RJIL/TRAI/2023-24/240
29th November 2023

To,
Shri Akhilesh Kumar Trivedi,
Advisor (Networks, Spectrum and Licensing),
Telecom Regulatory Authority of India
Mahanagar Doorsanchar Bhawan
Jawaharlal Nehru Marg, New Delhi - 110002

Subject: **RJIL's comments on TRAI's Consultation Paper on "Open and De-licensed use of Unused or Limited Used Spectrum Bands for Demand Generation for Limited Period in Tera Hertz Range".**

Dear Sir,

Please find enclosed the comments of Reliance Jio Infocomm Limited (RJIL) on the Consultation Paper dated 27.09.2023 on **"Open and De-licensed use of Unused or Limited Used Spectrum Bands for Demand Generation for Limited Period in Tera Hertz Range"**.

Thanking you,

Yours Sincerely,
For **Reliance Jio Infocomm Limited**

KAPOOR SINGH GULIANI
Digitally signed by KAPOOR SINGH GULIANI
Date: 2023.11.29 14:03:09 +05'30'

Kapoor Singh Guliani
Authorized Signatory

Enclosure: As above

Reliance Jio Infocomm Limited's comments on TRAI's Consultation on "Open and De-Licensed use of Unused or Limited Used spectrum for Demand Generation for Limited Period in Tera Hertz Range" dated 27th September 2023.

Preface:

1. Reliance Jio Infocomm Limited (RJIL) thanks the Authority for giving an opportunity to offer comments on the important consultation paper on Open and De-Licensed use of Unused or Limited Used spectrum for Demand Generation for Limited Period in Tera Hertz Range.

A. Experimental use of Tera Hertz frequencies:

2. We agree with the Authority and DoT that in view of the global practice of allowing experiments in spectrum bands beyond 95 GHz, **it is important that the Authority provides for a framework for assigning these spectrum bands in order to create demand in these spectrum bands in India.**

3. As further discussed by the Authority, the properties like non-ionizing nature, better penetration depths leading to better spatial imaging resolution of Tera Hertz band makes it useful in multiple use cases and applications like Biomedical Imaging, Security applications, biochemical and material sciences, wireless communication. We submit that in view of all this it is imperative that a facilitative framework is provided to help develop indigenous technologies and equipment, leveraging this unused spectrum band.

4. **In view of Nation's global technology leadership ambitions, it is important that all new opportunities are seized at inception and conducive environment is created for growth of services and devices.**

B. Licensing framework for Experimental use of Tera Hertz frequencies and spectrum in 77-81 GHz band:

5. As we already have an experimental use license provision available in the telecommunication regulatory framework and the same can be suitably extended to include the experimental use under Tera Hertz band, there is no need for a separate licensing framework. We have shared our issue wise inputs on DoT committee's proposed licensing framework as part of issue wise response.

6. Similarly, while we support the DoT committee's assessment that the frequency band 76-77 GHz and 77-81 GHz are globally harmonized bands for short range radar applications and should be earmarked for this purpose in India, we do not agree with the proposal for

license exempt operations in this band. **Instead of license exempt usage, we recommend that spectrum should be assigned through auction. However, if the auction is not feasible due to extremely low demand or technical infeasibility then a light touch licensing regime for experimental use with nominal license fee and compliance requirements for use of radar applications using this spectrum band to be permitted. However, this framework should be implemented only after technical evaluation of co-existence and non-interference with adjacent licensed bands, especially with point-to-point in the fixed service and point to multipoint applications in the fixed/mobile/space communication service in the 71-76 GHz and 81-86 GHz bands and automotive radar applications in the radiolocation service operating in the 76-81 GHz bands indicating the possibility of such interference.**

C. License exempt use of spectrum:

7. The purported intent of license-exempt use of any spectrum band is to promote various new communication technologies. **However, most of these proposals are without any technical justifications or any demand studies conducted on the requirement of such license-exempt spectrum, especially considering that spectrum is a scarce national resource. Neither is any analysis provided on potential loss to exchequer from such de-licensing on short term and long-term basis nor the long- term impact of license exempt use on the competition in the market and on already sunk investments in the sector. We submit that all these are valid consideration before any proposal for license exempt use is considered seriously by the Authorities.**

8. Our understanding of the unlicensed use/delicensing of spectrum is that it only leads to indiscriminate and irresponsible wide scale use with massive interference impact in case the same bands are also made available for licensed services. **Further, it is an irreversible process as it is impossible to subsequently implement licensing on any license-exempt spectrum, as has been seen in 6 GHz in some jurisdictions.**

9. We also understand that the proposals for license-exempt use generally emanate from the requirement to reduce spectrum costs, which can be substantial for new entrants or for experimental purpose. **However, when a light touch regulatory framework with nominal charges has been proposed, such requirements are also addressed, and the interested parties can apply to DoT and obtain right to use spectrum on experimental basis.** Further, by licensing, the Government will be able to control the usage and devices using the spectrum efficiently, which will not be possible in case of license exempt allocation.

10. In fact, we believe that the auction-based licensing framework is the most optimum solution. While on one hand this will ensure that the spectrum is most optimally used and

on the other hand it will ensure an optimum value of spectrum is maintained. However, during the experimental phase, the spectrum can be provided for experimental use as per the present policy of assigning the spectrum for research, development and testing of new services/products for limited duration. Therefore, we strongly recommend against license exempt usage of spectrum.

11. **Conclusions**

1. **Spectrum in Tera Hertz and 76-77 and 77-81 GHz band on long term basis or for the purpose of commercial services should be assigned only through auction.**
2. **The experimental use of Tera Hertz frequencies should be permitted under a light tough licensing regime for short duration.**
3. **The licensing regime should be based on current experimental license.**
4. **The frequencies from 76-77 GHz and 77-81 GHz should be earmarked for short range radar applications after technical evaluation for non-interference with adjacent licensed spectrum bands.**
5. **Light touch licensing requirement should be applicable for short term radar applications for experimental use as well.**
6. **There is no case for license-exempt use of any spectrum.**

Issue wise response:

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.
And
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.
And
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.

RJIL Response:

1. At the outset, we strongly disagree with any proposals for unlicensed/license exempt/delicensed use of any spectrum band that can be useful for communication

technologies at any stage, **we reiterate our submissions that any spectrum assignment for commercial use should be through auction only**.

2. Further, as mentioned in the preface, our understanding of the unlicensed use/delicensing of spectrum is that it only leads to indiscriminate and irresponsible wide scale use with massive interference impact in case the same bands are also made available for licensed services. **Further, it is an irreversible process as it is impossible to subsequently implement licensing on any license-exempt spectrum, as has been seen in 6 GHz in some jurisdictions.**

3. We also understand that the proposals for license-exempt use generally emanate from the requirement to reduce spectrum costs, which can be substantial for new entrants or for experimental purpose. However, when a light touch regulatory framework with nominal charges has been proposed, such requirements are also addressed, and the interested parties can apply to DoT and obtain right to use spectrum on experimental basis. **Further, by licensing the Government will be able to control the usage and devices using the spectrum efficiently, which will not be possible in case of license exempt allocation.**

4. As per DoT committee's and Authority's own assessment these are vacant bands with almost nil assignment. Further, a very low-cost limited duration experimental licensing regime is already proposed for parts of Tera Hertz frequencies. **This same low-cost licensing requirement can be extended to the entire gamut of spectrum in Tera Hertz band to avoid the ill-effects of delicensed use, which include but are not limited to indiscriminate use, interference, devaluation of spectrum, lack of Government control and no security compliances, no record keeping and irreversible loss of valuable spectrum resources. Furthermore, once the commercial use is possible, the spectrum assignment should anyway be only through Auction.**

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.
And
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.

RJIL Response:

1. We agree with the DoT committee assessment that the frequency band 76-77 GHz and 77-81 GHz are globally harmonized bands for short range radar applications and should

be earmarked for this purpose in India as well. The expected usage of these spectrum bands varies from high resolution radar in 77-81 GHz band for safety related applications in Japan to vehicular radar operations in USA and other parts of the globe. Thus, India can also earmark this spectrum for short range radar applications.

2. However, we do not agree with the need for permitting license exempt operations in this band. **We submit that license exempt operations invariably lead to under-utilization/mis-utilization of valuable resources and the process becomes irreversible, even if later on better use cases are developed using these spectrum bands. Therefore, instead of license exempt usage, we recommend that first preference should be auction based assignment and in case the auction is not feasible due to extremely low demand or technical infeasibility then a light touch licensing regime with nominal license fee and compliance requirements for use of radar applications using this spectrum band.** This will ensure suitable control and record keeping of the spectrum usage and the Government would also be able to devise polices to ensure end-customer benefits using this spectrum band.

3. Notwithstanding the above, before permitting the use under such licensing regime, it is important that technical evaluation of co-existence and non-interference with adjacent licensed bands is done, and all rectification measures are implemented before putting this spectrum to use. **We understand that the possibility of interference with certain use cases of E-Band spectrum have been identified in ITU study[1] titled *Compatibility between point-to-point applications in the fixed service operating in the 71-76 GHz and 81-86 GHz bands and automotive radar applications in the radiolocation service operating in the 76-81 GHz bands,* and the same should be examined in detail.**

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.

RJIL Response:

1. We submit that in order to realize the national vision on technology leadership, it is imperative that all new technological frontiers should be explored. The spectrum beyond 95 GHz is considered to be vacant, with minimal assignment and is therefore ideal for experimental use. Thus, we support opening this spectrum for experimental purposes as this will be an important measure to generate demand in this spectrum band.

[1] https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-F.2394-2016-PDF-E.pdf

2. The opening of this spectrum under appropriate limited duration licensing framework for experimental purposes can help India develop new radiocommunications technologies through testing/ experimentation in the field of wireless radiocommunications. **Indigenous Technological breakthrough will simultaneously give a boost to the 'Make in India' initiatives and should be promoted. However, once the use cases are established the commercial use should be permitted only with spectrum acquired through auction.**

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).

RJIL Response:

1. We submit that DoT committee has already provided detailed suggestions on the proposed licensing framework for experimental use of spectrum between 95 GHz and 3 THz, and our inputs on the DoT committee's proposal are as below.

Item	**DoT Committee Proposal for experimental license in ed conditions for - Tera Hertz License**	**RJIL submissions on DoT Committee proposal**
License Name	[Spectrum - Tera Hertz Applications License (STAL)]	There is no need for a new licensing regime and the assignment can be done under the existing Experimental use license with purpose and technical condition

Item	DoT Committee Proposal for experimental license in ed conditions for - Tera Hertz License	RJIL submissions on DoT Committee proposal
		specific additions. Thus, there is no need for a new license.
Purpose	To promote R&D activities, indoor/outdoor testing/ experimentation in the field of wireless radiocommunications and also to promote Make in India in wireless products, and international practices	We agree with the purpose suggested by the DoT committee
Period	Initially for five years and further extendable for periods of five years at a time with an interim report to be submitted at the time of each renewal.	We submit that as per the current practice, **the initial validity should be only One year and post that an automatic extension for one year should be provided, if sought by the applicant.** However, post the 2-year period, the Government should examine on whether the licenses need to be migrated from experimental service to full scale commercial service under the scope of Unified License alongwith auction of spectrum. **As the experimental use of this spectrum is going on globally, we should expect that in near future the use cases may achieve critical mass to become full-fledged commercial services, therefore a time bound review is required.** After 2 years of experimental services, in case any need is felt for further allocation of spectrum for commercial services then the same should be through Auction only.

Item	**DoT Committee Proposal for experimental license in ed conditions for - Tera Hertz License**	**RJIL submissions on DoT Committee proposal**
License Fee	Rs.1000/- towards spectrum charges for 5 years	We agree with the proposed spectrum charges, however, with reduced spectrum duration.
	There should not be any restriction on geographical areas for STAL. The user may be allowed to request operations over any area, except restricted areas, that they deem appropriate for their experiment.	We submit that the applicants should be required to define the areas where they propose to use the frequency assigned under experimental license. **However, the area assignment should be done with a liberal and progressive mindset to help promote the services and help discover new use cases.**
Technical Conditions	There shall not be any restriction on technical condition for designing and conducting experiments and tests provided they should not cause harmful interference to existing services including secondary services.	We agree with the DoT committee's proposal with a caveat that the interference management should be licensee's responsibility and in case of any instance of interference with commercial communication services under Unified License, the experimental licensee should rectify on immediate basis. **Further, in case of no solution is found the experimental license holder will be required to discontinue service in the affected area.**
Terms & Conditions	May be permitted to market experimental devices designed to operate in the bands above 95 GHz via direct sale	We agree with the proposal to permit marketing the experimental devices, however, the same should be as per the DoT guidelines for network testing before the launch of any services on a commercial basis. Further, the licensee should ensure complete disclosures to the users about the experimental nature of the services. The Licensee

Item	DoT Committee Proposal for experimental license in ed conditions for - Tera Hertz License	RJIL submissions on DoT Committee proposal
		to provide undertaking for not claiming any third-party rights on account of such marketing.
	Licensees who take advantage of these marketing provisions must uniquely identify each device (e.g., through a serial number) in a manner that will enable them to easily track each one. Finally, at the time of sale, the licensee is required to provide trial participants with a written disclosure that clearly states that the equipment being purchased is part of an experiment that may be terminated at any time by the licensee or the licensor, and the device will be surrendered or rendered inoperable at the conclusion of the experiment.	We submit that a verifiable framework for tracking the devices should be provided and the DoT and Law Enforcement Agencies (LEAs) should have an on-demand access to the tracking mechanism.
	However, the licensees shall ensure that trial devices are either rendered inoperable or retrievable at the conclusion of the trial. Additionally, each device sold under this program must be labelled as "Authorized Under STAL and may be subject to further conditions including Termination of Operation" and carry with it a licensee assigned equipment ID number to be issued by WPC, DoT.	We agree with this provision
	Government may prescribe any test/ measurement etc. from health safety/ environment safety/ EMI/ EMC etc. as per international practice, if case application wants to market experimental devices.	We agree with this provision
	No exclusive assignment should be given under 'STAL'. The assignment	We agree with this provision. Further, as mentioned above, the

Item	DoT Committee Proposal for experimental license in ed conditions for - Tera Hertz License	RJIL submissions on DoT Committee proposal
	will be given on 'Non-interference basis and Non-protection Basis' (NIB/ NPB). The operations under the license would also not claim any protection from allocated services or incumbent users.	licensee should be responsible for interference management.
	The spectrum assignment is subject to the condition that such spectrum, if subsequently assigned for regular (commercial, strategic, etc.) use will entail termination/ modification/ relocation of any test or experimentation being carried out in the said spectrum band. In the event, user will be offered alternative spectrum band. If alternative spectrum band is not feasible, the user will be allowed to continue experiment till the completion of license period in coordination with the licensed assignees.	We agree with this provision.

2. Further, our inputs on additional points are as below:

i. **Eligibility conditions for entities seeking to acquire the license-** We do not propose any stringent eligibility conditions. As the license is for experimental purposes only, the applicants should be able to demonstrate their credentials for conducting such experiments/studies to the satisfaction of DoT.

ii. **Mode of applying for the license-** The Applicants should be facilitated with online application process through Saral Sanchar portal.

iii. **Obligation under the license-** The obligations under the license should be limited to providing regular reports to the DoT and TRAI on the progress on the use-cases proposed by the applicant. **Further, in case the Applicant desires to add new use cases or discontinue any experiment, it would be obligatory on it to inform DoT and TRAI, prior to such action.**

(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.

RJIL Response:

1. We do not oppose the DoT committee proposed permission for marketing experimental devices, however, all the safeguards should be scrupulously followed by the licensees. The safeguards are reiterated below:

    i. Licensee shall offer services in compliance with DoT guidelines for network testing before the launch of any services on a commercial basis.

    ii. Licensees should uniquely identify each device (e.g., through a serial number)

    iii. An online real-time device tracking mechanism should be created by the licensee.

    iv. Access to this mechanism should be provided to DoT and LEAs, on demand basis.

    v. licensee to provide a written disclosure that clearly states that the equipment being purchased is part of an experiment that may be terminated at any time by the licensee or the licensor, and the device will be surrendered or rendered inoperable at the end of experiment. The Licensee to provide undertaking for not claiming any third-party rights on account of such marketing.

    vi. The devices should be either rendered inoperable or retrievable at the conclusion of the trial.

    vii. Each device sold under this program must be labelled as "Authorized Under Experimental license valid till xx.xx.xx [date]

    viii. The device should carry with it a licensee assigned equipment ID number to be issued by WPC, DoT.

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.

RJIL Response: None