and the overarching impact of 5G across the sectors. Commenting on the issue, representative of TEMA stated that the policy of spectrum in the country is of inverted structure. Raw material is expected to be purchased at highest price and the product at minimum price which is absolutely unviable. Having noted the unanimous view of industry associations and Telecom

Service Providers that spectrum price in India is exorbitantly high and that there is a need to review the spectrum price by taking into consideration factors, such as per capita and ARPU in the country, the Committee sought the views of TRAI on spectrum price. TRAI, to the surprise of Committee, have informed that if comparison is made in terms of population and geographical size, India's spectrum price is one of the lowest. The Committee note, however, that 5G is not intended to be rolled out everywhere in the country, nor extend to the entire population, for some years. TRAI further stated that there are well-defined parameters and if we compare all these parameters India's price is very moderate. The Committee are also given to understand that TRAI have given the reserve price of the spectrum after due consideration of all the aspects and due consultation with the stakeholders. The Department have informed the Committee that proposals for auction of spectrum in various bands including reserve price, after due consideration of TRAI recommendation will be placed before the Cabinet for a decision. The Committee further note that in order to ease the burden of high spectrum cost, TSPs had been given a one-time opportunity to opt for a higher number of installments (16) instead of the previously permitted 10 installments in respect of spectrum auction deferred payment, subject to the Net Present Value (NPV) being protected. The Committee have also been informed that considering the stress in the sector, the Government have given an option to the TSPs to defer payment of the spectrum auction installments due for 2020- 21 and 2021-22, either for one or both years. The Committee have been informed that all the operational TSPs have generally opted for moratorium of 2 years and deferment of spectrum auction installments will ease the cash outflow of the stressed TSPs and facilitate payment of statutory liabilities and interest in bank loans. Their industry body COAI, on the other hand, have stated that there is a need to rationalize other levies and duties on the telecom sector so as to ease their financial burden, such as providing soft loans against GST input line credit due to operator, reducing spectrum usage charge by 3 per cent for all TSPs and license fees from 8 to 3 per cent, soft loans at MCLR rate using the GST input credit as collateral etc. Going by the merits of the submissions from both sides, the Committee find that there are fundamental differences between the versions of TSPs and TRAI on fixing of spectrum price in the country and there is a need to review the spectrum pricing policy in the country. The divergent views given by the two sides also implies that there is a need to revisit the nuances of spectrum pricing in other countries and adopt the best practices. The Committee are of the view that telecom is the backbone of many important sectors of economy. Both DoT and TRAI which are at the forefront of telecom revolution in the country need to pay adequate attention to the concerns expressed by the TSPs and industry associations. Considering the stress in the sector and that the 5G ecosystem is yet to be developed, keeping such a huge reserve price for 3.3 GHz to 3.6 GHz will undoubtedly have an adverse impact on the ability of the TSPs to fully rollout 5G in the country. At this rate, price for a block of 20 MHz will be Rs.9,840 crore and minimum price

for 80 MHz per TSP will be Rs.39,360 crore. In this, the Committee are of the view that long-term consumer benefit should be the guiding principle and not short term revenue maximization. TRAI need to take the TSPs on board as it is they who are contributing to the growth of the sector. The concerns expressed by TSPs and COAI cannot be ignored but merit attention. Factors such as per capita income and ARPU should also be taken into consideration. The Committee recommend that the issue of high spectrum prices is looked into and DoT/TRAI should come out with a convincing spectrum pricing policy that is sustainable, affordable and acceptable to all, focusing on consumer interest and socio economic goals of our country. The Committee also recommend that the concerns raised by COAI for rationalization of levies and duties on the telecom sector should also be given time bound consideration by the Government, so that financial burden neither acts as a deterrent for TSPs in their move towards 5G nor places an unsustainable burden on the Indian customers."

16. The Department of Telecommunications, in the Action Taken Note, have stated as under:

"As regard to spectrum pricing, it is submitted that the valuation of spectrum is done by TRAI, TRAI uses various methodologies for valuation of spectrum, which can be broadly classified as variations of (i) Discounted Cash Flow(DCF) (ii) Cost savings or avoidance (iii) Multivariate Regression Analysis and (iv) Market Comparisons. TRAI uses average of various alternative valuation methods and benchmark the average value with recent auction discovered price of the Spectrum. In addition to this, TRAI also does a formal process of consultations with stakeholders."

**Comments of the Committee**

17. **Noting that pricing of 5G spectrum in the country is exorbitantly high as compared to other countries in the world and there is a need to review the spectrum pricing by taking into account factors such as per capita and ARPU in the country, the Committee had recommended the Department to look into the issue of high spectrum price and come out with a convincing spectrum pricing policy that is sustainable, affordable and acceptable to all. The Committee had also recommended that the concerns raised by COAI for rationalization of levies and duties on telecom sector should also be given time bound consideration by the Government. The Committee are, however, concerned to note that no action has been taken by the Department/TRAI on the above recommendation of the Committee. In their reply, the Department have merely stated that valuation of spectrum is done**

**by TRAI using various methodologies such as discounted cash flow, cost savings or avoidance, multivariate Regression Analysis and Market comparison. The Committee are also given to understand that TRAI does a formal process of consultation with stakeholders. However, this does not in any way indicate that the Department and TRAI will review the spectrum pricing policy for 5G in the backdrop of high price concerns as expressed by the stakeholders. The concern of the Committee is that price of the spectrum in the country should not become so unsustainable that it may have a long term negative impact for the telecom sector as a whole. Considering the stress in the telecom sector, high spectrum price will have a detrimental effect on TSPs to fully roll out 5G in the country. The Committee reiterate that the concerns of the TSPs with regard to spectrum pricing in the country are given due attention. As the reply of the Department is silent on concerns raised by COAI for rationalization of levies and duties on telecom sector, such as providing soft loans against GST import line credit due to operator, reducing spectrum usage charge by 5 per cent and license fees from 8 to 3 per cent, the Committee impress upon DoT/TRAI to look into these issues for amicable solution to mutual advantage. The Committee reiterate that the Department, in coordination with TRAI, should make sincere efforts to address the above issues/concerns so that financial burden of TSPs neither acts as a deterrent in their move towards 5G nor places an unsustainable burden on the Indian customers.**

**(Recommendation Sl. No. 10)**

**<u>Setting up of 5G Use Case Labs</u>**

18. The Committee, in their original Report, had recommended as under:

> "As per the submission made by COAI, China has been working on use case labs for last two years and claim to have more than 100 use cases for 5G which have been built through initiatives from Government, academia, operators and industry verticals. On the contrary, India does not have any applications or Use Cases which are ready to promote business case and capex investment by operators. Coordinated Government actions are required for enabling digital transformation across sectors. A Digital Readiness Index to measure the same for each sector should be there to monitor progress as well as to enable development of India specific Use Cases. The Committee are given to understand that the

Department are working with different Ministries/Departments for setting up of India specific Use Case in education, healthcare, agriculture, public safety, fintech, etc. So far, Institute of Development and Research in Banking Technology (IDRT), an institute under RBI, in collaboration of Department of Financial Services, has come forward for setting up of 5G use case lab in Banking and Financial Services and Insurance (BFSI). The Department are also presently working with Food Safety and Standard Authority of India for setting up of use case lab in food safety certification and Ministry of Health, AIIMS, Ministry of Housing and Urban Development for setting up of use cases in respective domains. To develop more use cases, the Department have organized 5G Hackathon and have shortlisted 100 use cases for further development. Out of these, 30 Use Cases will be demonstrated along with TSPs to learn 5G use cases and roll out challenges. On the suggestions of COAI for development of Digital Readiness Index, the Department have stated that Broadband Readiness Index is similar to Digital Readiness Index for Telecom sector. The framework on BRI parameters has been prepared based on the objectives of NDCP-2018 and inputs from the industry/expert. The BRI is envisaged to create robust and high quality digital communications infrastructure, attract investments in creating next generation digital communication infrastructure, simplification of compliance and procedures and create a collaborative institutional mechanism between Centre, States and Local Bodies. An MoU has been entered with Indian Council for Research on Institutional Economic Relations (ICRIER) to develop Broadband Readiness Index for Indian States and Union Territories for the period 2019-2022. The Committee also note that the Department are engaged with the States/UT Governments for the development of BRI and the report for the year 2019-20 is under finalization. COAI has further submitted that India is consuming a very large amount of data per capita in various industry verticals and there is a need to convert the data produced into useful services through the development of Use Cases. The Digital Readiness Index of various sectors can be monitored by a cross sectoral entity, such as NITI Aayog. This will facilitate the monitoring of digital transformation in various sectors and thereby facilitate the development of Use Cases for development of digital services in the most digitalized sectors. The Committee note with concern that even though Use Cases have been developed around the world, in India no sufficient use cases have been developed so far for successful implementation of 5G in India. The present status indicates that India is far behind countries like China in term of development of 5G. This will undoubtedly have an adverse impact on rolling out of 5G considering that development of sufficient Use Case labs is required for successful implementation of 5G. The Committee recommend the Department to focus on development of Use Cases by providing suitable incentives and support and Use Case labs which are currently under development should be expedited. The Department need to involve more Government Ministries/Departments, start ups/MSMEs, academia, telecom service providers, industries, etc. for development of Use Cases for 5G in the country with adequate funding and hand holding, wherever required. Considering the fact that coordinated Government actions are required for enabling digital transformation across sectors like

health, transportation, energy, agriculture, etc. the Committee desire that the Department may consider assigning cross sectoral entity like NITI Ayog to monitor Digital Readiness Index of various sectors so as to facilitate the development of use cases for development of digital services in the more digitalized sectors. The Committee also recommend that the Broadband Readiness Index Report for the year 2019-20, which is under preparation should also be finalized at the earliest."

19. The Department of Telecommunications, in the Action Taken Note, have stated as under:

"Department of Telecommunications along with Department of Financial Services have set up 5G Use Case Lab for Banking and Financial Services of India (BFSI) at Institute of Development and Research in Banking Technology (IDRBT), Hyderabad. They are working on FinTech Use cases. DoT is also working with other stakeholders for setting up of Use Case Labs in other economic verticals.

Department of Telecommunications has already finalized the Broadband Readiness Index Report for the year 2019-20."

**Comments of the Committee**

20. **The Committee are not satisfied with the reply given by the Department on status of development of 5G Use Cases in the country since the reply has not gone beyond the status furnished earlier. This indicates that sufficient Use Cases have still not been developed in India for successful implementation of 5G. As per the Action Taken Note the only 5G Use Case Lab that has been set up as on date is for Banking and Financial Services of India (BFSI) at Institute of Development and Research in Banking Technology (IDRBT), Hyderabad. The Committee are given to understand that the Department are also working with other stakeholders for setting up of Use Case Labs in other economic verticals. The Committee feel that the pace at which Use Cases are being developed is rather slow and does not match the pace at which technology is moving. The Department need to revisit the recommendations of the Committee, such as providing suitable incentives and support so that Use Case Labs currently under development gets expedited, involving more Government Ministries/Departments, Start Ups/MSME, Academics, Telecom Service Providers, industries, etc. for development of 5G Use Cases with adequate funding and hand holding whenever required and assigning cross sectoral**

**entity like NITI Aayog to monitor Digital Readiness Index of various sectors. The Committee also desire that the status of development of 5G Use Cases in the country *vis.-à-vis.* other countries where there had been significant progress in development of Use Case may also be furnished to them.**

**(Recommendation Sl. No. 13)**

**Need for Harmonization of Indian Standards with the Global Standards**

21. The Committee, in their original Report, had recommended as under:

> "The Committee note that the need for enhanced rural coverage is one of the important aspects to cover rural and remote areas. IIT Madras and associate institutions have developed a variant to the 3GPP standard (Release. 15) with the objective to enhance coverage in the existing standards and also offered technology solution to implement it. This is called TSDSI RIT and is self-evaluated by an Independent Evaluation Group and submitted to ITU. The standard compliant to the requirements of 5G technology, the TSDSI RIT along with the original 3GPP standard have been recommended by the ITU. Some of the other developing countries also supported the TSDSI RIT considering its relevance for enhanced rural coverage, which implies reduced capex costs to cover a certain defined area. One of the Indian operators also supported the TSDSI standard. The Department have also informed the Committee that after formal release of the standards, the TSDSI may recommend the standard to DOT for its consideration. DoT will take a policy decision after taking several factors into consideration on its Indian adoption. The Department have further stated that TSDSI RIT has been approved by ITU SG5 and one of the standards which has successfully completed all evaluation steps for IMT 2020. This is hence qualified for commercial deployments. It is in final stage of approval by the 193 member states of ITU. TSDSI-RIT (5Gi) is a standard/technology specification approved by ITU which meets the IMT 2020 requirements (including LMLC) with enhanced performance for LMLC rural eMBB use case. The concern of the TSPs relate to TSDSI-RIT. COAI have submitted before the Committee that it is important to have globally harmonized standards for 5G to allow interoperability and economies of scale. India should adopt globally harmonized 3GPP standards. If India adopts any standard other than 3GPP, it would disconnect India from the globally harmonized standard, device & network ecosystem. This would severely impact 5G rollouts, its adoption in India and increase cost. Bharti Airtel also has submitted that current TSDSI RIT standards being proposed for 5G are not globally harmonized. The adoption of TSDSI RIT without global harmonization would make India an isolated island in the global 5G ecosystem. GSMA & GSA have raised concerns on the same with DOT. Bharti Airtel have also cited examples of similar efforts in the past by other countries like China (TS-SCDMA, local 3G standards), Korea (WiBro -local 4G standards) etc. which proved to be failures due to the lack of harmonization of these standards with the global ecosystem. COAI have

further informed the Committee that even after submission of the inputs of the TSPs to TSDSI regarding technical errors, incompleteness, unimplementability aspects and non-testability issues in TSDSI documents, these have not been incorporated in the TSDSI RIT. Issues related to interoperability of the proposed specification with global 3GPP specification still prevail and remain unaddressed. Performance gain of proposed specifications compared to 3GPP specifications have not been established. Also, the 3GPP has identified that there is an overlap in the signalling messages of TSDSI, which will cause interoperability issues. Globally harmonized standards also allow economies of scale. The network and customer devices when developed for mass market will have economies of scale; however, if isolated devices are to be developed for niche market, the cost will definitely rise. COAI have suggested that the timelines should to be laid down for resolution of gaps around Interoperability, Performance, Implementation, Alignment, and IPR in the proposed TSDSI RIT specifications. When the Committee drew the attention of the Department to the above concerns around standards, the Department have stated that India should adopt standards that are harmonized sufficiently with global standards to ensure inter-operability, roaming, and to derive ecosystem benefits such as economies of scale. However, it is possible to adopt carefully enhanced variants of the global standard that specifically provide some features of importance to India such as enhanced rural broadband coverage, without compromising on either inter-operability or economy of scale. ITU standards are in final stages of approval for finalization. India has not adopted any standard for 5G services as yet. On the apprehensions that India will trap itself into a corner isolated from the global 5G ecosystem, Director, IIT, Madras has informed the committee that this is wholly misplaced, as inter- operability and compatibility between the 3GPP 5G and the TSDSI 5Gi standards can easily be ensured, since the latter is merely an enhanced version of the former. Moreover, there will be no cost implications as equipment will support both standards through mere software selection and in a manner transparent to the user. The Committee find that the objective of TSDSI RIT to enhance rural coverage is a worthy initiative; however, the concerns raised by COAI and other TSPs are also alarming and a cause for concern. Going by the merits of the views given by the Department and experts on the one hand and the entirely different views of COAI and TSPs on the other, Committee would like to sound a word of caution that while continuing with fostering innovation in the field of development of 5G standards, India should adopt only those standards that are globally harmonized to ensure interoperability, economies of scale, and help build a conducive device & network ecosystem. Considering that similar efforts in the past by other countries like China, Korea, etc. have been failures due to the lack of harmonization of these standards with the global ecosystem, the Committee would want the Department to be extra careful before adopting such standards in the country. The Committee recommend that the Department should look into the concerns raised by COAI and TSPs and ensure that their concerns are adequately addressed. While emphasizing that India should adopt the standards that are good for the country, the Committee also desire that the Department should also

take into consideration the interests of all before taking the final decision and adopt standards that will be in the best interest of the country."

22. The Department of Telecommunications, in the Action Taken Note, have stated as under:

> "The Telecom Engineering Centre (TEC) follows transparent process of stakeholder's consultations and also take into consideration the interests of all before taking the final decision and adopt standards in the best interest of the country.
>
> For providing the service, the TSPs may utilize any type of equipment and product that meet TEC standards, wherever made mandatory by the DoT from time to time. In the absence of mandatory TEC standard, the TSPs 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/Licensor from time to time."

**Comments of the Committee**

23. **The Committee had noted divergent views on adoption of 5G standards in India specifically relating to adoption of TSDSI-RIT (5GI) which is a standard/technology specification approved by ITU. The concern of the TSPs is that if India adopts standards other than the most compatible with the emerging international environment, it would disconnect India from the globally harmonized standard, device and network ecosystem. COAI had also raised various issues, such as technical errors, incompleteness, unimplementability and non-testability issues relating to TSDSI RIT, etc. Accordingly, the Committee had sounded a word of caution that while continuing to foster innovation in the field of development of 5G standards, India should adopt only those standards that are globally harmonized to ensure interoperability, economies of scale, and help build a conducive device and network ecosystem. The Committee had also recommended that concerns raised by COAI and TSPs are looked into and adequately addressed by the Department. The Department in the Action Taken Note have stated that the Telecom Engineering Centre (TEC) follows transparent process of stakeholder's consultations and also takes into consideration the interests of all before taking the final decision and adopt standards that are in the best interest of the country. The Committee have also been**

**informed that the TSPs may utilize any type of equipment and product that meet TEC standards, wherever made mandatory by the DoT from time to time. In the absence of mandatory TEC standards, TSP may utilize only those equipment and products which meet the relevant standards set by International Standardization bodies. The Committee find the reply of the Department evasive which does not in any way assure the Committee that DoT/TRAI are making efforts to address the concerns raised by TSPs and COAI with regard to adoption of TSDS RIT. If the concerns of the TSPs and COAI are to be believed then the adoption of such India specific standards is going to have disastrous consequences for the country. Though experts have maintained that the concerns raised by TSPs and COAI are unfounded and misplaced as interoperability and compatibility between 3GPP 5G and TSDSI (5Gi) standards can easily be ensured, the Committee, still feel that adequate safeguard need to be put in place by the Department at decision making/policy level so as to address the concerns of the TSPs which is clearly missing in the Action Taken Notes. Keeping in view the gravity of the concerns expressed by the TSPs and COAI, the Committee desire that the Department consider the issues relating to the standards in a fair and transparent manner so that the trust/confidence of stakeholders in the telecom eco-system remains in-tact. This is important when we have instances/examples before us of failure of products/services in countries like China (TS-SCDMA, Local standards) and South Korea (WiBro Local 4G standards) due to lack of harmonization of standards with the global ecosystem. The Committee are hopeful of Department's due indulgence in the standards issue and suitable measures will be taken to address the concerns raised by COAI and TSPs in adoption of standards which are globally harmonized to ensure interoperability, economies of scale, and help build a conducive device and network ecosystem in the country.**

**(Recommendation Sl. No. 14)**

**<u>Promotion of Domestic Manufacturing of Telecom Equipment and Affordable 5G Handsets</u>**

24. The Committee, in their original Report, had recommended as under:

> "The Committee note that recently Government have taken many initiatives under "Make in India" and "AtmaNirbhar Bharat" for promotion of

domestic manufacturing in the country. The Committee hope that domestic manufacturing in the country will receive a fillip through the implementation of these policies. The Committee are of the view that the promotion of proper R&D is absolutely necessary for the success of telecom manufacturing in the country. An ecosystem must be developed for complete manufacturing rather than just assembly, as manufacturing gives much higher value addition. A Telecom Research and Development Fund (TRDF) is to be created with an initial corpus of Rs. 1000 crore for promoting research, innovation and manufacturing indigenous telecommunications equipment. The Committee recommend that TRDF as proposed by TRAI should be created at the earliest. Apart from this, the suggestions given by TEMA for extension of PPP MII policies to private telecom operators, and TEC, DOT technical specifications to all public or private operators as also State Government/State PSUs, may be given a thorough consideration by the Department. The Committee also note that India is a price-sensitive market. Therefore, the success of 5G rollout will also greatly depend on the availability of affordable 5G devices. The Committee note that the creation of a mobile manufacturing ecosystem, including components, in the country is the need of the hour. The Committee are also given to understand that the promotion of globally harmonised standards for 5G will allow the development of common smartphones/infrastructure, which will drive down the cost of services. The local standards approach will affect affordable 5G devices, making the devices cost higher apart from causing delay in the rollout of 5G. The Committee recommend that the ecosystem for 5G smartphones and devices is created and nurtured and right incentives are given to domestic manufacturers who should be encouraged under 'Make in India' and "AtmaNirbhar Bharat" to ensure that affordable 5G devices and smartphones are readily available for the successful rollout of 5G services.

25. The Department of Telecommunications, in the Action Taken Note, have stated as under:

"In so far as Committee's suggestion to create Telecom Research and Development Fund (TRDF) with an initial corpus of Rs. 1000 crore for promoting research, innovation and manufacturing indigenous telecommunications equipment, the Digital Communications Commission (DCC), inter-alia, deliberated the proposal during its meeting held on 19.09.2020 and noted that the Working Group for the Telecom Sector in the 12th Plan had proposed to create the three funds with a total corpus of Rs. 17,500 Crore for promoting Research & Development (R&D) and manufacturing of telecom equipment during the 12th Five Year Plan period. However, the Cabinet on 10th December 2014 approved a proposal of DeitY (Department of Electronics and Information Technology), now Ministry of Electronics and IT (MeitY) to establish an Electronic Development Fund (EDF) for attracting venture funds, angel funds and seed funds towards R&D and innovation in the specified areas.

As regard to Promotion of Domestic Manufacturing of Telecom Equipment and Affordable 5G Handsets, it is to state that Department of Telecommunications has notified Production Linked Incentive Scheme

(PLI) on 24th February 2021 for Telecom and Networking Products within overall budgetary outlay of 12,195 INR Crore over a period of five years. The PLI Scheme intends to promote Telecom and Networking Products manufacturing in India and proposes a financial incentive to boost domestic manufacturing and attract investments in the target segments of telecom.

Further, for the availability of affordable 5G devices including 5G Smart Phones, Production Linked Incentive Scheme for Large Scale Electronics Manufacturing notified on April 1, 2020."

**Comments of the Committee**

26. **The Committee express their displeasure that the Department have not made their stand clear on the issue of extension of PPP MII policies to private telecom operators, and TEC, DoT technical specifications to all public or private operators as also State Governments/State PSUs. The Committee had been informed by representatives of TEMA during the examination of the subject that Public Procurement Preference to Make in India (PPP MII) policies was applicable to only Central Government and Central PSUs and thus PPP MII policy addressed only about 10 per cent of the market share of telecom service providers. The Committee are of the view that even this share is also gradually declining. It is unfortunate that only PSUs are placing orders for Indian manufactured goods, and purchasing Make in India, IDDM products which might remain unsold. In this backdrop, the suggestion of TEMA for expansion of PPP MII policies to private telecom operators need to be given positive consideration by the Government for giving a boost to domestic manufacturing and their sustained promotion in the country. This will also give credence to initiatives such as 'Make in India' and 'Atma Nirbhar Bharat'. Considering that critical projects like BharatNet, Network for Spectrum (NFS) projects are being implemented using domestically developed equipment, the Committee see no reasons why Indian manufactured products are not deemed suitable alternative by private TSPs or other entities. The Department have also not furnished any reply on the recommendation of the Committee for extension of TEC, DoT technical specifications to all public or private operators as also State Governments/State PSUs. The Committee, therefore, reiterate their earlier recommendation on the need for extension of PPP MII policies to private telecom operators, and TEC, DoT**

**technical specifications to all public or private operators as also State Governments/State PSUs. The Committee desire that the Department will make their stand clear on all the issues and difficulties, if any, in extending these conditionalities to private entities, etc. shall be furnished to them.**

## CHAPTER II

## OBSERVATIONS/RECOMMENDATIONS WHICH HAVE BEEN ACCEPTED BY THE GOVERNMENT

### (Recommendation Sl. No. 1)

The Committee note that 5G is a new member of the vast global communications eco system. The four components of this eco-system are standards development, equipment design and IP development, manufacturing and service provision. 5G standardization and deployment are at a nascent stage and the technology is considered likely to reign the next decade or more considering its relevance across industry verticals. 5G will extend the use of technologies across new sectors of economy. It will enable service providers to develop novel business models to offer innovative applications in different economic verticals from industrial, commercial, educational, healthcare, agricultural, financial and social sectors. Several countries across the globe have already taken a foray into 5G technology.

**Reply of the Government**

Para contains views of the committee on 5G Technology.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25$^{th}$October, 2021)

### (Recommendation Sl. No. 2)

The Committee note that an Inter-Ministerial High-Level Forum for 5G India 2020 was constituted in September, 2017 to articulate the vision for 5G in India and to recommend policy initiatives and action plans to realize this vision. This Committee submitted its Report titled “Making India 5G Ready”in August, 2018. Based on the Report, the Government is creating an enabling framework for development of 5G services in India. The 5G services are expected to be introduced gradually and advance to a full range of services as ecosystem and demand for services grows. As per the above Report, 5G is the next generation of cellular communications technology with evolutionary and revolutionary services that can have a deep impact on India. 5G can unleash new economic opportunities and societal benefits giving it the potential for being a transformational force for Indian society. It can help the country leapfrog the traditional barriers to development as well as advance the “Digital IndiaMission”. The cumulative economic impact of 5G on India can reach one trillion USD by 2035. The Committee note that the 3GPP (3rd Generation Partnership Project), an industry driven standardization body that has undertaken the standardization of mobile technologies for the past 25 years, is currently in the process of developing standards for 5G networks based on the ITU requirements. The Committee have been informed that the Fifth Generation (5G) mobile communication technology is a paradigm shift in the field of communications as it not only enables human to human communications but machine to machine communication in a digitally connected world with a variety of use cases.

However, there are apprehensions that India is set to miss the 5G bus due to lack of preparedness, spectrum issues, inadequate use-case development, uncertainty around sale of radio waves for 5G, etc. The Committee find that inadequate availability of spectrum, high spectrum prices, poor development of use cases, low status of fiberization, non-uniform RoW issues, deficient backhaul capacity, etc. are some of the factors coming in the way of rolling out of 5G services in India. Considering the immense benefits of 5G for a country like India, the Committee took up the subject India's preparedness for 5G for detailed examination. During the course of examination of the subject, the Committee heard the views of the representatives of the Ministry of Communications (Department of Telecommunications) and Telecom Regulatory Authority of India (TRAI). The Committee also heard the views of the representatives of the Cellular Operators Association of India (COAI), Telecom Equipment Manufacturers Association of India (TEMA) and representatives of three Telecom Service Providers viz., Reliance JioInfocom Limited, Vodafone Idea Limited and Bharti Airtel Limited. The Committee examined the subject in the light of the views expressed by the above stakeholders and written documents/information furnished by DoT, TRAI, COAI, TEMA and TSPs. The Committee also received inputs from the professors of IITs involved in 5G Test bed development. All the issues relevant to the subject have been dealt with in the succeeding paragraphs.

**Reply of the Government**

Para contains review of the HLF Report "Making India 5G Ready" with stakeholders and issues in rolling out of 5G services.

(Ministry of Communications/Department of Telecommunications O.M. No. O.M. No.12-14/2019-IC Dated the 25th October, 2021)

**Spectrum for Industrial Use**

**(Recommendation Sl. No. 8)**

TEMA have submitted that apart from Enhanced Mobile Broadband (EMBB), Industry 4.0 is the main driver for 5G. Industry 4.0. is mooted in the concept of advanced manufacturing, also called Smart Manufacturing. Industry 4.0 based solutions enable better interoperability, more flexible industrial processes, and autonomous and intelligent manufacturing. Many countries in the world like USA, Germany, UK and Australia have allocated 5G spectrum for industrial development. For example, in Germany, Mercedes is setting up a factory entirely based on 5G, termed as 'Factory 56'. Many countries are setting aside spectrum and laying out policies for industrial growth using 5G. Not only industry, captive users of mobile wireless communications are industries, police, paramilitary, fire, forest and mining, municipal corporations and public utilities as well as critical infrastructure services like Railways, Metros, Airports, Sea Ports, Refineries, Highways, etc. As per the present policy of licensing, TEMA have stated that they have to apply to WPC/DoT for three licenses – Captive Mobile Radio Trunking Services (CMRTS) License, Spectrum License and import License which usually takes six months to two years. They have further informed the Committee that since these captive users only need wireless spectrum for their 'captive' use only, it appears that there should be no need for a separate

CMRTS license. TEMA have requested that TRAI may be requested to conduct a public consultation on spectrum needs and issues for captive users. TEMA have also stated that a group be formed to work out policy for spectrum allocation and spectrum of 5G for 4.0 industrial uses. The Committee feel that Industry 4.0 will be one of the main drivers of 5G in days to come. However, the present licensing policy is not conducive to the growth of Industry 4.0. The manufacturing industry's choice and decision to come to India is heavily dependent on how quickly the Government of India can go ahead and allocate spectrum for 5G-driven industry. The issues relating to licensing and allocation of spectrum for Industry 4.0 need to be properly streamlined to attract the manufacturing industry to set up their base here and also to reap the full benefits of 5G in industry. In this regard, the Committee desire the Department to look into the above suggestion given by TEMA and also to explore all possible issues needed for the success of Industry 4.0, so that spectrum can be allocated and proper policies are laid down for industrial growth of the country using 5G. The Committee would like DoT/TRAI to take the views of stakeholders on board in the matter.

**Reply of the Government**

In this regard, it is to state that Industry 4.0 will also be tested as one of the use case by TSPs along with OEMs and indigenously developed 5G technology/use cases. The requirement/allotment of spectrum for Industrial development using 5G have been noted.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

**Setting up of Indigenous 5G Test Bed**

**(Recommendation Sl. No. 9)**

The Committee note that the Department of Telecommunications had approved financial grant for multi-institute collaborative project to set up 'Indigenous 5G Test Bed' for building end-to-end 5G Test Bed in India in March, 2018 with total cost of Rs.224.01 crore. The Test Bed was expected to be ready by October, 2020. However, due to the Covid-19 pandemic, the work of hardware design, fabrication and testing was adversely affected. The test bed is likely to be set up by October, 2021. The Committee have been informed that the indigenous test bed is completely home-grown and it is first of its kind, wherein eight leading academic and research institutes have come together to build the test bed with Government support. The eight collaborative institutions are IIT (Indian Institute of Technology) Madras, IIT Delhi, IIT Hyderabad, IIT Bombay, IIT Kanpur, IISc Bangalore, Society for Applied Microwave Electronics Engineering & Research (SAMEER) and Centre of Excellence in Wireless Technology (CEWiT). India's effort is unique with special focus on setting up a Test Bed that will be utilized by academic, industry, telecom operators and startups to develop solutions and use cases which can be India specific. The Test Bed is going to raise India's visibility in the global forums and standardization bodies. The Committee also note that 5G Test Bedproject is focused on developing IPRs in the country in 5G

technology. Some of the IPRs generated by this project can also be utilized for product development for the Defence sector of the country. It is expected that technology spin-offs from this Test Bed will enable Indian industry and startups to enter the Indian and global markets for 5G telecom equipment, thus addressing a critical gap in our economic and security prospects. The Department have informed the Committee that the Test Bed is not a commercial project, only what is reasonable or affordable will be charged. The Department also foresee a lot of private sector participation for testing. The Committee are happy to note that the 5G test bed project which is a good example of harnessing the talents and capabilities in the country is progressing well and is going to be ready for operation by October, 2021. The Committee hope that the balance fund of Rs. 45 crore allocated for the project will be utilized fully and project becomes operational as per schedule. It is indeed encouraging to note that some of the best Institutes in the country are making collaborative efforts to develop end-to-end and open Test Bed for 5G. While appreciating the efforts put in for 5G test bed as a right step for promotion of indigenous technology, startups, Indian innovators, the Committee desire that more such collaborative efforts are encouraged in future too by involving more and more Institutes/Industry verticals. The Committee recommend that efforts should be made to get the Test Bed ready and operational as per schedule and the Department must ensure that the deadline is not further extended. The Committee may be kept apprised of the progress of the project and its technological spin-offs.

**Reply of the Government**

The Test Bed is planned to be realized in stages over 4 versions –Version 0 (V0) to Version 3 (V3). The initial two versions have been completed. The development and testing of Version 2 (V2) is under progress at present. It is anticipated that the final version (Version 3) will be ready by October, 2021.

The issue regarding usage charges of the 'Indigenous 5G Test Bed' is under examination at present in consultation with industry & other stakeholders.

An amount of Rs. 222.24 crore out of total cost of Rs.224.01 crore has been released so far for the project 'Indigenous 5G Test Bed' to various grantee institutions. The allocated fund of Rs 224.01 crore will be fully utilized.

As regard to encourage collaborative efforts in future by involving Institutes/Industry, it isto intimate that DoT has already requested various Ministries for setting up of Use cases in different economic verticals of 5G Technology.

The Department of Telecommunications has launched '5G Hackathon' on 21st February 2020. The objective of the Hackathon was to identify and promote applications relevant to India in the 5G realm. DoT has selected 100 winners in Phase 1 who have submitted their solutions for further evaluation. These applicants have been requested to offer their products for testing by TSPs during 5G Technology trials. The winners will also get an opportunity to test their products on test beds as well as technology trial networks.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25thOctober, 2021)

**Experimental Spectrum Policy and Conduct of 5G Trial**

**(Recommendation Sl. No. 11)**

The Committee have been informed by the Department that the Government have allowed all applications for 5G trials, in limited areas and for a limited time, to test potential 5G India specific use cases based on enhanced Mobile Broadband (eMBB), Massive Machine Type Communications (MMTC) and Ultra Reliable Low Latency Communications (URLLC) in isolation on non-commercial basis subject to strict safeguards. The Department have received 16 applications for 5G trials, using imported as well as indigenous technologies. 5G trials were likely to be started in 2-3 months. DoT have issued guidelines for assignment of spectrum for trials across all available spectrum bands on a nominal fee of Rs.5000. Guidelines for experimental spectrum has also been issued. An Inter-Ministerial Committee has been constituted under Member (Technology) in the Department of Telecommunications for monitoring and evaluation of 5G technology trials. With regard to Indian entities/TSPs that have been issued experimental license, the Department have informed that so far one experimental (radiating) license for 5G Test Bed at IIT, Delhi has been issued on 20.04.2018 with 3 months' validity and 5G field trials have not yet been permitted. Though the Department submitted that there are no major issues confronting trials in the country, industry body COAI flagged a number of issues relating to trial spectrum. These include, license for trial spectrum should be for minimum one year, flexibility to conduct trial in any city/location within the circle as per allocated trial spectrum, singe window clearance for the trial license, no equipment/application vendor restriction for conducting lab trial, import duty waiver in 5G trial equipment, etc. TSPs also echoed the same sentiment during evidence that for proper commercial 5G roll outs to take place by 2022, there is an urgent need to initiate the trials now and start to build the ecosystem. COAI brought out the concern that though TSPs submitted the applications of 5G trial in January, 2020, till date the guidelines for trials have not been made clear and there is no set date for commencement of these trials. Bharti Airtel specifically emphasized that the lab and field trials of 5G should be carried out extensively to test factors, such as interoperability, testing of indigenous 5G infra based an Open RAN ecosystem with the commercial 5G handsets. The trial is also critical to ascertain the interoperability of 5G infra with the existing 4G networks, serving as an underlay network for 5G services. Notwithstanding the submission of TSPs, and the industry body, it is really disturbing to note that 5G trials have not yet been permitted. This is in complete contradiction to what the Department had informed the Committee during examination of Demands for Grants (2020-21) in the month of February, 2020 that Government have allowed all applications for 5G trials in limited area and for limited time to test potential 5G India specific use cases. The Department have also issued only one experimental (Radiating) license to IIT Delhi for 5G Test Bed in April, 2018 with 3 months' validity. The Committee wonder why spectrum for 5G trial has still not been allowed when the Department have categorically stated that there are no major issues confronting trials in the country. Considering that TSPs have submitted their applications for 5G trials in the month of January, 2020, the Committee would like to know the reasons for the delay in issuing spectrum for 5G trials to TSPs.The Committee feel that 5G trials are an essential prerequisite for building the 5G ecosystem and the Department need to take the issues of experimental spectrum and early

conduct of 5G trials more seriously. Any further delay will only have an adverse impact on building an ecosystem for 5G in the country and will further delay the launching of 5G services. The Committee recommend that the guidelines relating to experimental spectrum are streamlined and implemented in letter and spirit. The concerns raised by COAI for bringing in improvements in 5G trials may also be looked into by the Department. The Committee anticipate the number of field trials in the 5G spectrum to accelerate in the coming days.

**Reply of the Government**

As regard to 5G Technology trials, the trials will be conducted on non-commercial basis and in an isolated network. The data generated during the trials shall be stored in India. TSPs are also expected to facilitate the testing of the indigenously developed use cases and equipment as part of the trials. Each TSP will have to conduct trials in rural and semi-urban area also.

DoT has granted permission to Telecom Service Providers namely, M/s Bharti Airtel Ltd., M/s Reliance JioInfocomm Ltd., M/s Vodafone Idea Ltd. and M/s Mahanagar Telephone Nigam Limited during May-June 2021 for conducting 5G Technology trials with different technology/ Original Equipment Manufacturers (OEM) partners for a period of 6 months at various locations across the country. The spectrum assigned for these trials is in 700MHz, 3.5GHz, 26/28 GHz, 60GHz (V band) & 76 GHz (E band) frequency bands as per TSPs' requirements.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25$^{th}$October, 2021)

**India's Contribution in Developing 5G Standards**

**(Recommendation Sl. No. 12)**

The Committee note that the Department and Telecom Standards Development Society India (TSDSI), in collaboration with the IITs, have been successful in getting the Low Mobility Large Cell (LMLC) use case accepted by ITU as one of the 5G requirements for rural area. LMLC reflects the need of rural India in which the distance between two Base Stations will increase up to 6 km against 1.73 km by other technology. This technology will be beneficial for India as well as other developing countries. The TSDSI has been established to enable Indian industry to take the lead in international standardization activities. Currently Indian contribution in design ownership of telecom products is very limited and the Indian market has been a significant user of global products. The Department have informed the Committee that LMLC is part of the IMT-2020 requirements for ITU. This mainly looks at rural connectivity by placing base stations at Gram Panchayats and providing connectivity to the neighbouring villages and farms. LMLC requirement was strongly supported by many African countries in ITU. The Committee have also been informed that the standard could be useful for deeper penetration in urban areas for other 5G applications.

Director, IIT, Kanpur has hailed the achievement of TSDSI facilitating the LMLC contribution from India to ITU as an important beginning in 5G revolution. Commenting on the issue, Director, IIT, Madras also stated that the rural towers have to be located where the BharatNet fiber ends, i.e. at approximately 2.5 lakh Gram Panchayats. From the towers at these locations, neighbouring villages numbering more than 3.5 lakh villages have to be provided wireless coverage. Roughly 33 per cent of these villages are between 3-6 km away from the Gram Panchayats, the rest being within 3 km. Ensuring coverage to these villages at distance up to 6 km. is therefore crucial if a large fraction of rural Indians is not to be left out of 5G as well. The Department have also informed the Committee that in addition to LMLC, academia, R&D units, startups and Indian companies are participating with Government in 3GPP, ITU, IEEE, IEC and are engaged in providing contributions to developing the standards and trying to incorporate Indian technologies. The Committee are given to understand that more efforts can be made by the Indian research community to take their research contributions to 3GPP and other global standards development organization such as IEEE through forum offered by TSDSI. The Committee are of the view that LMLC is a suitable technology for providing telecom connectivity in rural India. The Committee are glad to note that for the first time a global standard is emerging from India at ITU. This will enhance rural coverage and reduce capex cost. It is indeed a big achievement to note that LMLC use case has been accepted by ITU as one of the 5G requirements for rural area. The Committee are given to understand that LMLC is a test configuration for rural eMBB use case which has become part of the IMT 2020 performance requirements at ITU. The Committee recommend the Department to make sustained efforts to contribute in development of 5G standards by engaging academia, R&D units, startups and Indian companies. The Committee desire that the Department continue to represent the aspirations of the rural population and facilitate their access to telecom services and keep on safeguarding their interest in international forums such as ITU.

**Reply of the Government**

The standards for IMT 2020 (International Mobile Telecommunications 2020) have been finalised by International Telecommunications Union (ITU), Geneva vide press release dated 26th November 2020. 5Gi supported by DoT has been approved as an ITU standard for IMT-2020 along with 3GPP's 5G. Both meet all requirements required by ITU for being approved as fifth generation wireless technology.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

**Development of Open RAN in the Telecom Network**

**(Recommendation Sl. No. 15)**

The Committee note that in a single RAN model, the control to resolve many of the challenges that confronts the TSPs on a day-to-day basis lies with just one telecom vendor, which designed the particular hardware/software because the software and interfaces remain either proprietary or closed by the individual vendor and are often tied to the underlying hardware by the same

vendor. 'Open RAN' is a movement in wireless telecommunication to disaggregate hardware and software and to create open interfaces between them. Open RAN is about de-coupling of hardware and software and thus provides more choices and interoperability. In cost effective market like India, Open RAN promises to offer a substantial saving to the telecom operators and also help in promoting 'Make in India' and 'AtmaNirbhar Bharat'. The Committee have been informed that Open RAN can have a large presence in India provided supportive policy and enabling environment are put in place to accelerate the revolution. Considering the fact that it has the potential to give the legacy telecom equipment vendor a strong and effective competition in the RAN market, the Committee desire that the Department create an enabling environment for Open RAN in the country by providing financial incentives for research, development and production of Open RAN solutions. The suggestion of the TSP for enabling Open RAN Centre for Excellence is worth consideration by the Department. This will not only lead to cost saving and other benefits for the TSPs but will also help India to emerge as a global leader in Open RAN hardware and software development. The Committee recommend the Department to take suitable policy measures for promotion of Open RAN in the telecom sector by providing requisite thrust in this direction.

**Reply of the Government**

TSPs are doing 5G technology trials using Open RAN technology. DoT, Telecom Engineering Centre and TSDSI are working with various stakeholders on Open RAN.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

**Development of Indigenous 5G Technology**

**(Recommendation Sl. No. 16)**

The Committee are given to understand that Reliance Jio had developed its own 5G technology using 100 per cent home-grown technologies and plans to offer it to other telecom companies. The Committee note that the Department have sought details from them. However, the Department have not tested the technology and examined it. Jio has also given an application for a trial using their own technology. With regard to the development of 5G technology by domestic industry, the Committee have been informed that apart from Reliance Jio, 5G Test Bed is coming up with technology, and the Department are also encouraging C-DoT to come up with 5G technology. ITI has also recently tied up with system integrators like Tech Mahindra, TCS etc. for 4G equipment. They are also discussing with couple of Indian companies with 4G upgradable to 5G solutions. ITI has the capabilities to take up manufacturing of Radio equipment for 4G/5G and has been discussing with Original Equipment Manufacturers to have transfer of technology to manufacture these products. TEMA have also informed the Committee that Indian OEMs have proved time & again their

expertise on technologies. Indian prowess on Software is recognized world over. In recent times there is more of software in telecom equipment than hardware. Indian telecom equipment has already proved them in implementing many mission critical and national importance networks (Bharatnet, NFS, AFNET etc) based on domestically developed equipment. 5G standards are Open standards. Foreign OEMs has an edge in 2G, 3G & 4G; however, in the case of 5G, this is not the case. All components can be developed individually with no dependency on one component working over the other, as 5G Use Cases do not just cover Mobile Users but a plethora of applications. TEMA requested that for 5G, domestic procurement be made mandatory, so that Indian companies are able to first have an in-country deployment base and then are enabled to enter the world market. The Director, IIT, Kanpur also emphasized on the need for developing indigenous 5G technology. According to him, India currently has an insignificant share of its own home-grown product or equipment manufacturing companies in the domain of mobile communication technology. As discussed earlier, we missed the 3G and the 4G bus already. However, due to the changed nature of network components and the architecture of 5G, we now have an opportunity to develop products in India. Unlike specialized hardware elements in the earlier generations of mobile networks, a large number of equipment/network entities in the 5G network will be based on software running on off-the-shelf hardware. Specialized chipsets and hardware elements may not be needed for most of the network entities in the 5G network, barring elements like Radio Frequency front-ends and the antenna sub-system. This provides an opportunity to Indian vendors (R&D and software vendors) to leapfrog and start developing a 5G network equipment for deployments in India and across the world, given our expertise in software. The Committee are of the view that the development of indigenous 5G technology by the domestic telecom industry is very important in view of the fact that India is greatly dependent on the import of telecom equipment. Considering that there will be multi-fold increase in demand for telecom equipment to provide ubiquitous connectivity, it is desirable that the Department should take initiatives to promote domestic capabilities and support Indian companies for developing home-grown technologies. This will not only help in addressing the burgeoning telecom import bill and help save precious foreign exchange, but will also help in addressing national security concerns. India has missed the 3G and 4G bus; however, it is comforting to note that, due to the changed nature of network components and the architecture of 5G, it offers us an opportunity to develop products in India. The Committee note that the key design principles used by 5G networks called 'softwarization' of network components provides an opportunity to Indian vendors (R&D and software vendors) to leapfrog and start developing 5G network equipment for deployment in India and across the world, given our expertise in software. The Committee recommend that sincere efforts must be made by the Department so that India can take full advantage of the opportunities emerging out of 5G. It will be a great achievement if Indian companies can develop end-to-end 5G technology and emerge as global players in 5G technology. The Committee would like the Department to work in a mission mode in order to encourage Indian companies to develop home-grown 5G technologies. The Committee further recommend that the Department should make serious efforts to minimize their reliance on foreign support and wherever unavoidable due regard be paid to national security considerations.

## Reply of the Government

In March 2018, DoT approved financial grant of Rs. 224.01 Crore for the multi-institute collaborative three-year project to set up 'Indigenous 5G Test Bed' in India in collaboration with Indian Institute of Technology (IIT) Madras, IIT Delhi, IIT Hyderabad, IIT Bombay, IIT Kanpur, IISc Bangalore, Society for Applied Microwave Electronics Engineering & Research (SAMEER) and Centre of Excellence in Wireless Technology (CEWiT). The project envisages setting up of end-to-end open 5G Test Bed for Indian companies & academia in distributed architecture model. It is anticipated that the final version (Version 3) will be completed by October, 2021.

Department of Telecommunications has notified Production Linked Incentive Scheme (PLI) on 24$^{th}$February 2021 for Telecom and Networking Products within overall budgetary outlay of 12,195 INR Crore over a period of five years. The PLI Scheme intends to promote Telecom and Networking Products manufacturing in India and proposes a financial incentive to boost domestic manufacturing and attract investments in the target segments of telecom.

5G Hackathon had been organized and the Department have shortlisted India specific 100 use cases for further development. 30 out of 100 use cases will be demonstrated along with TSPs to learn 5G use cases and roll out challenges.

Reliance Jio Infocomm Limited has been granted permission on 27$^{th}$ May 2021 for 5G Technology trials with their own indigenous products at various locations. C DoT has also been granted permission to conduct 5G technology trials with MTNL. Telecom service providers who has been granted permission for 5G Technology trials are also expected to facilitate the testing of the indigenously developed use cases and product/equipment as part of the trials.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25$^{th}$October, 2021)

## Uniform RoW Policy across States

**(Recommendation Sl. No. 17)**

COAI have submitted that Uniform RoW policy across states has a critical role in the operationalization of a strong and robust 5G telecom network in the country. India lacks fiberized sites and there needs to be strong Government push to build at least 50 percent sites on fibre. Providing free RoW for this will be a great contributor in the national interest of providing 5G access to the entire nation. Explaining the difficulties, the representative of Reliance Jio stated that there are multiple agencies right from State Governments, Municipalities to RWAs which have erected entry barriers to the laying of fibre. The ability of the TSPs to reach out to the customers is seriously hampered by delays, exorbitant costs and non-uniform RoW rules and this could be the single largest cause of delay in the expansion of the 5G network across the length and breadth of the country. The Department have stated that The Indian Telegraph Right of Way Rules, 2016 (IT RoW Rules, 2016) govern the RoW for setting up of towers and laying of fibre in the country. Some of the main challenges in providing RoW

across all States/UTs are delay in issuing permissions due to lack of an online single window clearance system, lack of clarity regarding documents required for submission of application for RoW permission, multiple policies with multiple levies of charges and procedures by many States/UTs, lack of availability of Government Land & Buildings for installation of Mobile Towers (as procedure for the same has not been included by many States/UTs in their existing policies). The IT RoW Rules, 2016 provide uniform rates for granting RoW permission by the States/UTs. So far 16 States/UTs have aligned their RoW Policies/Rules with the Indian Telegraph Right of Way Rules, 2016. Various Seminars, Regional Workshops, Meetings are being held from time to time with the States/UTs, including other stakeholders, for reviewing the implementation of IT RoW Rules, 2016. Requests have been/are being made to Chief Ministers and Chief Secretaries of the remaining States/UTs from time to time for aligning their RoW Rules/Policies with the IT RoW Rules, 2016. The Committee have also been informed by TRAI that a very detailed recommendations have been made by them. They have suggested that a time bound schedule should be prepared for grant of RoW permission and if required, Municipal Act or the Municipal Corporation Act and the Panchayat Act should be amended and specific provisions should be made. There is also increasing cost overruns and in many of the cases the rates are prohibitive. The Committee note that TRAI is going to work with the State Governments and they are preparing a White Paper on it. TRAI have also suggested that to improve the quality of service, modification of building bylaws is also very much required. TRAI have taken up this particular issue with the Ministry of Housing and Urban Affairs. The Committee note that the Right of Way issue is still a big concern in our country. Even though the Department had issued the Row guidelines in 2016, only 16 states have aligned their policies with the RoW rules. The result is that different states are having different rules. Since Local Bodies and municipal corporations are laying down separate rules and this has greatly hampered the work of TSPs to lay fibre, the Committee are of the view that considerable efforts need to be made by the Department on topmost priority for implementation of uniform RoW policies. If the present situation continues, then Row issues will definitely act as stumbling block and it will be difficult for the TSPs to provide the best quality of services. To solve the RoW issues, the Committee desire that the Department should look into the matter by taking various stakeholders on board and come out with coherent and practical solutions. In this regard, the Committee desire that the suggestions given by TRAI for the time-bound issue of RoW permissions, suitable amendment of Municipal or Panchayat Acts, building bylaws, fixing of uniform RoW rates across the country, etc. may be considered by taking it up with concerned Department/Ministry and appropriate authorities at the earliest. The Committee feel that there should be common guidelines for States/UTs for RoW permission and specific provisions for the same may be made in Municipal law. Since modification of building bylaws is also very much required, the Committee recommend that the Ministry of Housing and Urban Affairs may be impressed upon to furnish their views and comments at the earliest, to permit a suitable policy decision on RoW issues for the safe and convenient passage of fibre and also come out early with a White Paper by taking various stakeholders on board. The Committee also recommend that TRAI complete the consultation process on the “Roadmap to Promote Broadband Connectivity and Enhanced Broadband speed” so that suitable recommendations may be issued to the Government for addressing all remaining issues relating to RoW permissions.

## Reply of the Government

As per recommendations of the TRAI, the Government of India has notified, Right of Way (RoW) Rules, 2016 to address the Right of Way related fees and procedures across the country. These rules govern variousRight of way related procedures such as Time-bound permission for RoW, electronic application/approval process, and Dispute Resolution Mechanism etc. These rules provide for one-time administrative fees in relation with establishment of underground/over ground telegraph infrastructure.Till date, 23 States/UTs have issued RoW policies largely aligned with the ITRoW Rules. Remaining States/UTs and other stakeholders are on the way to doing the required alignment. RoW related issues will be largely resolved once all States/UTs and Central Organizations align their RoW policies with the ITRoW Rules. The Department is also working on amendment of the Indian Telegraph Act, 1885 to, inter-alia, incorporate suitable RoW related provisions.

Further, in connection with In-Building Access (IBA) by the Telecom Service Providers (TSPs), the Ministry of Housing and Urban Affairs (MoHUA) has been requested –

(i) To instruct State/ UT Governments to issue necessary directions/ guidelines to Municipal authorities etc. for taking the following steps with respect to the existing private commercial/ residential complexes:-

(a) Providing access to all TSPs on a fair, transparent and non-discriminatory manner in the larger interest of the residents thereof.

(b) In future, no Owners/ RWAs of any existing/new building/complexes shall enter into/renew any kind of agreements with TSPs which results in exclusive access by a particular TSP or lessening of competition thereby taking away choice and flexibility from the residents of such premises which they would have had in terms of Quality of Service (QoS), tariff, redundancy etc.

(ii) To advise all Departments/Owners of public buildings like Airports, Railway Stations, Bus Terminals, Metro Stations/Lines, Hospitals etc for providing access to Telecom Service Providers so that seamless telecom services are available to general public.

(iii) To issue advisory to all concerned Central Government agencies and Public sectors regarding allowing sharing of telecom infrastructure amongst all TSPs.

(iv) To make necessary changes in the Model Building bye-laws and send revised bye-laws to all State/ UT Governments for the following necessary actions with respect to the new building premises:

a) Suitable provision for the creation of Common Telecom Infrastructure (CTI) inside the newly constructed public places and residential complexes should form part of the Model Building Bye-laws.

b) The essential requirement for telecom installations and the associated cabling, which is now a part of National Building Code of India

(NBC) amended by Bureau of Indian Standards (BIS), should be enforceable.

c) The telecom ducts to access the buildings from outside should invariably be part of the CTI, which could be used by TSPs/ IP-Is for putting cables; and should ensure unhindered access to TSPs/ Infrastructure Providers (IP-Is).

d) No building plan should be approved without having a plan for creation of CTI including the duct inside the building.

e) Completion certificate to a building to be granted only after ensuring that the CTI as per the prescribed standards is in place.

f) As part of Building Bye-laws, the builder/RWA should be mandated to ensure that:

- Access to building as well as CTI facilities inside the building should be available on a fair, transparent and non -discriminatory manner and minimum three TSPs/ IP-Is should have presence in the building.
- Public Sector TSPs (BSNL/ MTNL) should be given access to Government and commercial buildings.
- The TSPs/ IP-Is should have unrestricted access for maintenance work.
- The permission to in-building access and/or use of CTI facilities inside the building should not be seen a source of revenue generation.
- Charges (rental/ power rates etc.) levied to the TSPs should be fair, transparent and non-discriminatory.

State/ UT Governments and their agencies and the TSPs are being advised by this Department for needful action to share the In-Building Infrastructure (IBS, OFC & Other cables, Ducts etc.) in all the existing Government/ Public buildings.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25$^{th}$October, 2021)

**Use of E and V Bands for Backhaul**

**(Recommendation Sl. No. 19)**

The Committee note that fibre-based backhaul is still in its infancy in India. There is inadequacy in terms of optic fibre cable density, both in urban and rural areas, and a special focus for its densification in a time-bound manner is essential for 5G deployment. TRAI has recommended a number of strategies for increasing fibre penetration in the country and most of these strategies have been reflected in the National Digital Communication Policy (NDCP) 2018. The

Committee have been informed that TRAI has recommended giving the E band and V band for backhaul and V band, for some portion, as a hotspot and Wi-Fi. The spectrum in E Band and V band will provide high capacity backhaul links for mobile networks and is very important specially for deployment 5G network. E-band was established in the US over 10 years ago. Since then, E-band has grown steadily. E-band is now open in more than 85 countries and the most common regulation for E-band assignment is link-by-link coordination. Over 70 countries across the world including US, UK, Korea, Japan, Australia, Sweden, South Africa among others, have already opened up the 60 GHz (V band) for delicensed usage. However, the Committee were disturbed to see the anguish and frustration of TSPs that in India, the decision to permit the opening of the E&V band for backhaul purposes is still pending. The Department have replied that the issue of allotment of Microwave Backhaul spectrum to the TSPs, which also include E&V Bands, is part of the ongoing process of finalisation of Policy for Normative and Transparent Assignment/Authorisation of Spectrumǁ. The TSPs have requested that Government may consider auction of E and V band along with the spectrum auction. They have expressed the view that this will be like providing airwave based fibre. TSPs have also expressed the view that delicensing is a problem. They have informed the Committee that in the last 18 months, 550 MHz has been delicensed but this has not led to the proliferation of Wi-Fi. On the other hand, the Committee have been informed by the Department that while the TSPs want the E band to be auctioned, Internet Service Providers and others are of the opinion that it should not be auctioned. The Department have further stated that it will be allowed to be used for Wi-Fi only. The Committee clearly note that TSPs are demanding an enabling policy for the E and V bands, keeping in view their usage for both integrated access and backhaul transmission. The Committee note that many fibre rich countries like Japan and South Korea, among others, are already using E&V band for backhaul transmission networks. Keeping in view the fact that the laying of fibre requires manpower, in addition to considerable investments, and that the provision of spectrum in the E&V band will provide the requisite high capacity backhaul links for mobile networks which is essential in 5G deployment, the Committee desire that the Department should identify the spectrum in E&V band and frame a policy and suitable guidelines to allocate them to TSPs for meeting their backhaul needs. The current cumbersome approval process should also be amended. On the issue of delicensing the E&V band, the Committee desire the Department to take a balanced approach where both TSPs and ISPs come to an agreement so that both will equally benefit from the allocation of this scarce resource. The Department should not lose sight of the fact that the telecom operators as they themselves pointed out to have invested thousands of crores in acquiring spectrum for providing telecom services and hence they should not be deprived of providing services in advanced technology due to want of backhaul requirements, which can be taken care of by spectrum in E and V band. The Committee expect the Department to evolve a policy that will give due consideration to all these aspects.

**Reply of the Government**

The recommendations of the committee have been noted and will be taken in to account while deliberating on E and V band spectrum policy and other issues for growth of the telecom sector.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25thOctober, 2021)

**Threat from Imported Telecom Equipment**

**(Recommendation Sl. No. 21)**

The Committee are given to understand that there is a growing reluctance by a number of countries globally to allow Chinese telecommunications operators like Huawei and ZTE to rollout 5G services in their territories. The US and the UK have already banned Huawei over concerns of security. The Department have informed the Committee that they are closely watching 5G development around the world and would take an appropriate decision after evaluating all the pros and cons on 5G ecosystem including social, economic and security considerations. The Department have not specifically banned any company including Huawei and ZTE. In view of the security-related concerns raised by various countries, such as USA and European Union, the Committee feel that adequate precautions should also be taken by India before installing telecom equipment from Chinese sources in the Indian telecom network including 5G. The Committee desire that in-built safety measures be put in place to ensure that the security of the country is not compromised. The Committee also desire that such safety mechanisms should be strictly adhered to by both the public and private telecom companies.

**Reply of the Government**

To ensure the use of secure network equipment in deployment of 5G services, this department has already issued amendment in existing License conditions on 30th March 2021 which is effective from 15th June 2021. As per the amendment, the Licensee shall only connect Trusted Products in the network and also seek permission from National Cyber Security Coordinator for upgradation of existing network utilizing the telecommunication equipment's not designated as "Trusted Products".

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25thOctober, 2021)

**Availability of Reliable Power Supply**

**(Recommendation Sl. No. 22)**

The Committee note that the availability of reliable grid power in India is one of the largest bottlenecks in upgrading the network. Only about 35 percent of the towers in the country are connected to reliable power supply. As regards rural areas, on an average, power supply is available for just 10-12 hrs. Since telecom services are to be maintained on 24x7 basis, the shortfall in the power supply is supplemented through alternate power sources like DG sets, renewable energy solutions and high efficiency battery deployment. The Committee are of the view that there is an urgent need to augment grid power supply, especially in rural areas, by taking up the matter with the Ministry of New and Renewable Energy. This will not only ensure better quality of service but will also help in the greening

of the telecom sector. The Committee also recommend that the Department should make an active effort to introduce renewable energy, such as solar energy, to power telecom towers in the country. The Committee are also of the view that the Department must take the necessary steps to utilize the existing tower infrastructure for installing antennas of the TSPs.

**Reply of the Government**

In order to achieve the objectives of Green Telecom and reduce the carbon footprint, Telecom Regulatory Authority of India (TRAI) had issued recommendations on "Approach towards Sustainable Telecommunications". Government of India has considered the TRAI recommendations and decided for setting up of procedures for measurement of carbon footprint and implement carbon emission reduction targets. Accordingly, directions to all telecom service providers have been issued.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25$^{th}$October, 2021)

**Coordinated Effort Across Sectors for 5G Eco-system**

**(Recommendation Sl. No. 24)**

The Committee note that it is important to develop India-specific Use Cases across different verticals for utilizing the 5G ecosystem. The cross-sectoral Use Cases would require coordinated efforts in managing the 5G ecosystem with cross-sectoral involvement. The Committee have been informed that for cross-sectoral cases of M2M/ IoT, in order to bring M2M industry concerns and regulatory bottlenecks, DoT has proactively formed an M2M Apex Body, a M2M Review Committee and a M2M Consultative Committee. Domain experts from every vertical that has been considered as a potential M2M/IoT market have to get together to address the concerns and also be enlisted to serve in an advisory role to the policy making bodies of the Government. A consultative Committee has been constituted incorporating representatives from Standardizing bodies such as Bureau of Indian Standards (BIS) and Telecom Standards Development Society of India (TSDSI) and sectoral industry representative bodies to bring M2M industry concerns and regulatory bottlenecks to the notice of the Apex body. The scope of the existing committees can be expanded or broadened for inclusion of all the 5G use cases. The Committee observe that 5G will lead to the convergence of multiple sectors and critical sectors will no longer work in silos. This calls for convergence between various regulatory bodies/authorities so as to arrive at a consensus on multiple regulatory frameworks and different laws applicable to them. The Committee recommend that the scope of the existing Committees should be expanded or broadened for inclusion of all the 5G Use Cases. The Committee also recommend that efforts must be made by the Department to work in tandem with different Ministries so that an inter-sectoral regulatory body to deal with regulatory issues emerging due to the development of 5G Use Cases in different sectors may be identified and set up at the earliest. The Committee trust that such regulatory bodies shall intervene in conflict situations and also help formulate policies that will promote innovation in development of 5G Use Cases and local entrepreneurship in the country.

## Reply of the Government

As regard to M2M/IOT ecosystem, it is to state that DoT has started the process of making policy for Machine-to-Machine communications which will look into the aspects of standards, licensing, spectrum, KYC, security, etc. Various initiatives taken by this department to regulate and facilitate the development of M2M eco-system like, Release of 13-digit national M2M numbering plan, Adoption of oneM2M Release-2 standards with national standards, Notified Mandatory Testing and Certification of Telecom Equipment's to ensure that only certified M2M/IoT devices are allowed for sale in India and also established IoT experience center in TEC etc. The draft M2M guidelines has been placed on DoT website for comments. Also a meeting for M2M communication with academia was organized by DoT recently.

For technology development of 5G ecosystem and Use cases,DoT has taken following steps: -

i) Establishing5G Indigenous Test bed at IITs
ii) Set up Use case lab at IDRBT Hyderabad
iii) 5G Hackathon
iv) Funding Startups/MSMEs under Digital Communications Innovation Square Scheme
v) Production Linked Incentive Scheme to promote telecom and networking products manufacturing

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

## 5G and Health Concerns

**(Recommendation Sl. No. 25)**

The Committee note that the International Commission for Non-Ionizing Radiation Protection (ICNIRP) issues guidelines for limiting exposure to electromagnetic fields which cover many applications such as 5G technologies, Wi-Fi, Bluetooth, Mobile phones, and base stations. The Department have informed the Committee that WHO has concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields. In the year 2008, DoT adopted the ICNIRP guidelines that are recommended by WHO for basic restriction levels of electromagnetic emission from mobile towers. An Inter-Ministerial Committee (IMC) was constituted in 2010 to examine the effects of EMF radiation from base stations and mobile phones. The Committee note that based on the recommendation of IMC, the norms for exposure limit for the Radio Frequency Field (Base Station Emission) have been made further stringent and reduced to 1/10th of the existing limit prescribed by ICNIRP. After taking into consideration the concerns raised in public and report of the IMC, the Government in 2014 decided that the present prescribed limits are adequate and need no further change. WHO has again clarified in 2020 that to date, and after much research performed, no adverse health effect has been causally linked with exposure to wireless technologies.

The Department have also informed the Committee that no information or report has come to their notice regarding any Government halting the rollout of 5G until their health authorities have reviewed its impact on the environment and human health. As earlier noted, the Committee have also been informed that there is a portal called TARANG Sanchar, where anybody can go and check the levels of emission taking place from any tower in their neighbourhood. The Committee are glad to note that India had adopted an exposure limit of Base Stations that is 1/10th of the existing limit prescribed by ICNIRP, thereby ensuring that the levels of permitted exposures are much lesser in India when compared with other countries that have adopted the ICNIRP guidelines. However, there are many citizen's groups, RWA, local organizations which are not convinced of the findings made by WHO regarding the absence of adverse health effect due to exposure to radiation from base stations of mobile towers. The Committee have also received representations from noted citizen's groups expressing fear relating to radiation which they feel will escalate due to intrusive technology of 5G. The Committee feel that 5G technology is still in a nascent stage and the real dangers of radiation for health will become clearer only when its application becomes all pervasive. The Committee recommend the Department not only to rely on the reports of WHO, but to keep their eyes and ears open to other studies and scientific researches that emerge from time to time on health hazards from 5G radiation. The Committee also recommend that the Department should collaborate with other Ministries and Institutes for a longterm India-specific research to study the impact of EMF from mobile towers and propose adequate budgetary allocation for this purpose. At the same time, the Department/TRAI should carry out a continuous and effective awareness programme to educate the masses. While appreciating the Department's launching the TARANG Sanchar Portal, the Committee are of the view that greater efforts need to be undertaken by the Department to increase the visibility and awareness of the portal among the general public.

**Reply of the Government**

Apart from World Health Organization (WHO), DoT has also been following several other relevant International agencies/ organisations such as, International Commission on Non Ionizing Radiation Protection (ICNIRP), International Advisory Committee (IAC) on EMF, International Telecommunication Union (ITU) and various Study Groups under ITU for monitoring global developments in this regard.

Also, based on the recommendation of the Inter-Ministerial Committee, constituted in 2010, to examine the effects of EMF radiation from base stations and mobile phones, the norms for exposure limit for the Radio Frequency Field (Base Station Emission) have been made further stringent and reduced to 1/10th of the existing limit prescribed by ICNIRP. The directions in this regard has been issued to the Operators on 30.12.2011

Further, for India specific research, a joint initiative has already been launched by Science and Engineering Research Board (SERB) under Department of Science & Technology (DST) and Department of Telecommunications (DoT), wherein nineteen research proposals, have already been initiated to study possible impact of EMF exposure from mobile towers and handsets on life. i.e. Humans, Living Organisms, Flora & Fauna and

Environment. These research proposals are being supported for funding jointly by Department of Science and Technology and Department of Telecommunications (DoT).

Apart from Launch of Tarang Sanchar portal, following steps have also been/ are being taken:

i. Department of Telecommunications (DoT) has initiated a nation-wide Awareness Programme on EMF Emissions & Telecom Towers to build a direct bridge of engagement between different stakeholders and to fill the information gap with scientific evidence. Six such programs held in Dehradun on 30 June, 2016, in Hyderabad on 13 July, 2016, in Mumbai on 23 August, 2016, in Chandigarh on 21 October, 2016 in Jaipur on 17 December, 2016 and in Guwahati on 24 January, 2017, helped in bringing lot of clarity on this issue and were appreciated by all participants including the Chief Secretaries of Uttarakhand, Telangana, Maharashtra, Punjab, Haryana, Rajasthan and Assam, Senior Officers of State Governments and representatives of local bodies & RWAs. These Programs are further being followed up at sub-state level by the License Service Area (LSA) field unit of DoT so that more and more people are made aware about the scientific facts on health effects of EMF emissions from mobile towers.

ii. Pamphlets/ Information Brochures on various topics related to EMF have also been published and are being distributed in Hindi, English and various regional languages.

iii.Detailed information on EMF related issues and steps taken by Government of India in this regard have been made available on DoT website www.dot.gov.in in section “A Journey for EMF”.

iv.DoT has issued Broad guidelines for issue of clearances for installation of Mobile Towers to Chief Secretaries of all the State Governments. These guidelines require State Governments along with DoT to organize public awareness programs involving civil society members.

v. Government has issued advertisement for ensuring safety from radiations of mobile towers & handsets which has been published in National & Regional Newspapers.

vi. During EMF testing to check the compliance of EMF radiation norms, officers of LSA field units of DoT have been interacting with local resident of societies/ localities and educating them about Mobile phone/Tower radiation and make aware about misconception of EMF radiation related health consequences.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25$^{th}$October, 2021)

## CHAPTER- III

## OBSERVATIONS/RECOMMENDATIONS WHICH THE COMMITTEE DO NOT DESIRE TO PURSUE IN VIEW OF THE REPLIES OF THE GOVERNMENT

-NIL-

## CHAPTER IV

## OBSERVATIONS/RECOMMENDATIONS IN RESPECT OF WHICH REPLIES OF THE GOVERNMENT HAVE NOT BEEN ACCEPTED BY THE COMMITTEE AND REQUIRE REITERATION

### 5G Deployment Around the World vis.-à-vis. Position in India

**(Recommendation Sl. No. 3)**

The Committee have been informed by TRAI that globally 118 operators in 59 countries have deployed 5G network. Currently, the 5G network covers around 7 per cent of the world population. It is expected that 20 per cent of the world population will be covered by the year 2025. Major countries where 5G technology have been launched are USA, Canada, UK and European Union, Asia pacific countries like China, Japan, South Korea, Thailand, Australia, New Zealand and Philippine etc. In Middle East, UAE, Oman, Saudi Arabia, Qatar, Kuwait, Bahrain have also launched 5G. In Africa, 5G has been launched in South Africa. Mostly, 5G has been launched partially in these countries. Countries in Asia Pacific like South Korea, Japan and China have witnessed sizeable growth in 5G developments and possibly they are ahead of the curve. The Committee are given to understand that so far China has already developed more than 5 lakh 5G base stations covering around 7-8 per cent of their population. Regarding status of deployment of 5G in India, the Department have informed that 5G High Level Forum has given its report titled 'Making India 5G Ready' to the Government in August, 2018. 5G Hackathon had been organized and the Department have shortlisted 100 use cases for further development. 30 out of 100 use cases will be demonstrated along with TSPs to learn 5G use cases and roll out challenges. However, Cellular Operators Association of India (COAI) has informed the Committee that even though the report of the 5G HLF has been released by the Department of Telecommunications in August, 2018 minimal implementation instructions have been issued so far. Spectrum issues which are at the heart of 5G are yet to be resolved. The TSPs, have submitted that spectrum bands for 5G are yet to be identified and made available to them. The current reserve price of spectrum is one of the highest in the world, which needs to be rationalized taking into account per capita income and reserve price benchmarks of other countries, 5G trial applications have been submitted by the TSPs in the month of January, 2020, however, till date the guidelines for trials have not been made clear and there is no set date for commencement of these trials. When asked about the timeline for the rollout of 5G, the Secretary, DoT informed the Committee during its hearings that in India 5G technology will initially ride on 4G technology. In the initial years, the core will be 4G and the radio access network will be 5G. First it will not be rolled out pan India, but in selected areas where the demand would justify the Capex. The Committee have been informed that by the end of calendar year 2021 or beginning of 2022, there will be some roll out in India in some specific uses, because 4G should continue in India for at least another 5-6 years. From the foregoing, the Committee are inclined to conclude that sufficient preparatory work has not been undertaken for launching of 5G services in India. As such, India has not moved beyond the modest beginning stage as compared to other countries in the world. The Committee's concern about this observation is enhanced by the fact that while

2G was deployed globally in 1991, it was deployed in India only in 1995; 3G was deployed globally in 1998 but deployed in India ten years later, i.e. in 2008. Similarly, 4G services were launched in India 7 years after their global launching in 2008. This reflects very poorly on our planning and execution. Now when many countries are swiftly moving towards 5G technology, India is likely to witness its deployment only by the end of 2021 or early part of 2022, that too partially. So, it is very likely that after missing the 2G, 3G and 4G bus, India is going to miss on 5G opportunities, unless time-bound action is taken in core areas where Governmental intervention is required. It is disappointing to note that the Department have hardly learnt from the past delays as the vision for 5G which was reflected in the constitution of the HLF and Expert Committees has not been transformed into action on the ground and is not reflected in the policies formulated by the Government. The Committee trust that the Government will take expeditious action on the pending recommendations of TRAI. The Government are yet to take action on many of the recommendations of TRAI on issues which have direct bearing on 5G deployment (outlined in subsequent pages).While expressing their displeasure over the laid back approach, the Committee recommend that the Department review all their policies relating to 5G, identify the areas which need concerted action and fast track their action so that a conducive eco-system for 5G deployment is developed soon and India is not left behind the race for 5G. The Committee desire that the Department should conduct a thorough study of the experience gained by other countries in successfully rolling out 5G for better understanding the complexities involved in the process. The Committee further desire that the Department apprise them of the reasons for delay and explain why India has not been able to catch up and keep pace with comparable countries in rolling out 5G services. The Committee may be kept informed of the progress made as well as hurdles that in the Government's view impede such progress.

**Reply of the Government**

To ensure early and pervasive deployment of 5G Services in the Country, the department has taken following initiatives.

(a) The Government has setup 'Indigenous 5G Test Bed' a multi-institute collaborative project lead by Indian Institute of Technology, Madras. The test bed is likely to enhance national capability in telecom technology, develop indigenous Intellectual Property and give fillip to Indian telecom manufacturers;

(b) The Government has setup 5G Use case lab to develop India specific 5G use cases in Banking & Financial sector at Institute of Development and Research in Banking Technology, Hyderabad.

(c) Department of Telecommunications (DoT) has granted permission to Telecom Service Providers namely, M/s Bharti Airtel Ltd., M/s Reliance JioInfocomm Ltd., M/s Vodafone Idea Ltd. and M/s Mahanagar Telephone Nigam Limited during May-June 2021 for conducting 5G Technology trials with different technology/ Original Equipment Manufacturers (OEM) partners, such as Nokia, Ericsson, Samsung and C-DOT, for a period of 6 months at various locations across the country. The spectrum assigned for these trials is in 700MHz, 3.5GHz, 26/28 GHz, 60GHz (V band) & 76 GHz (E band) frequency bands as per TSPs' requirements.

In addition, Reliance JioInfocomm Ltd. will also be conducting trials using its own indigenous technology.

(d) The Government has also notified Production Linked Incentives Schemes for Telecom and Networking Products manufacturing and large-scale electronic manufacturing that includes Mobile phones, 4G/5G telecom products, internet of things etc.

(e) The department has identified 5G spectrum and TRAI recommendation has been sought.

(f) The 5G spectrum is likely to be auctioned during next year.

In regard to the observations of the Committee on the pending recommendations of TRAI, it is submitted that DoT follows a Standard Operating Procedure (SOP). As per the SOP, all TRAI recommendations are thoroughly examined by the concerned divisions of DoT and the implications & impact of each recommendation are analysed further by a Standing Committee chaired by Additional Secretary (Telecom). Thereafter, the report of the Standing Committee is placed before Digital Communications Commission (DCC) for final consideration. Subsequently, necessary instructions/Guidelines, etc. are issued and if necessary, the recommendations are referred to the Cabinet for approval.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25$^{th}$October, 2021)

**Comments of the Committee**
**(Please see Para No. 8 of Chapter I)**

**<u>Availability of Adequate Spectrum</u>**

**(Recommendation Sl. No. 5)**

The Committee note that the 5G ecosystem is currently available in three bands, lower band, Mid Band 3300 MHz to 3600 MHz and millimetre wave band (26 GHz and 28 GHz) for 5G deployment. Globally seven operators have deployed 5G in lower band, 82 operators have deployed in mid band and more than 8 operators have deployed in mmWave band. However, India at present does not have sufficient spectrum earmarked for 5G in any of these bands. Department of Space and Defence are seeking spectrum in the bands identified for 5G. The Committee have been informed by COAI that to make India 5G ready at the earliest, the Government need to allocate at least 100 MHz per operator in 3.5 GHz, at least 400 MHz per operator in mmWave (26,28,37 GHz) and at least 2x10 MHz per operator in each of these bands in Sub-GHz (600 MHz & 700 MHz). This is without taking into consideration the requirement of the operators in E&V band. In 3.5 GHz, which is basically the mainstream spectrum for 5G, almost every operator across the globe has 100 MHz. However, in case of India out of 300 MHz, 25 MHz are required for satellite uses. About 100 MHz between 3.3 and 3.4 GHz has been demanded by Defence. If this is deducted, only 175 MHz is available. The Committee note that the Department are deliberating with Department of Space (DoS) and the Ministry of Defence (MoD) for making sufficient spectrum available for 5G IMT services. The Department have stated

that they have received very positive response and expressed the hope that the issue will be resolved. With regard to mmWave spectrum, the same is yet to be earmarked in India. The average 4G spectrum per operator in India is around one-fourth of the global average. According to submission made by one of the TSPs, we have four times more people and four times less spectrum which means that spectrum available to one person is 1/16th of the global average. The Committee are fully aware of the extreme shortage of spectrum in the country. Availability of 175 MHz only in 3300 MHz to 3600 MHz band will mean that approximately 50 MHz or so spectrum per operator could be allocated, which is far below the global average. The Committee note that not allocating right amount of spectrum will not only deprive the customers of good quality of services but also lead to severe under utilization of investment made as the equipment installed cannot be optimally utilized. The Committee are of the view that the issue of allocating the right amount of spectrum as demanded by the industry needs to be addressed by the Department if India is to have the real benefits of 5G. In this regard, the Committee recommend that the Department need to have fruitful deliberation with Department of Space and Ministry of Defence and an understanding must be reached at the earliest for identification of adequate spectrum for 5G services. The Department should also expedite the implementation of OFC based network for Defence services. Efforts should be made to earmark and allocate mmWave band for 5G in consultation with TRAI.

**Reply of the Government**

In this regard, it is to state that the Committee of Secretaries (CoS) Chaired by Cabinet Secretary deliberated on usage of certain frequency bands in 26 GHz, 28 GHz, 3300-3600 MHz, 526-698 MHz, V Band, etc. Other Ministries/ Departments including Department of Space and Ministry of Defence also participated in the meetings. The CoS, among others, has recommended for the following:

(i) Millimetre wave spectrum in 24.25 GHz to 28.5 GHz range would be made available for IMT/ 5G services.

(ii) In the mid-band, the frequency range 3300 MHz to 3670 MHz would be made available for IMT/ 5G services pan India except at few locations in which Department of Space and other departments are using the spectrum.

(iii) In the Low band, the suitable parts of frequency range 526-698 MHz would be made available for IMT/ 5G services.

(iv) The V Band (57- 66 GHz) would be made available for Wi-Fi/ Public Wi-Fi, fixed links etc.

**Comments of the Committee**
**(Please see Para No. 11 of Chapter I)**

**Audit of Spectrum**

**(Recommendation Sl. No. 6)**

The Committee note that TRAI as back as 2015 have recommended that there is an urgent need for audit of all allocated spectrum both commercial as well as spectrum allocated to various PSUs/Government organizations. However, Government's decision in the matter is still awaited. The Committee are of the view that audit of spectrum is essential for detecting under utilization of this precious natural resource and also to assess the adequacy and operating effectiveness on management control framework in order to make its utilization more efficient. It is deplorable that the Department have neglected such an important recommendation of TRAI, which is both future oriented and has serious implications for technological advancements. The Committee would like the Department to explain as to why spectrum audit as recommended by TRAI has still not been carried out so far by DoT and come out with specific reasons/compulsions which has forced the Department not to undertake such an exercise. The Committee desire that early decision on spectrum audit may be taken on a priority basis and the findings of the audit may be shared with the Committee.

**Reply of the Government**

In this regard, it is intimated that DoT is taking action for Audit of Spectrum. Audit has been started by the C&AG.

Further, various Ministries/ Departments, State Governments and Union Territories have been requested to conduct self-assessment of their spectrum holding and submit half-yearly reports in January and July each year.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

**Comments of the Committee**
**(Please see Para No. 14 of Chapter I)**

**Issues Relating to High Spectrum Price in the Country**

**(Recommendation Sl. No. 7)**

COAI has informed the Committee that TRAI had recommended Rs.492 crore per MHz as reserved price for spectrum in 3300 MHz to 3600 MHz for 5G which is far higher than the auctioned spectrum price in other countries. Comparison of unit pricing of 5G spectrum with other countries indicates that it is 7 times costlier than UK, 14 times costlier than Australia, 35 times costlier than Spain and 70 times costlier than Austria. Bharti Airtel has informed the Committee that the price recommended by TRAI is exorbitantly high and ranges from 3-70 times of the market determined price of the spectrum in other countries in absolute terms and is 16 times of the price in relative terms. They are of the view that there is a need to strike a balance between the Government's expectation to generate revenue from the auction and growth of the sector and

the overarching impact of 5G across the sectors. Commenting on the issue, representative of TEMA stated that the policy of spectrum in the country is of inverted structure. Raw material is expected to be purchased at highest price and the product at minimum price which is absolutely unviable. Having noted the unanimous view of industry associations and Telecom Service Providers that spectrum price in India is exorbitantly high and that there is a need to review the spectrum price by taking into consideration factors, such as per capita and ARPU in the country, the Committee sought the views of TRAI on spectrum price. TRAI, to the surprise of Committee, have informed that if comparison is made in terms of population and geographical size, India's spectrum price is one of the lowest. The Committee note, however, that 5G is not intended to be rolled out everywhere in the country, nor extend to the entire population, for some years. TRAI further stated that there are well-defined parameters and if we compare all these parameters India's price is very moderate. The Committee are also given to understand that TRAI have given the reserve price of the spectrum after due consideration of all the aspects and due consultation with the stakeholders. The Department have informed the Committee that proposals for auction of spectrum in various bands including reserve price, after due consideration of TRAI recommendation will be placed before the Cabinet for a decision. The Committee further note that in order to ease the burden of high spectrum cost, TSPs had been given a one-time opportunity to opt for a higher number of instalments (16) instead of the previously permitted 10 instalments in respect of spectrum auction deferred payment, subject to the Net Present Value (NPV) being protected. The Committee have also been informed that considering the stress in the sector, the Government have given an option to the TSPs to defer payment of the spectrum auction instalments due for 2020- 21 and 2021-22, either for one or both years. The Committee have been informed that all the operational TSPs have generally opted for moratorium of 2 years and deferment of spectrum auction instalments will ease the cash outflow of the stressed TSPs and facilitate payment of statutory liabilities and interest in bank loans. Their industry body COAI, on the other hand, have stated that there is a need to rationalize other levies and duties on the telecom sector so as to ease their financial burden, such as providing soft loans against GST input line credit due to operator, reducing spectrum usage charge by 3 per cent for all TSPs and license fees from 8 to 3 per cent, soft loans at MCLR rate using the GST input credit as collateral etc. Going by the merits of the submissions from both sides, the Committee find that there are fundamental differences between the versions of TSPs and TRAI on fixing of spectrum price in the country and there is a need to review the spectrum pricing policy in the country. The divergent views given by the two sides also implies that there is a need to revisit the nuances of spectrum pricing in other countries and adopt the best practices. The Committee are of the view that telecom is the backbone of many important sectors of economy. Both DoT and TRAI which are at the forefront of telecom revolution in the country need to pay adequate attention to the concerns expressed by the TSPs and industry associations. Considering the stress in the sector and that the 5G ecosystem is yet to be developed, keeping such a huge reserve price for 3.3 GHz to 3.6 GHz will undoubtedly have an adverse impact on the ability of the TSPs to fully rollout 5G in the country. At this rate, price for a block of 20 MHz will be Rs.9,840 crore and minimum price for 80 MHz per TSP will be Rs.39,360 crore. In this, the Committee are of the view that long-term consumer benefit should be the guiding principle and not short term revenue maximization. TRAI need to take the TSPs on board as it is they who are

contributing to the growth of the sector. The concerns expressed by TSPs and COAI cannot be ignored but merit attention. Factors such as per capita income and ARPU should also be taken into consideration. The Committee recommend that the issue of high spectrum prices is looked into and DoT/TRAI should come out with a convincing spectrum pricing policy that is sustainable, affordable and acceptable to all, focusing on consumer interest and socio economic goals of our country. The Committee also recommend that the concerns raised by COAI for rationalization of levies and duties on the telecom sector should also be given time bound consideration by the Government, so that financial burden neither acts as a deterrent for TSPs in their move towards 5G nor places an unsustainable burden on the Indian customers.

**Reply of the Government**

As regard to spectrum pricing, it is submitted that the valuation of spectrum is done by TRAI, TRAI uses various methodologies for valuation of spectrum, which can be broadly classified as variations of (i) Discounted Cash Flow(DCF) (ii) Cost savings or avoidance (iii) Multivariate Regression Analysis and (iv) Market Comparisons. TRAI uses average of various alternative valuation methods and benchmark the average value with recent auction discovered price of the Spectrum. In addition to this, TRAI also does a formal process of consultations with stakeholders.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25$^{th}$October, 2021)

**Comments of the Committee**
**(Please see Para No. 17 of Chapter I)**

**Setting up of 5G Use Case Labs**

**(Recommendation Sl. No. 10)**

As per the submission made by COAI, China has been working on use case labs for last two years and claim to have more than 100 use cases for 5G which have been built through initiatives from Government, academia, operators and industry verticals. On the contrary, India does not have any applications or Use Cases which are ready to promote business case and capex investment by operators. Coordinated Government actions are required for enabling digital transformation across sectors. A Digital Readiness Index to measure the same for each sector should be there to monitor progress as well as to enable development of India specific Use Cases. The Committee are given to understand that the Department are working with different Ministries/Departments for setting up of India specific Use Case in education, healthcare, agriculture, public safety, fintech, etc. So far, Institute of Development and Research in Banking Technology (IDRT), an institute under RBI, in collaboration of Department of Financial Services, has come forward for setting up of 5G use case lab in Banking and Financial Services and Insurance (BFSI). The Department are also presently working with Food Safety and Standard Authority of India for setting up of use case lab in food safety certification and Ministry of

Health, AIIMS, Ministry of Housing and Urban Development for setting up of use cases in respective domains. To develop more use cases, the Department have organized 5G Hackathon and have shortlisted 100 use cases for further development. Out of these, 30 Use Cases will be demonstrated along with TSPs to learn 5G use cases and roll out challenges. On the suggestions of COAI for development of Digital Readiness Index, the Department have stated that Broadband Readiness Index is similar to Digital Readiness Index for Telecom sector. The framework on BRI parameters has been prepared based on the objectives of NDCP-2018 and inputs from the industry/expert. The BRI is envisaged to create robust and high quality digital communications infrastructure, attract investments in creating next generation digital communication infrastructure, simplification of compliance and procedures and create a collaborative institutional mechanism between Centre, States and Local Bodies. An MoU has been entered with Indian Council for Research on Institutional Economic Relations (ICRIER) to develop Broadband Readiness Index for Indian States and Union Territories for the period 2019-2022. The Committee also note that the Department are engaged with the States/UT Governments for the development of BRI and the report for the year 2019-20 is under finalization. COAI has further submitted that India is consuming a very large amount of data per capita in various industry verticals and there is a need to convert the data produced into useful services through the development of Use Cases. The Digital Readiness Index of various sectors can be monitored by a cross sectoral entity, such as NITI Aayog. This will facilitate the monitoring of digital transformation in various sectors and thereby facilitate the development of Use Cases for development of digital services in the most digitalized sectors. The Committee note with concern that even though Use Cases have been developed around the world, in India no sufficient use cases have been developed so far for successful implementation of 5G in India. The present status indicates that India is far behind countries like China in term of development of 5G. This will undoubtedly have an adverse impact on rolling out of 5G considering that development of sufficient Use Case labs is required for successful implementation of 5G. The Committee recommend the Department to focus on development of Use Cases by providing suitable incentives and support and Use Case labs which are currently under development should be expedited. The Department need to involve more Government Ministries/Departments, start ups/MSMEs, academia, telecom service providers, industries, etc. for development of Use Cases for 5G in the country with adequate funding and hand holding, wherever required. Considering the fact that coordinated Government actions are required for enabling digital transformation across sectors like health, transportation, energy, agriculture, etc. the Committee desire that the Department may consider assigning cross sectoral entity like NITI Ayog to monitor Digital Readiness Index of various sectors so as to facilitate the development of use cases for development of digital services in the more digitalized sectors. The Committee also recommend that the Broadband Readiness Index Report for the year 2019-20, which is under preparation should also be finalized at the earliest.

**Reply of the Government**

Department of Telecommunications along with Department of Financial Services haveset up 5G Use Case Lab for Banking and Financial Services of India (BFSI) at Institute of Development and Research in Banking Technology (IDRBT), Hyderabad. They are working on FinTech Use cases.DoT is also

working with other stakeholders for setting up of Use Case Labs in other economic verticals.

Department of Telecommunications has already finalized the Broadband Readiness Index Report for the year 2019-20.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

**Comments of the Committee**
**(Please see Para No. 20 of Chapter I)**

**Need for Harmonization of Indian Standards with the Global Standards**

**(Recommendation Sl. No. 13)**

The Committee note that the need for enhanced rural coverage is one of the important aspects to cover rural and remote areas. IIT Madras and associate institutions have developed a variant to the 3GPP standard (Release. 15) with the objective to enhance coverage in the existing standards and also offered technology solution to implement it. This is called TSDSI RIT and is self-evaluated by an Independent Evaluation Group and submitted to ITU. The standard compliant to the requirements of 5G technology, the TSDSI RIT along with the original 3GPP standard have been recommended by the ITU. Some of the other developing countries also supported the TSDSI RIT considering its relevance for enhanced rural coverage, which implies reduced capex costs to cover a certain defined area. One of the Indian operators also supported the TSDSI standard. The Department have also informed the Committee that after formal release of the standards, the TSDSI may recommend the standard to DOT for its consideration. DoT will take a policy decision after taking several factors into consideration on its Indian adoption. The Department have further stated that TSDSI RIT has been approved by ITU SG5 and one of the standards which has successfully completed all evaluation steps for IMT 2020. This is hence qualified for commercial deployments. It is in final stage of approval by the 193 member states of ITU. TSDSI-RIT (5Gi) is a standard/technology specification approved by ITU which meets the IMT 2020 requirements (including LMLC) with enhanced performance for LMLC rural eMBB use case. The concern of the TSPs relate to TSDSI-RIT. COAI have submitted before the Committee that it is important to have globally harmonized standards for 5G to allow interoperability and economies of scale. India should adopt globally harmonized 3GPP standards. If India adopts any standard other than 3GPP, it would disconnect India from the globally harmonized standard, device & network ecosystem. This would severely impact 5G rollouts, its adoption in India and increase cost. Bharti Airtel also has submitted that current TSDSI RIT standards being proposed for 5G are not globally harmonized. The adoption of TSDSI RIT without global harmonization would make India an isolated island in the global 5G ecosystem. GSMA & GSA have raised concerns on the same with DOT. Bharti Airtel have also cited examples of similar efforts in the past by other countries like China (TS-SCDMA, local 3G standards), Korea (WiBro -local 4G standards) etc. which proved to be failures due to the lack of harmonization of these standards with the global ecosystem. COAI have further informed the Committee that even after submission of the inputs of the TSPs to TSDSI regarding technical errors,

incompleteness, unimplementability aspects and non-testability issues in TSDSI documents, these have not been incorporated in the TSDSI RIT. Issues related to interoperability of the proposed specification with global 3GPP specification still prevail and remain unaddressed. Performance gain of proposed specifications compared to 3GPP specifications have not been established. Also, the 3GPP has identified that there is an overlap in the signalling messages of TSDSI, which will cause interoperability issues. Globally harmonized standards also allow economies of scale. The network and customer devices when developed for mass market will have economies of scale; however, if isolated devices are to be developed for niche market, the cost will definitely rise. COAI have suggested that the timelines should to be laid down for resolution of gaps around Interoperability, Performance, Implementation, Alignment, and IPR in the proposed TSDSI RIT specifications. When the Committee drew the attention of the Department to the above concerns around standards, the Department have stated that India should adopt standards that are harmonized sufficiently with global standards to ensure inter-operability, roaming, and to derive ecosystem benefits such as economies of scale. However, it is possible to adopt carefully enhanced variants of the global standard that specifically provide some features of importance to India such as enhanced rural broadband coverage, without compromising on either inter-operability or economy of scale. ITU standards are in final stages of approval for finalization. India has not adopted any standard for 5G services as yet. On the apprehensions that India will trap itself into a corner isolated from the global 5G ecosystem, Director, IIT, Madras has informed the committee that this is wholly misplaced, as inter- operability and compatibility between the 3GPP 5G and the TSDSI 5Gi standards can easily be ensured, since the latter is merely an enhanced version of the former. Moreover, there will be no cost implications as equipment will support both standards through mere software selection and in a manner transparent to the user. The Committee find that the objective of TSDSI RIT to enhance rural coverage is a worthy initiative; however, the concerns raised by COAI and other TSPs are also alarming and a cause for concern. Going by the merits of the views given by the Department and experts on the one hand and the entirely different views of COAI and TSPs on the other, Committee would like to sound a word of caution that while continuing with fostering innovation in the field of development of 5G standards, India should adopt only those standards that are globally harmonized to ensure interoperability, economies of scale, and help build a conducive device & network ecosystem. Considering that similar efforts in the past by other countries like China, Korea, etc. have been failures due to the lack of harmonization of these standards with the global ecosystem, the Committee would want the Department to be extra careful before adopting such standards in the country. The Committee recommend that the Department should look into the concerns raised by COAI and TSPs and ensure that their concerns are adequately addressed. While emphasizing that India should adopt the standards that are good for the country, the Committee also desire that the Department should also take into consideration the interests of all before taking the final decision and adopt standards that will be in the best interest of the country.

## Reply of the Government

The Telecom Engineering Centre (TEC) follows transparent process of stakeholder's consultationsand also take into consideration the interests of all

before taking the final decision and adopt standards in the best interest of the country.

For providing the service, the TSPs may utilize any type of equipment and product that meet TEC standards, wherever made mandatory by the DoT from time to time. In the absence of mandatory TEC standard, the TSPs 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/Licensor from time to time.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

**Comments of the Committee**
**(Please see Para No. 23 of Chapter I)**

**<u>Promotion of Domestic Manufacturing of Telecom Equipment and Affordable 5G Handsets</u>**

**(Recommendation Sl. No. 14)**

The Committee note that recently Government have taken many initiatives under "Make in India" and "AtmaNirbhar Bharat" for promotion of domestic manufacturing in the country. The Committee hope that domestic manufacturing in the country will receive a fillip through the implementation of these policies. The Committee are of the view that the promotion of proper R&D is absolutely necessary for the success of telecom manufacturing in the country. An ecosystem must be developed for complete manufacturing rather than just assembly, as manufacturing gives much higher value addition. A Telecom Research and Development Fund (TRDF) is to be created with an initial corpus of Rs. 1000 crore for promoting research, innovation and manufacturing indigenous telecommunications equipment. The Committee recommend that TRDF as proposed by TRAI should be created at the earliest. Apart from this, the suggestions given by TEMA for extension of PPP MII policies to private telecom operators, and TEC, DOT technical specifications to all public or private operators as also State Government/State PSUs, may be given a thorough consideration by the Department. The Committee also note that India is a price-sensitive market. Therefore, the success of 5G rollout will also greatly depend on the availability of affordable 5G devices. The Committee note that the creation of a mobile manufacturing ecosystem, including components, in the country is the need of the hour. The Committee are also given to understand that the promotion of globally harmonised standards for 5G will allow the development of common smartphones/infrastructure, which will drive down the cost of services. The local standards approach will affect affordable 5G devices, making the devices cost higher apart from causing delay in the rollout of 5G. The Committee recommend that the ecosystem for 5G smartphones and devices is created and nurtured and right incentives are given to domestic manufacturers who should be encouraged

under ‘Make in India’ and “AtmaNirbhar Bharat” to ensure that affordable 5G devices and smartphones are readily available for the successful rollout of 5G services.

**Reply of the Government**

In so far as Committee’s suggestion to create Telecom Research and Development Fund (TRDF) with an initial corpus of Rs. 1000 crore for promoting research, innovation and manufacturing indigenous telecommunications equipment, the Digital Communications Commission (DCC), inter-alia, deliberated the proposal during its meeting held on 19.09.2020 and noted that the Working Group for the Telecom Sector in the 12th Plan had proposed to create the three funds with a total corpus of Rs. 17,500 Crore for promoting Research & Development (R&D) and manufacturing of telecom equipment during the 12th Five Year Plan period. However, the Cabinet on 10th December 2014 approved a proposal of DeitY (Department of Electronics and Information Technology), now Ministry of Electronics and IT (MeitY) to establish an Electronic Development Fund (EDF) for attracting venture funds, angel funds and seed funds towards R&D and innovation in the specified areas.

As regard toPromotion of Domestic Manufacturing of Telecom Equipment and Affordable 5G Handsets, it is to state that Department of Telecommunications has notified Production Linked Incentive Scheme (PLI) on 24$^{th}$February 2021 for Telecom and Networking Products within overall budgetary outlay of 12,195 INR Crore over a period of five years. The PLI Scheme intends to promote Telecom and Networking Products manufacturing in India and proposes a financial incentive to boost domestic manufacturing and attract investments in the target segments of telecom.

Further, for the availability of affordable 5G devices including 5G Smart Phones, Production Linked Incentive Scheme for Large Scale Electronics Manufacturing notified on April 1, 2020.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25$^{th}$October, 2021)

**Comments of the Committee**
**(Please see Para No. 26 of Chapter I)**

## CHAPTER V

## OBSERVATIONS/RECOMMENDATIONS IN RESPECT OF WHICH REPLIES OF THE GOVERNMENT ARE INTERIM IN NATURE

**Allocation of Spectrum for 5G**

**(Recommendation Sl. No. 4)**

The Committee note that International Telecommunication Union (ITU) has identified two broad spectrum ranges for 5G, the frequency range-I and frequency range-II. Frequency range-I extends from 410 MHz to 7125 MHz and multiple frequency bands have been identified for 5G in this large range. Frequency range-II is the millimeter wave band lying between 24.25 GHz and 52.6 GHz. Around 40 countries in the world have completed allocation of 5G spectrum. So far as allocation of spectrum for 5G in India is concerned, the Committee note that TRAI on 01.08.2018 had given their recommendation for the auction of spectrum, in the 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3400 MHz and 3400-3600 MHz bands for providing mobile services. However, it is disturbing to note that even after the lapse of more than 2 years since TRAI gave their recommendations for auctioning of spectrum, including 3300 MHz to 3600 MHz in the prime band for 5G, the auction of spectrum in this band is yet to be done by the Department. The Department while deposing before the Committee had informed that they are still in the process of preparing a Cabinet Note for auction of bands like 700 MHz, 800 MHz, 900 MHz, 1800 MHz etc. excluding 3300-3600 MHz bands as the Digital Communications Commission has decided to hold auction of 3300 and 3600 MHz band separately. The bandwidth of 3300 MHz to 3600 MHz is currently not used for 2G, 3G and 4G. It is envisaged to be used for 5G. The Committee have also been informed that 5G will come in other bands like 700 MHz, 800 MHz, 900 MHz bands in times to come and also in millimeter wave spectrum which are 224.2G GHz to 275 GHz. As this Report is being finalized, the Committee have come to know from media reports that auctions for the above bands except 3300 MHz to 3600 MHz are slated to be held in March, 2021. The coveted 5G spectrum has been kept out of the offer. The Department had informed the Committee that 3300 MHz to 3600 MHz band will also be auctioned sometime in the next six months or so. The Committee fail to understand as to how the TSPs are going to move towards 5G technology without spectrum, the lifeline for 5G, being allocated. No wonder the TSPs and the industry body COAI were in unison in their demand for right spectrum at right price as the key for 5G rollout and pleaded for release of spectrum at the earliest. The Committee, while deploring the Department's unconscionably long delay in auctioning of spectrum, recommend that spectrum auction including auctioning of 3300 MHz to 3600 MHz be conducted at the earliest. The Department have assured the Committee that 3300 MHz to 3600 MHz is going to be auctioned in the next 6 months or so. While urging the Department to take necessary steps so that auction of spectrum takes place early, the Committee also desire that the process of spectrum allocation must be guided by constitutional provisions and the doctrines of equality and larger public good. They, therefore, trust that the Department will take all the appropriate steps

for the successful auctioning of the spectrum so as to avoid any litigation or controversy which may further impede the process of 5G launching.

**Reply of the Government**

DoT has successfully conducted auction of spectrum in 700, 800, 900, 1800, 2100, 2300 and 2500 MHz bands in March, 2021. The issues involved in 3300-3600 MHz band and certain other bands suitable for 5G/IMT were addressed by a Committee of Secretaries (CoS). Based on the CoS recommendations and approval of the Government thereon, further action for auction of spectrum in various bands will be taken after consultation with TRAI. TRAI recommendations have been sought and are awaited.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

**Fibre as National Asset**

**(Recommendation Sl. No. 18)**

The Committee note that Infrastructure Providers Category-I (IP-I) are permitted to deploy and share passive infrastructure such as Dark fibre, Right of Way, Duct space, and Towers on lease/rent out/sale basis to the licensees of telecom services on mutually agreed terms and conditions. In the year 2009, the scope of IP-I registration was enhanced to cover the active infrastructure. However, IP-I providers are not permitted to own and share active infrastructure, i.e., these elements should be owned by the TSPs. TRAI has recommended to expand the scope of the IP-I providers, and permit them to own, establish, maintain, and work all such infrastructure items, equipment, and systems which are required for establishing Wireline Access Network, Radio Access Network (RAN), and Transmission Links. The recommendations are under consideration in DoT. Once implemented, this would increase sharing of common active sharable infrastructure established by IP-I providers resulting in efficient utilization of resources. The National Broadband Mission launched in December 2019, to achieve the NDCP goal of 'Broadband for All', highlights fiberisation of towers, to increase by around two and half times the current number of fiberized telecom towers in the country. As per the latest data available with TRAI, approximately 30 percent of the total base stations are connected through OFC. Further, TRAI has already taken steps to increase fiberisation through recent consultation paper on “Roadmap to Promote Broadband Connectivity and Enhanced Broadband speed”, illustrating the current footprint status, existing bottlenecks, and opportunities to increase fibre penetration. As the Government is aiming to increase fibre footprint to 5 million-kilometer route and increase fiberized towers to 60 percent by 2022, TRAI would furnish its recommendations on fiberisation soon. The Committee also have been informed by the TSPs that 5G rollouts typically have been in countries which are already having more than 90 per cent fibre rollouts. They have suggested that Government should incentivize the right of way by creating a free right of way and creating fibre as a national asset. They have asked for a well defined fibre sharing policy which can be shared by all from PSUs to TSPs, so that 5 lakh towers can be lit by fibre. The sharing of fibre and using fibre as a national asset has not been the case till now.

Commenting on the issue, Bharti Airtel has submitted before the Committee that the connectivity of the BTSs through fiber is one important requirement for the roll-out of 5G services. However, India remains highly under-fiberized, providing connectivity to less than 30 percent of mobile towers and 7 percent of our homes. Fibre needs to be accorded the status of essential national infrastructure, and TSPs should be supported with zero RoW cost with single window clearance so that they can fiberize their BTSs. Sharing of fibre infrastructure across Govt. and private players should be made mandatory, and a pricing model for such sharing needs to be adopted.

The Committee are in full agreement with TSPs that sharing of fibre will provide a healthier competitive environment for telecom market. It will improve economies of scale, avoiding duplication of networks where unnecessary. The Committee note that, at present in India, IP-I providers are not permitted to own and share active infrastructure and TRAI had recommended to expand the scope of the IP-I providers. The recommendations are under consideration in DoT. The Committee recommend that the Department should consider the recommendation made by TRAI early, as this would increase sharing of common active sharable infrastructure established by IP-I providers, resulting in the efficient utilization of resources. The Committee further note that the main reason that India remains a fibre-challenged country in the world is because of difficulties, delays and costs associated with Right of Way permissions from various state/local authorities, and it is high time these issues are addressed. The Committee feel that there is an urgent need for a well-defined fibre sharing policy which can be shared by all starting from PSUs to TSPs so as to increase fibre footprint and decongest our cities. The Committee are of the firm view that introducing an enabling policy like single window clearance for the grant of permission for fibre laying will be of great help. The Committee recommend that the Department should take all necessary steps to increase India's fibre footprint so that the goal of covering 5 million kilometres and 60 per cent fiberized towers by 2022 is achieved.

**Reply of the Government**

DoT will consider for according fibre the status of essential national infrastructure while amending the Indian Telegraph Act, 1885.

Further, the National Digital Communications Policy - 2018 [under National Broadband Mission] has envisaged for creation of a National Fibre Authority (NFA). DoT is working on the broad contours of the Authority.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

**Security Scenario in 5G Climate**

**(Recommendation Sl. No. 20)**

The Committee note that with so much data being shared through mobile network, there is an increased risk of hacking of data on 5G connections. Usually, data including voice that goes through the network is

protected, considering the fact the network protocols reliably take care of potential scenarios. Further, several applications, such as banking transactions, are protected end-to-end with application specific encryption keys. However, as 5G is a bouquet of technologies considered to work across platforms, devices, radio technologies, the threat perception may be higher considering the fact that rollouts have just begun and issues are still being studied. When asked about India's preparedness with regard to the security architecture for 5G, the Department have informed the Committee that Telecom Service Providers (TSPs) provide telecom service in India after obtaining licenses from DoT. Therefore, with regard to the security of Telecom networks, TSPs have to abide by the 'Security Conditions' specified in chapter 6 of the license agreement. Further, DoT has notified the Indian Telegraph (Amendment) Rules, 2017 enabling the Mandatory Testing and Certification of Telecommunication Equipment (MTCTE) which prescribes that any telegraph which is used, or capable of being used, with any telegraph established, maintained or worked under a licence granted by the 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. The Committee have also been informed that mandatory testing and certification in respect of "Security requirements" is planned to be implemented through a scheme titled "Communication Security Certification Scheme" (ComSeC). National Centre for Communication Security (NCCS) is responsible for implementation of this scheme.

Reliance Jio has informed the Committee that from 5G onwards, technology will become much more intrusive in our business operations, given the applications, widespread digitisation, e-governance, the smart city project, all the cameras in a city, the data centres, the device and the chipset in the devices, etc. Now, the more open and denser this whole network gets, the more vulnerable it becomes to threats. The threats are simple and can be represented by the term STRIDE, where 'S' stands for Spoofing, 'T' stands for Tampering, 'R' stands for Repudiation, 'I' for information disclosure, 'D' for denial of service making the network not available when it is needed, and 'E' for what they call the escalation of privileges. The mitigation strategy to combat STRIDE is to comply flawlessly with the right standards, ensuring that the IPR is either our own or is validated in such a foolproof way that there is absolutely no backdoor or hacking kind of scenario. TEMA have submitted that while the focus is on 5G, it is important not to lose sight of the cyber threats that are faced by existing infrastructure like small city networks, BharatNet, power grid infrastructure, banking infrastructure, etc. 5G infrastructure is going to be a national strategic asset. There is lot of data being shared on 4G networks and it will only increase multifold in 5G networks. Because of the increased dependency of communication networks, the hacking of 5G networks is a very clear national security risk. The Committee concur with the view that the only solution is to build secure and trustworthy indigenous communication infrastructure. Vodafone Idea has suggested that all our critical services should be hosted more from India as compared to being hosted from outside and the user data and user information should be secured in the Indian territories. The Committee observe that while 5G promises to deliver low latency, high speed and more reliable connections, there is going to be heightened security risks in

a 5G scenario. Managing security is going to be much more complex and complicated as 5G is a bouquet of technologies that are supposed to work across platforms, devices and technologies. STRIDE is just one of the threat models identified by Reliance Jio. The Committee can well foresee that 5G will generate massive data, both personal and non-personal, which will demand special efforts for its protection. The growing concern over availability and protection of user data and privacy will exacerbate with security challenges in 5G. The Committee are aware the Personal Data Protection Bill, 2019 is still under consideration of the Government and will deal with various data security issues. The Committee recommend that to address the threat to data security, indigenous IPR, equipment and software should be encouraged and developed. It is important to examine in detail the need for critical services to be hosted from India so that user data and user information are secured within Indian territory, provided this does not impede India's access to global services and data flows. On the issue of mandatory testing of telecom equipment, the Committee are concerned to note that the Indian Telecom Security Assurance Requirement has still not been finalized and notified. The Committee recommend that it should be finalized at the earliest. The Committee also feel that cyber security threats are a collective concern and there is a need for a collective effort to build an effective Government data protection and security strategy. The Committee are hopeful that DoT will work in greater co-ordination with MeitY/Cert-In, State Governments and other agencies on cyber security in the 5G environment. The Committee also urge the Department to study the experience of other countries on 5G rollout and report to them about their experience with regard to security concerns.

**Reply of the Government**

As regard to issue of mandatory testing of telecom equipment, and Indian Telecom Security Assurance Requirement (ITSAR), it is to state that NCCS, DoT, has been entrusted to finalize the ITSARs for 5G Network Functions/Elements.

To ensure the use of trusted products from trusted sources in deployment of 5G services, this department has already issued amendment in existing License conditions on 30th March 2021 which is effective from 15th June 2021. As per the amendment, the Licensee shall only connect Trusted Products in the network and also seek permission from National Cyber Security Coordinator for upgradation of existing network utilizing the telecommunication equipment's not designated as "Trusted Products".

DoT has also established Proof of Concept of Telecom Security Operations Centre (TSOC).TSOC is a telecom sectoral CERT established in DoT for coordination with umbrella organization for cyber security response i.e. CERT-In for incidence response, resolution and cyber crisis management in telecom sector. Further, for Pan India roll-out of TSOC, formation of a committee to examine DPR in under progress. The TSOC is capable of analysing the internet traffic of Telecom Service Providers/ Internet Service Providers (TSPs/ ISPs) for vulnerabilities/ threats/ cyber-intrusions etc. in near real time, and regular inputs are being generated and disseminated to the TSPs/ ISPs.Since 5G is Packet and Internet Protocol based technologies,

TSOC shall play a crucial role in monitoring and analysis of the traffic generated thereupon and in securing the 5G network infrastructure.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

**5G to BSNL and MTNL**

**(Recommendation Sl. No. 23)**

The Committee are concerned to note that 4G spectrum has still not been allocated to BSNL/MTNL, even though the Cabinet in its meeting held on 23.10.2019 had approved the administrative allotment of spectrum for 4G services through capital infusion. The funds for 4G spectrum has been allocated in FY 2020-21. BSNL had floated a tender on 23.03.2020 for a 4G Mobile Network on turnkey basis. However, due to some policy issues, that tender has been cancelled and a fresh tender will be floated compliant with PMI provisions to give preferential treatment to domestic vendors as per Government of India guidelines. State-owned BSNL and MTNL have not yet planned the introduction of 5G services yet on their networks. TEMA has desired that to promote domestic manufacturing it is important that BSNL/MTNL survive, because only PSUs are placing orders for Indian manufactured goods. BSNL, which is of strategic importance, purchases Make in India, IDDM products which might remain unsold otherwise. The issue remains of why Indian manufactured products are not deemed sufficiently attractive by other entities. The Committee observe that the revival of BSNL/MTNL is critical for domestic telecom manufacturing industries as they are the only ones purchasing Indian manufactured goods, and they have been implementing important schemes in remote rural areas and LWE affected areas. In such circumstances, the survival of BSNL/MTNL is in the national interest. In order for BSNL/MTNL to remain viable telecom service providers in the country, the Committee recommend that necessary measures be taken to allocate 4G spectrum to them at the earliest. The Committee also recommend that the Department also take adequate measures to ensure that 5G spectrum be allocated to BSNL/MTNL at the same time as private TSPs, so that they are in a position to compete and stay relevant in the market. They recommend that if necessary, the Government can provide necessary guarantees, such as through a Letter of comfort to BSNL/MTNL to facilitate 4G/5G allocation.

**Reply of the Government**

The Union Cabinet on 23.10.2019 approved the revival plan for BSNL and MTNL that inter-alia included administrative allotment of spectrum for 4G services through Capital Infusion at the auction discovered price of Rs. 20,410 crores. The Cabinet also approved the GST component of Rs. 3,674 Crores to be paid through budgetary allocation of Government of India.

The funds were made available in FY 2020-21. However, on BSNL's request to synchronize the allotment of spectrum for 4G with the procurement of equipment for 4G networks, the funds for spectrum has now been made available

in 2021-22. BSNL has informed that it intends to utilize the funds in the current financial year.

The Government has subsequently approved the allocation of spectrumfor 4G services in Delhi and Mumbai (MTNL areas) to BSNL to have pan-India presence in 4G services, in place of MTNL.

BSNL has floated the Expression of Interest (EOI) on 01.01.2021 for Proofof Concept (PoC) from Indian Companies interested in participating in BSNL's upcoming 4G tender. BSNL issued the Letter of Intent (LOI) to five bidders on 01.07.2021. The PoC is under progress.

In addition, the Cabinet also approved the proposal to administratively allot spectrum to BSNL/MTNL for providing 5G services on the same principle as adopted for allotment of spectrum for 4G services.

DoT has granted permission to MTNL on 23.06.2021 for conducting 5GTechnology trials with C-DoT in Delhi Licensed Service Area (LSA). BSNL is managing the wireless services of MTNL in Delhi LSA since 01.04.2021.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25$^{th}$October, 2021)

**Telecom Services as Essential Services**

**(Recommendation Sl. No. 26)**

The Committee are of the view that telecommunications services have become inevitable for the growth of key sectors in the country. Its role and importance in business and Government, and in empowering different sections of society, can hardly be overstated. It is also becoming a force multiplier for various other sectors of the economy. Considering its importance for business, Governments and various other sectors, the Committee feel that it is a high time that the Government should treat telecommunications services as an essential service like water and electricity and accord ICT the status of essential national infrastructure. The telecom sector needs to be treated as an important strategic sector and no longer only as source of revenue for the Government. The Committee, therefore, desire that necessary legislation be formulated to declare telecom services as an essential service and telecom infrastructure as critical infrastructure of the country. The enabling legislation can also address several related issues such as theft of fibre, disruption of services, RoW, cyber security measures and other matters addressed in the present report, which are well beyond the scope of the Indian Telegraph Act of 1885. Such new legislation can underpin the various measures reviewed by the Committee in this report, and equip the country better to take its place as a significant telecommunications power in the 21st Century.

## Reply of the Government

DoT is engaged with National Law University, Delhi to review and suggest amendments to Indian Telegraph Act (1885) and Indian Wireless Telegraphy Act (1933) for simplifying them and to bring them in line with the current telecom industry trends. The gap between present legislative and regulatory framework and the requirements of the future will be kept in mind while reviewing the Indian Telegraph Act.

(Ministry of Communications/Department of Telecommunications O.M. No. 12-14/2019-IC Dated the 25th October, 2021)

**New Delhi;**

**28 March, 2022**
**07 Chaitra ,1944 (Saka)**

**DR. SHASHI THAROOR,**
**Chairperson,**
**Standing Committee on Communications and Information Technology.**

**Annexure-I**

**STANDING COMMITTEE ON COMMUNICATIONS AND INFORMATION TECHNOLOGY**
**(2021-22)**

**MINUTES OF THE SIXTEENTH SITTING OF THE COMMITTEE**

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The Committee sat on Monday, the 28 March, 2022 from 1600 hours to 1810 hours in Committee Room '2', Extension to Parliament House Annexe, New Delhi.

**PRESENT**
**Dr. Shashi Tharoor -Chairperson**

**MEMBERS**

***Lok Sabha***

2. Smt. Locket Chatterjee
3. Shri Karti P. Chidambaram
4. Smt. Sumalatha Ambareesh
5. Smt. Sunita Duggal
6. Shri Jayadev Galla
7. Smt. Raksha Nikhil Khadse
8. Shri Dhairyasheel Sambhajirao Mane
9. Ms. Mahua Moitra
10. Shri Ganesh Singh
11. Shri Parvesh Sahib Singh
12. Col. Rajyavardhan Singh Rathore
13. Dr. T. Sumathy (A) Thamizhachi Thangapandian

***Rajya Sabha***

14. Dr. Anil Agrawal
15. Shri John Brittas
16. Shri Suresh Gopi
17. Shri Syed Nasir Hussain
18. Shri Syed Zafar Islam
19. Shri Jawhar Sircar

***Secretariat***

| | | | |
|---|---|---|---|
| 1. | Shri Y.M. Kandpal | - | Joint Secretary |
| 2. | Dr. Sagarika Dash | - | Director |
| 3. | Shri Shangreiso Zimik | - | Deputy Secretary |

**LIST OF WITNESSES**

**FACEBOOK**

| Sl. No. | Name | Designation |
|---|---|---|
| 1. | Shri Rajiv Aggarwal | Head of Public Policy, India |
| 2. | Shri Shivnath Thukral | Public Policy Director, India |
| 3. | Ms. Saanjh Purohit | Associate General Counsel |

**MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY**

| Sl. No. | Name | Designation |
|---|---|---|
| 1. | Shri K.Rajaraman | Secretary |
| 2. | Dr.Rajendra Kumar | Addl. Secretary |
| 3. | Shri Rakesh Maheshwari | Scientist 'G' and Group Coordinator |
| 4. | Dr. Sanjay Bahl | DG, CERT-In |
| 5. | Shri Notan Roy | Scientist 'E' |

2. At the outset, the Chairperson welcomed the Members to the sitting of the Committee convened to consider and adopt one Draft Action Taken Report relating to the Ministries/Departments under their jurisdiction and to hear the views of the representatives of Facebook India and to take evidence of the representatives of Ministry of Electronics and Information Technology on the subject 'Safeguarding citizens' rights and prevention of misuse of social/online news media platforms including special emphasis on women security in the digital space'.

3. The Committee, then, took up the Draft Action Taken Report on Twenty- first Report on the subject 'India's preparedness for 5G' relating to Ministry of Communications (Department of Telecommunications) for consideration.

4. The Committee, thereafter, adopted the above Report with some modifications.

5. The Committee authorized the Chairperson to present the above Report to the House during the current Session of Parliament.

*(The witnesses were then called in)*

6. xxxxxxx…….xxxxxxx……..xxxxxxx*

7. xxxxxxx…….xxxxxxx……..xxxxxxx

8. xxxxxxx…….xxxxxxx……..xxxxxxx

**The witnesses, then withdrew.**

A copy of verbatim record of the proceedings was kept on record.

**The Committee, then, adjourned.**

* Matters not related to the Report

**Annexure-II**

## ANALYSIS OF ACTION TAKEN BY THE GOVERNMENT ON THE OBSERVATIONS/RECOMMENDATIONS CONTAINED IN THEIR TWENTY-FIRST REPORT

## (SEVENTEENTH LOK SABHA)

**[Vide Paragraph No. 5 of Introduction]**

| | | |
|---|---|---|
| (i) | Observations/Recommendations which have been accepted by the Government | |
| | Rec. Sl. Nos.: 1,2,8,9,11,12,15,16,17,19,21,22,24 and 25 | |
| | | Total - 15 |
| | Percentage | 57.69 |
| (ii) | Observations/Recommendations which the Committee do not desire to pursue in view of the replies of the Government | |
| | Rec. Sl. No.: Nil | |
| | | Total - Nil |
| | Percentage | 0.00 |
| (iii) | Observations/Recommendations in respect of which replies of the Government have not been accepted by the Committee and require reiteration | |
| | Rec. Sl. Nos.: 3,5,6,7,10,13 and14 | |
| | | Total - 06 |
| | Percentage | 23.08 |
| (iv) | Observations/Recommendations in respect of which the replies of the Government are of interim in nature | |
| | Rec. Sl. Nos.: 4,18,20, 23 and 26 | |
| | | Total - 05 |
| | Percentage | 19.23 |