

BIF RESPONSE TO TRAI CP on Open and De-licensed use of Unused or Limited Used Spectrum Bands for Demand Generation for Limited Period in Tera Hertz Range

Q1. Whether there is a need for permitting license-exempt operations in 116-123 GHz, 174.8-182 GHz, 185-190 GHz, and 244-246 GHz frequency ranges? Please provide a detailed response with justification.

BIF RESPONSE:

Yes. All the mentioned bands should be made license exempt.

Justification:

Due to the limited distance propagation characteristics associated with the sub-THz bands, they are best suited for a license exempt framework. Unlicensed spectrum is a significant driver of innovation and allows tech entrepreneurs and startups to develop innovative use cases around it.

We find that all the mentioned bands have contiguous spectrum of upto 7, 7.2, 5 & 2 GHz. This we feel may not be adequate. The chance to enable wider channels i.e upto 20GHz or more may be a limiting factor in these bands. Hence it is felt that we should strive to obtain other frequency bands which permit wider channels of 20GHz and more.

We would like to reference the recent work undertaken by the Electronic Communications Committee of the European Conference of Post and Telecommunications Administrations in enabling radar applications in the ranges which allow applications that were not possible before. Please refer to ECC Decision (22) 03.

Q2. In case it is decided to permit license-exempt operations in 116-123 GHz, 174.8-182 GHz, 185-190 GHz, and 244-246 GHz frequency ranges, what should be the terms and conditions including technical parameters for permitting license-exempt operations in these bands, while protecting both passive and active services in and around these frequency ranges? Please provide a detailed response with justification.

BIF RESPONSE:

The frequency bands, 116-123 GHz, 174.8-182 GHz, 185-190 GHz, and 244-246 GHz may be opened for unlicensed use. We suggest that FCC's Technical specifications may be adopted. Please refer to FCC rules. (see Part 15.258 "For operation in the bands 116–123 GHz, 174.8–182 GHz, 185–190 GHz). Also reference may be drawn to ERC 70-03 Annex 1, p for wider band of 244 - 246 GHz

Q3. Whether there is a need for permitting license-exempt operations in any other bands in the 95 GHz to 3 THz frequency range? Please provide a detailed response with justification.

BIF RESPONSE:

Yes. All the frequency bands listed in Q1 have limited bandwidth. The full potential of the 95 GHz to 3 THz frequency range can only be unleashed if wide channel bandwidths are made available (20 GHz or more). We suggest to preserve regulatory flexibility in recognition of the difficulty of making predictions about the future path of technology and look into shared use with incumbents adjacent to these frequency ranges.

Q4. Whether there is a need for permitting license-exempt operation in 77-81 GHz band for automotive radar applications? Please provide a detailed response with justification.

BIF RESPONSE:

We recommend that the 77-81 GHz band may be delicensed for automotive radar applications in line with international best practices.

Justification:

Delicensing of the 77-81 GHz Band for Automotive Radars has been proposed by the DoT's Technical Committee. In the Committee Report, DoT has recommended implementation of V2X in the country. Frequency bands 76-77 GHz and 77-81 GHz are proposed to be used. for long range radar and short & medium range radars respectively for V2X application.

Global Experience:

FCC, USA and MIC, Japan have designated 76-77 GHz for automotive radars. MIC, Japan has also recommended introduction of high resolution radar in 77-81 GHz band for safety related applications. ETSI has adopted the harmonized standard in the frequency band 77-81 GHz for the application of short range radars. FCC, USA has allowed 77-81 GHz band for vehicular radar operations aligning with rest of the world. Many countries in Asia Pacific Region have also designated 77- 81 GHz bands for short range automotive radar applications for ITS. Therefore, the frequency band 77-81 GHz band is a globally harmonized band for short range radar applications.

Q5. In case it is decided to permit license-exempt operations in the 77-81 GHz band for automotive radar applications, what should be the terms and conditions including technical parameters for permitting licensed-exempt operations in this frequency band? Please provide detailed response with justification.

BIF RESPONSE:

1. The DoT THz Committee recommended that the devices in the unlicensed bands would operate on no-interference and non-protection basis while

protecting both passive and active services running in these bands and adjacent bands.

2. The DoT THz Committee also proposed technical parameters for the unlicensed bands as given below:

Technical Parameters:

- a. Limit Maximum EIRP: 40 dBm (average) and 43 dBm (peak) 82 dBm (average) and 85 dBm (peak) for outdoor fixed point-to-point devices
- b. Limit Maximum antenna gain: 51 dBi (with 2 dB reduction in the maximum permissible EIRP; for each dB the antenna gain falls below 51 dBi)
- c. Out-of-Band emission limit 90 picowatts per cm² at a distance of 3 meters Peak radiated power.
- d. Transmitters with an emission bandwidth of less than 100 MHz must limit their peak radiated power to the product of the maximum permissible radiated power (in milliwatts) times their emission bandwidth divided by 100 MHz.

Technical conditions

FCC's technical parameters may be adopted initially and after conducting intensive research in Indian environment, technical parameters may be modified at later stage.

Other terms and conditions:

No equipment should be permitted to operate on satellites or on board any aircraft. Experiments operating in the 174.8-182 GHz and 185- 190 GHz bands should not be designed to operate in the 182-185 GHz band to avoid possible interference.

Q6. Whether there is a need to open the frequency spectrum between 95 GHz to 3 THz for experiment and demonstration of equipment designed to operate on any frequency above 95 GHz through a separate experimental license? Please provide a detailed response with justification.

BIF RESPONSE:

We recommend that there is a need to open up the frequency spectrum bands between 95GHz-3THz for experiment and equipment demonstration. This would provide scope to develop technologies at higher frequencies with larger bandwidths. This has the potential to significantly improve the fidelity of emerging technologies, supporting applications that are infeasible today as also applications that cannot be visualised at this stage.

Q7. In case it is decided to open the frequency spectrum between 95 GHz to 3 THz for experiment and demonstration of equipment designed to operate on any frequency above 95 GHz through a separate experimental license - (a) what should be the terms and conditions under such a license? Kindly provide inputs in respect of, inter alia, the following

aspects for the proposed separate experimental license: i. Purpose of the license; ii. Scope of the license; iii. Eligibility conditions for entities seeking to acquire the license; iv. Mode of applying for the license; v. Duration of the license; vi. Obligation under the license; vii. Financial conditions including the license fees; viii. Technical conditions and other terms and conditions for operations under the license; ix. Mechanism to ensure protection to passive services in the frequency range between 95 GHz to 3 THz; and x. Any other (please specify). (b) whether the licensees should be permitted to market experimental devices designed to operate in the frequency range between 95 GHz to 3 THz via direct sale? If yes, what should be the associated terms and conditions? Please provide a detailed response with justification.

BIF RESPONSE:

The spectrum beyond 95 GHz and upto 3 THz may be opened for experiments under 'Spectrum-Terahertz Applications License'. There shall not be any restriction on technical conditions for designing and conducting experiments and tests, provided they should not cause harmful interference to existing services including secondary services. We suggest that the Terms and Conditions of Experimental License for Spectrum issued vide 29.07.2019 may be applicable for spectrum in the bands from 95GHz to 3 THz also.

Q8. Whether there are any other issues or inputs in respect of the frequency spectrum in Tera Hertz bands? If yes, please provide detailed comments with justification.

BIF RESPONSE:

No additional comments
