



GSMA
11th Floor, Hindustan Times House
18-20 KG Marg, Barakhamba,
New Delhi - 110001
Tel: +91 (011) 4322 4400
gsma.com

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Shri Syed Tausif Abbas

Advisor (Networks, Spectrum and Licensing)

Telecom Regulatory Authority of India

Mahanagar Doorsanchar Bhawan

Jawahar Lal Nehru Marg

New Delhi 110002,

E-mail: advmn@traigov.in

Subject: Consultation on *Allotment of Spectrum to Indian Railways for Public Safety and Security Services*

Ref: Consultation paper: 8/2019 dated 24 June 2019

Dear Sir,

This is with reference to the consultation paper on '*Allotment of Spectrum to Indian Railways for Public Safety and Security Services*'.

Please find attached GSMA's comments on this consultation as **Annexure-1** to this letter. We hope that our response will merit your kind consideration.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Manoj Kr Misra', is written over a blue circular scribble.

(Manoj Kr Misra)

Sr. Public Policy Director-India

Email: mmisra@gsma.com

Mob. No. +919818210011

Enclosed: As above (*ANNEXURE-1, number of pages – 06*).



ANNEXURE - 1

Executive Summary:

The GSMA¹ thanks TRAI for welcoming comments from industry on the questions posed and for the extensive discussion presented in the consultation paper. The purpose of our submission is to bring to your attention three areas TRAI and the government departments concerned must consider in ensuring the successful assignment of the 700 MHz spectrum, in connection with the proposal for allocation of spectrum for Indian Railways.

The GSMA wishes to congratulate India for the efforts in providing the people of India with access to the 700 MHz digital dividend spectrum. Ensuring mobile broadband continues to expand and reach more communities in India, especially in rural areas, will guarantee significant economic benefit to all people participating in the digital economy of India. We appreciate that making this spectrum available can be challenging and thank you and your colleagues for the tremendous effort you've made.

The 700 MHz digital dividend spectrum is crucial for achieving country-wide access to advanced mobile broadband services because of the wide-area coverage characteristics of this spectrum. Readily available access to advanced mobile broadband services in "coverage spectrum", such as 700 MHz, will contribute to the provision of a solid foundation for India to fully benefit from the emerging next-generation 5G ecosystem – as both 4G and 5G will complement each other in the provision of national mobile infrastructure.

In relation to the spectrum allotment for Indian railways, there are three areas that stand out and we believe must be addressed:

1. Spectrum set-aside for railways in 700 MHz is likely to severely constrain the development of wide-area mobile broadband network for India:

Considering the available 700 MHz mobile spectrum in India (2x45 MHz) is already being planned with a set-aside of 2x10 MHz for government use, the proposed additional set-aside for railways (between 2x10/15 MHz) would result in only 2x20 MHz being made available for mobile broadband. This reduced available bandwidth is unlikely to provide a balanced distribution of spectrum assets in a key coverage band; resulting in missed opportunities for increased economic activity arising from optimum mobile broadband capacity available to operators and consumers. We note that countries using the APT700 band have opted for assignments that can accommodate optimum LTE use (i.e. 2x15 MHz per operator).

¹ The GSMA represents the interests of mobile operators worldwide, uniting more than 750 operators with almost 400 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces the industry-leading MWC events held annually in Barcelona, Los Angeles and Shanghai, as well as the Mobile 360 Series of regional conferences. (<https://www.gsma.com/aboutus/>)



It would be important for government to undertake a cost-benefit analysis to determine the long-term economic gains for India and the trade-offs likely to emerge by constraining mobile broadband spectrum in 700 MHz as a result of the quantum of spectrum set-aside for railways. The GSMA's view is that the economic benefits of countrywide mobile broadband in 700 MHz outweigh those of set-asides for application-specific uses, and therefore we do not recommend assigning 700 MHz spectrum for railways.

2. Interference management needs between Indian Railways and mobile operators using 700 MHz will pose increased costs and the need for ongoing coordination:

When mixing an application-specific use (LTE-R) with IMT mobile broadband services in the 700 MHz, interference mitigation between railways and commercial mobile networks will be required. The necessary hardware to reduce interference will need funding, but an assessment of how much funding is required is difficult to ascertain because the number of rail LTE-R receivers is unknown and also because commercial IMT networks are yet to be deployed.

Any costs arising from interference protection needs by railways should not be an impediment for mobile operators to build cost-efficient networks. These costs should be absorbed by the parties concerned, and not passed on to mobile operators. We also note that the added technical complexities arising from coordination requirements between railways and IMT in the 700 MHz will have an impact on the value of 700 MHz spectrum – which will need to be reflected on the sale price when offering this spectrum to mobile operators.

3. There are options for spectrum use by Indian railways in other bands:

Other bands are available for use by Indian Railways and should be considered in first instance in order to avoid undue costs, technical complexities and missed economic opportunities (i.e. 150, 300, 400, 450-470 MHz). Indian Railways would benefit from undertaking a cost-benefit comparative analysis amongst these options, especially if the concern of the proposals is to put spectrum to use by railways for the purpose of public safety. Public safety applications for railways should avoid planning operational robustness based on the effectiveness of interference mitigation between railways and other spectrum users. As explained in point two above, Indian Railways will require coordinating its networks with commercial mobile broadband to achieve interference mitigation, which is not an effective platform to begin planning a public safety use.

The fact that the actual requirement by Indian Railways (in terms of the final radio network plan) is unknown and the deployment requirements by commercial mobile networks is yet to be defined (and will always undergo optimisation) would make safety appraisals impractical. Commitments in terms of reliability levels for safety purposes by railways are unlikely to provide enough rigour under such circumstances if planned in 700 MHz. Therefore, we recommend considering an alternative band.



Finally, it is important to understand that 700 MHz will serve India's rural needs for advanced mobile broadband – which require significant investment in CAPEX.

In a similar way, well-planned and readily available advanced mobile broadband in coverage bands will support India's vision of benefiting from the emerging 5G ecosystem, reaching across vast territorial areas with good quality broadband.

TRAI must consider the large investments required by operators to serve the public with mobile infrastructure and the investment-intensive nature of wide area rural broadband – constraining the availability of spectrum in 700 MHz is likely to undermine this vision.

We would appreciate the opportunity to discuss and work together to ensure the benefits of mobile infrastructure continue to advance the interests of the citizens of India.

The detailed answers to the questions are provided in the *section below*.

Question-wise Response:

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

GSMA Response:

1.1 GSMA is of the view no spectrum in the 700 MHz band should be assigned to railways or any other application specific uses.

1.2 Spectrum below 1 GHz in general, and the APT700 digital dividend band specifically, has been a key part of the mobile operators' drive to connect everyone, given the wide area coverage advantages of 700 MHz. 700MHz is set to become the biggest LTE ecosystem globally. All three ITU regions have adopted this mobile band. Most advanced markets have already licensed, deployed or planned to license this band for 4G/5G IMT.

1.3 There are 1,789² APT700 (band 28) devices comprising phones, tablets, CPE and related devices announced by many suppliers across all price points (compared to 861 devices two year ago). This represents a CAGR of 44% over 2 years.

1.4 Using the 700 MHz band for purposes other than for mobile broadband LTE/5G will pose significant socio-economic losses to India, given the benefits of widespread mobile broadband using sub GHz – particularly in countries with large rural areas³.

² LTE Ecosystem Report – Global Status Update June 2019

³ https://www.gsma.com/spectrum/wp-content/uploads/2018/08/GSMA_700MHz_ASEAN_Executive_Summary_Aug2018.pdf,
<https://www.gsma.com/spectrum/wp-content/uploads/2012/07/277967-01-Asia-Pacific-FINAL-vf1.pdf>



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

GSMA Response:

2.1 No spectrum should be assigned to railways in the 700 MHz band.

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?

GSMA Response:

3.1 The band 450-470 MHz should be considered for RSTT. Also, the recent AWG report⁴ shows the band 150MHz, 300MHz and 400MHz have been widely used for RSTT in Asia Pacific countries.

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?

GSMA Response:

4.1 GSMA has no specific views about the mechanism and price for spectrum that is not allocated to IMT services. However, any costs arising from spectrum management and interference mitigation mechanisms between railways and LTE/5G networks should not be passed on to mobile operators.

4.2 Moreover, we note that mixing LTE/5G use with RSTT use in the 700 MHz band is likely to require interference mitigation to coordinate the two systems along the path of railways – this is likely to result in unpredictable costs. Any ongoing risk of interference or need for pre-emptive interference mitigation measures will have an impact also on the price of IMT spectrum in 700 MHz.

4.3 GSMA also notes that spectrum set-asides for application specific uses create **spectrum fragmentation** and break the principle of service neutrality.

4.4 Spectrum set-asides for railways in a commercial mobile band would require an assessment of economic value and a **cost/benefit analysis** to justify that a reduction of mobile broadband spectrum would result in increased economic benefits.

4.5 The allocation methodology should support **fair and non-discriminatory access to spectrum** principles and without creating **artificial scarcity for mobile operators**, avoiding a limited performance and inflated spectrum costs.

⁴ Draft New Apt Report On System Deployment And Relevant Testing Studies Of Railway Radiocommunication System Between Train And Trackside (RSTT) In Apt Countries



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?

GSMA Response:

As per our response above in paragraph 4.5

Q.6 Do you foresee any challenges, if IR makes internet services available on board i.e. within the train using spectrum allocated for signaling purpose?

GSMA Response:

6.1 The railway company should facilitate the process to allow mobile operators to deploy their own infrastructure to provide high-quality internet services.

Q.7 Whether the requirement of IR for RSTT can be fulfilled using the following alternate methods: i) Alternate method suggested in para 4.47, wherein a TSP could build, deploy and maintain LTE-R network for IR; while the control, use and operation of the LTE-R network may be with IR.

OR

ii) Alternate method suggested in para 4.48, wherein there could be a common integrated network (with common spectrum) for Public Safety i.e. Public Protection and Disaster Relief (PPDR) and Railways, using PS-LTE and LTE-R technology respectively.

OR

iii) Any other method as may be suggested by the stakeholders. (Please provide detailed response with justifications and required enabling provisions.)

GSMA Response:

7.1 Mobile operators have provided services to vertical industries for years, notably in 3G and 4G, and will also provide dedicated services using 5G. This allows for competition between operators in order to secure the best financial deal possible via commercial arrangements.

7.2 Network slicing will allow mobile operators to dedicate a portion of their spectrum to provide best quality of service for application-specific uses.



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

GSMA Response:

8.1. DoT is encouraged to explore how mobile operators could enable access to spectrum resources via voluntary spectrum sharing/leasing.

8.2 Mobile operators have access to a wide range of frequencies across their spectrum portfolio, which can cater for different approaches required by application-specific uses and depending on the regional situation.
