

## **Consultation Paper on Allotment of spectrum to Indian Railways for Public Safety and Security services**

Dear Sir,

We welcome the opportunity to submit our views on the Consultation Paper “Allotment of spectrum to Indian Railways for Public Safety and Security services”, dated 24<sup>th</sup> June 2019, by Telecom Regulatory Authority of India (TRAI). We are providing a general response to the questions raised in the Consultation paper.

Regards,

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<sup>1</sup> All views expressed are personal.

## ISSUES FOR CONSULTATION

### **Q.1 Whether spectrum in 700 MHz band should be assigned to Indian Railways for RSTT in India? Please provide justification for your response.**

The 700 MHz spectrum band is the most appropriate spectrum band for LTE technology.

Importance of 700 MHz band :

- It Possesses excellent propagation characteristics. Thus, it can easily penetrate to buildings and walls (urban setup) and can cover relatively larger geographic areas without losing signal. This would also reduce the burden of deploying base stations as it requires lesser infrastructure to serve larger areas as compared to higher frequency bands.
- It has wider coverage which results in low deployment cost. This would be beneficial, particularly in rural areas.
- Global harmonization- alleviate interference along national borders

Apart from this, it is also critical for the new generation telecom services. Therefore, if the spectrum in this band is assigned to the Indian Railways (IR), there will be very less left for the telecom industry. The lesser spectrum available in 700 MHz frequency band would mean a downward shift in telecom industry growth. It would also inflate the prices at auctions.

The 700 MHz band is important as LTE needs to be harmonized for efficient deployment. If no spectrum is available in this band, there will be no incentive for investment in LTE. As a result, there will be a negative impact on Foreign Direct Investments (FDI) and productivity (business).

Further, Spectrum available for commercial 5G services in India is already limited. Thus the allocation of 700 MHz to Railways, will further limit the scope of implementing 5G technology in India by making it impossible for operators to fight for already limited spectrum, resulting in inflated prices through auctions. Even the 5G committee (5G HLF) of the DoT, has recommended the use of 700 MHz band for 5G in India based on its significance towards 5G deployment. Adding to this, it is approximately 70% cheaper to provide mobile broadband coverage in this frequency band, making a strong case for using it for 5G deployment in light of the current condition of the Indian telecom sector.

Available spectrum is insufficient to serve the growing demand of spectrum across sectors. The spectrum available in India is significantly lower than the USA, France, etc. It is even lower than that available in countries like Brazil and China. The spectrum available for each subscriber is as low as 0.2 Hz per subscriber, as given in table no 1. Further, the spectrum available in various bands, is also amongst the lowest for India when compared to most other countries.

Due to the rapidly growing telecom sector, there is a steep rise in spectrum requirement by the sector. Spectrum bands allocated and unutilized by other sectors is now being considered for use due to the technical developments leading to the expansion of telecommunication applications in bands allocated for other services.

**Table No 1: Summary of Licensed Spectrum across Countries (in MHz)**

S.No.	Country	Current Availability across spectrum bands (MHz)	Under Process (MHz)	Spectrum / Subscribers (Hz/Subscriber)
1	USA	608	55	2.1
2	France	555	50	9.3
3	Germany	615	0	6.2
4	Australia	478	230	22.8
5	Spain	540	60	11.8
6	China	227	360	0.5
7	Brazil	554	0	2.0
8	India	221	10	0.2

Source: 'Spectrum policy in India', by Shamika Ravi and Darrell M. West, published in August 2015, <https://www.brookings.edu/wp-content/uploads/2016/06/Spectrum-Policy-in-India8515.pdf>

Therefore, it is not sustainable for DoT to assign spectrum in the 700 MHz band to IR for RSTT deployment. Other spectrum bands must be looked upon for allocation to IR for this purpose.

**Q.2 In case your answer to Q1 is in affirmative, how much spectrum should be assigned to Indian Railways?**

**Not Applicable**

**Q.3 In case your answer to Q1 is negative,**

**i) what are the other bands (including 450-470 MHz) in which spectrum can be assigned for RSTT,**

**ii) how much spectrum should be assigned to Indian Railways?**

In China, a framework for the development of LTE-R is under process and is scheduled to be introduced by 2020<sup>2</sup>. As a high-frequency band has larger propagation loss and more severe fading, therefore, the low-frequency bands, such as 450–470 MHz, 800 MHz, and 1.4 GHz, have widely been used. The 450–470-MHz band is already well adopted by the railway industry in China; therefore, dedicated bandwidth for professional use can still be allocated from local regulators.

Therefore, for RSTT, 10 MHz spectrum must be provided to IR initially, in the 450-470 MHz band. This may be increased in the future based on requirements and utilization of allocated spectrum. It can be either provided at a lower price or free of cost, based on DoT's discretion.

**Q.4 In case it is decided that spectrum in IMT bands which have already been earmarked for mobile services, be assigned to Indian Railways for RSTT in India, what should be the methodology (including price) of allotment of spectrum?**

**Not Applicable**

**Q.5 In case it is decided to assign spectrum in other spectrum bands (including 450-470 MHz band), what should be the methodology (including price) of allotment of spectrum?**

Supreme Court's February 2012 judgment<sup>3</sup> on "WRIT PETITION (CIVIL) NO. 423 OF 2010", allows for using natural resources (spectrum in our case) for "larger public good" with reference to the following point, as mentioned in the judgment:

*"In conclusion, we hold that the State is the legal owner of the natural resources as a trustee of the people and although it is empowered to distribute the same, the process of distribution must be guided by the constitutional principles including the doctrine of equality and larger public good."*

The Union Government, later, had opted for a Presidential Reference asking a series of questions seeking clarity on the 2G judgment. The basic question was whether auction as a mode of disposal of natural resources under the government's control was a constitutional requirement. The Supreme Court's response to this was in negative.

While there was an argument in favor of auctions stating that revenue maximization during the sale or alienation of a natural resource for commercial exploitation is the only way of achieving public good since the revenue collected can be channelized to welfare policies and controlling the burgeoning deficit. But the court rejected this view stating- "**we are not persuaded to hold so. Auctions may be the best way of maximizing revenue but revenue maximization may not always be the best way to subserve the public good. 'Common good' is the sole guiding**

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<sup>2</sup> High-Speed Railway Communications: From GSM-R to LTE-R by Ruisi He, bo ai, Gongpu Wang and Ke Guan; published in IEEE Vehicular Technology Magazine September 2016; [https://www.researchgate.net/publication/307518255\\_High-Speed\\_Railway\\_Communications\\_From\\_GSM-R\\_to\\_LTE-R](https://www.researchgate.net/publication/307518255_High-Speed_Railway_Communications_From_GSM-R_to_LTE-R) accessed on July 2, 2019

<sup>3</sup> "In The Supreme Court Of India Civil Original Jurisdiction Writ Petition (Civil) No. 423 Of 2010", case no - W.P.(C) No.- 000423-000423 / 2010 dated February 2, 2012, <http://supremecourtindia.nic.in/jonew/judis/39041.pdf>, accessed on November 27, 2017.

**factor under Article 39 (b) for distribution of natural resources”**. Thus, when the endeavors of state policy is to attain social good, an auction cannot be considered the sole criteria for allocation of natural resources.<sup>4</sup>

Therefore, the spectrum in the 450-470 Mhz band may be administratively allocated to the IR. This is further supported by the fact that to accelerate the pace of investment in telecom infrastructure in the North East and Jammu & Kashmir, TRAI had previously recommended discounting the reserve price of the spectrum by 50% even for the TSP’s.

Following a similar approach, the spectrum may be allocated to IR at a discounted price or can even be given free of cost, considering the fact that the purpose of deployment of the spectrum, in this case, is for public benefit. For additional requirement, IR can team up with TSPs on case to case basis.

**Q.6 Do you foresee any challenges, if Indian Railway makes internet services available onboard i.e. within the train using spectrum allocated for signaling purpose?**

**No Comments**

**Q.7 Whether the requirement of Indian Railway for RSTT can be fulfilled using the following alternate methods:**

**Alternate: iii) Any other method as may be suggested by the stakeholders.**

In case of assignment of spectrum to Railways, there are two main areas of deployment highlighted by IR:

- A. Public communication network (making communication and internet service available to passengers onboard).
- B. Railway operations (signaling, security, etc.)

A. For public communications network: IR may collaborate with TSP’s towards developing and maintaining the network as this involves a larger framework. The TSP’s already have a robust communication network along the railway routes and there is no need for IR to build a new one. A study showed that almost 63% of the railway route had mobile connectivity by the year 2016.<sup>5</sup> Also, there is no merit in allocating bandwidth to the railway for their internal communication as IR already has a nationwide contract with Reliance Jio

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<sup>4</sup> Keeping Vigil by Harish Salve; published on October 28, 2012; <https://www.businesstoday.in/magazine/focus/2g-presidential-reference-sc-clarity-on-natural-resources/story/188856.html>; accessed on July 8, 2019

<sup>5</sup> Delhi-Kolkata route has the best mobile network coverage: Railyatri, Published on April 04, 2017 <https://www.thehindubusinessline.com/economy/logistics/delhikolkata-route-has-the-best-mobile-network-coverage-railyatri/article9616175.ece>, accessed on July 17, 2019

for providing communication services to railway officials (1.95Lakh CUG mobile connections)<sup>6</sup>. They can expand the contract if additional capacity is needed.

A 2009 survey in Belgium, concluded that onboard internet does not appeal to a mass market, but will attract a rather limited but heavily interested niche. In addition, the study showed that the willingness to pay for these services was quite low. This would burden the railways with increased costs if such passenger services are provided for free.<sup>7</sup>

On the other hand, a certain section would be willing to pay a higher fee for access to premium internet services. The train is a mobile office for many passengers and for companies and persons who charge by the hour, work on the train can often cover the cost of their fare. The train is widely considered an integral part of the working day. This, therefore, suggests that rail services are more likely to appeal to business travelers if they are offered high-quality broadband. This can be done by providing a reserved quality of broadband onboard. Such passengers would be willing to pay extra to get access to extra facilities and services. It will also prove to be a revenue source to telecom operators providing a particular service.<sup>8</sup>

B. For railway operations: 10 MHz spectrum must be provided to IR initially, in the 450-470 MHz band. This may be increased in the future based on requirements and utilization of allocated spectrum. It can be either provided at a lower price or free of cost, based on DoT's discretion.

IR must collaborate with TSP's for passenger communication purposes (considering future 5G developments) and the RSTT network must be developed and governed by the IR. Keeping two separate network infrastructures would prevent under-utilization of any spectrum allocated solely to IR, reduce infrastructure rollout time and would result in better spectrum management. Such a structure would prove sustainable for both the Railway operators as well as the TSPs.

**Q.8 If there are any other issues/suggestions relevant to the subject, stakeholders may submit the same with proper explanation and justification.**

### **No Comments**

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<sup>6</sup> Reliance Jio to take over as service provider for Railways from January 1, published on November 21, 2018; [//economictimes.indiatimes.com/articleshow/66737294.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](https://economictimes.indiatimes.com/articleshow/66737294.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst), accessed on July 17, 2019

<sup>7</sup> Future Rail Communication - Implementation Scenarios for LTE by Steffen Amundsen, published in June 2013; <https://pdfs.semanticscholar.org/6462/65489043e98515868f0a0732b7fd3a11b45c.pdf> accessed on July 22, 2019

<sup>8</sup> Broadband Access in Complex Environments: LTE on Railway by Cesar Briso-Rodriguez et al; published in August 2014; [https://search.ieice.org/bin/pdf\\_link.php?category=B&lang=E&year=2014&fname=e97-b\\_8\\_1514&abst=](https://search.ieice.org/bin/pdf_link.php?category=B&lang=E&year=2014&fname=e97-b_8_1514&abst=) accessed on July 22, 2019.