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To

Shri Syed Tausif Abbas,
Advisor (Networks, Spectrum and Licensing),
TRAI, New Delhi.

No. BSNLCO-RGLN/25/3/2021-REGLN**dated 04.07.2022****Sub: Comments on Consultation Paper on “Spectrum Requirements of National Capital Region Transport Corporation (NCRTC) for Train Control System for RRTS Corridors”.**

With regard to Consultation Paper on “Spectrum Requirements of National Capital Region Transport Corporation (NCRTC) for Train Control System for RRTS Corridors”, please find the comments of BSNL, as below.

Issues for Consultation

Q.1 In which band, spectrum should be assigned to NCRTC for their LTE-R technology based Train control system for RRTS rail corridors?

Q.2 How much spectrum in the spectrum band(s) suggested in response to Q1, should be assigned to NCRTC to meet its requirement for its RRTS LTE-R based network?

Q.3 Do you see any challenge, if the same spectrum is assigned to different RRTS/metro rail networks, operating in geographically separated areas/corridors in the country? If yes, kindly provide details and possible solutions.

Q.4 In case more than one RRTS Metro/rail networks are to operate in overlapping geographical areas, will it be appropriate for RRTS Metro/rail networks to share the Radio Access Network (RAN) in the overlapping areas using Multi-Operator Core Network (MOCN)? Any other feasible mechanism for using same spectrum in overlapping areas may also be suggested with detailed explanation. Kindly justify your response.

Q.5 In case it is decided that RRTS Metro/rail networks may share the Radio Access Network (RAN) in the overlapping area using Multi-Operator Core Network (MOCN),

a) Whether it should be included in the terms and conditions for assignment of spectrum that the assigned spectrum may have to be shared with other RRTS/Metro rail networks to whom government decides to assign the same spectrum frequencies on sharing basis?

b) Whether certain guidelines for coordination mechanism need to be issued or it should be left to the mutual agreement between the RRTS/Metro rail networks operators mandated for MOCN RAN sharing? In case, guidelines need to be prescribed, kindly suggest the points to be included in the guidelines.

c) Whether commercial arrangements between two RRTS/Metro rail networks for

RAN sharing needs to be regulated or left to the mutual arrangement?

d) Whether any other conditions need to be prescribed for such RAN sharing? Kindly provide detailed justifications.

BSNL Comments on Q1 to Q5:

1. Radio spectrum is a scarce natural resource. The demand for spectrum is derived from the demand for final goods and services that are produced using spectrum as an input. In the cellular industry there are millions of subscribers and high usage of voice, video and data results in constantly increasing demand for additional spectrum.

2. As far as the matter of development of the global standards for RSTT application and harmonization of the spectrum for Railways is concern, the Consultation Paper has brought out the fact, as:

Standards are still evolving and international or regional organizations, such as the 3rd Generation Partnership Project (3GPP), the International Union of Railways (UIC), the European Telecommunications Standards Institute (ETSI), the European Union Agency for Railways (ERA), etc., are developing specifications for technologies and new functions to evolve RSTT. The work on draft new Recommendation ITU-R M.[RSTT_FRQ] was not concluded in the WRC study cycle 2015-2019 and same is likely to be completed by 2023. Following aspects are yet to be studied:-

- i. *What are the current and future technologies to maximize efficient and flexible use of spectrum to be used by RSTT?*
- ii. *What are the capabilities of the applications of the four RSTT categories (Train radio, Train positioning information, Train remote and Train surveillance) in specific frequency bands?*
- iii. *What are the possible solutions and implementation for global/ regional harmonization of frequency bands for RSTT focused on bands already allocated to the Mobile Service on a primary basis?*

3. Considering the reference from the Annexure 2.1 of TRAI Consultation Paper, it is clear that harmonization of the bands for Railway signaling and safety applications is still in progress. This implies that allocation of spectrum for the RSTT application should be adopted based on the international/ regional harmonization that will provide better visibility and ecosystem for deployment of such applications.

4. As part of the National Frequency Allocation Plan (NFAP), 2018, as part of India Footnote IND 16, various bands including **700 MHz band have been identified for primary usage for IMT services.**

5. TRAI in its recommendations on "Auction of spectrum in frequency bands identified for IMT/5G" dated 11th April, 2022 has recognized that:

*India has adopted FDD configuration-based Band 28 or APT 700 band for 700 MHz spectrum. **700 MHz spectrum band is also emerging as a prime coverage band for 5G.** Corresponding 5G band defined by 3GPP is n28, which uses the similar frequency arrangement as that of Band 28.*

7. Subsequent to the allocation of 10 MHz spectrum for government usage and 5 MHz to Railways, the availability of the spectrum in **700 MHz band has already been reduced to 30 MHz for allocation to the TSPs** out of total available spectrum of 45 MHz in the band 28.
8. The key frequency bands to priorities for 5G are the 3.5 GHz range, 700 MHz and mm Wave. **700 MHz is much more widely harmonized for IMT services and there is substantial 4G deployment by a number of countries.**
9. As such, 700 MHz is crucial for coverage and penetration of mobile services both in the urban and rural areas. The lesser inventory of access spectrum availability in 700 MHz band will result in fewer option for TSP to deploy the services at quickest possible time and same will adversely impact the strategic objective and vision of the National Digital Communication Policy (NDCP), 2018 as such Broadband for all, connecting the unconnected areas and ensuring adequate spectrum for telecom services.
10. Allocation of spectrum to the TSPs is through auction process or auction determined price. The investment made by the TSPs are substantial in acquiring the spectrum to rollout the services to the users. The bands in which services are launched are generally having adequate ecosystem and it is therefore important that the investment made by the TSPs are protected with availability of purposeful spectrum.
11. Efficient utilization of radio resource is an important and prime aspect. The allocation of 5 MHz spectrum to Indian Railways should cater to the requirement of NTRCT as well. Following are the arguments in support of the utilization of spectrum allocated to Indian Railways in co-existence with NCRTC:
 - a. Assigned spectrum will be utilized more efficiently at all across the country.
 - b. Based on the feasibility study on co-existence of the two separate LTE networks, the recommendations of Center of Excellence in Wireless Technology (CEWiT), IIT Madras and IIT Hyderabad are very thought-provoking and clear regarding the issue. As per the recommendations **co-existence of two separate LTE networks of IR and NCRTC is possible in the same frequency band by applying the interference mitigation methods.** In the study report it has been outlined that in majority of operation places 5 MHz spectrum can be utilized entirely by the each entity and at certain locations with minimal mutual coordination during network planning stage the issue of likely interference can be mitigated.
 - c. As per the Consultation Paper, it has been mentioned that there is no such demand from the organisations involved in **Metro Rail operations.** In such a scenario, it can be assumed that requirement of Metro operations are already been fulfilled with the exiting assignments through CMRTS licenses. It is a matter of fact that Metro Rail is already in place for the last many years in most of the Tier –I cities. Further expansion is happening in these cities and work is in progress in many of the Tier –II cities as well.
 - d. Assigning another 5 MHz in 700 MHz band to NCRTC will lead to loss of valuable spectrum by the TSPs for telecom operations. As such, unless and until the spectrum harmonization and standradisation process is finalised, the decision on further assignment of spectrum to Railway operations (including RRTS, Metro Rail, Bullet Train etc.) should be kept on hold. India will be benefited with the spectrum assignments only when the harmonization is concluded by the international bodies.
 - e. Even if another block of 5 MHz in 700 MHz band is assigned to NCRTC and considering the futuristic requirement from Metro Rail networks, the requirement of interference mitigation will still persist as since there may be possibility of existence of Indian

Railway, RRTS and Metro Network at the same place. Therefore, it will be prudent to evolve the network in such a way that spectrum assigned to IR is utilized in co-existence manner.

12. The idea to share the Radio Access Network (RAN) in the overlapping area using Multi-Operator Core Network (MOCN) is very much feasible and should be adopted for implementation in coordination with IR and NCRTC.
13. In order to cater the long term requirement of spectrum the **Railways, RRTS, Metro Rails and other such entities, Railway Ministry and Ministry of Housing and Urban Affairs (MoHUA) may set up a Special Purpose Vehicle (SPV) acting as an umbrella to provide the Network-as-a-service (NaaS) to these organizations.** The SPV will ease the planning, coordination and implementation of the projects based on the requirements.
14. The spectrum assigned to Indian Railways for RSTT can be efficiently utilized by RRTS and other relevant entities with the broad guidelines of DoT/ Govt. Further, detailed planning and implementation should be left to the mutual coordination between the organizations.
15. NCRTC has submitted the calculations which indicates the spectrum requirement of around 3 MHz. TRAI Consultation Paper has indicated that due to migration of PMRTS services from Analog to Digital, some of the carriers in 800 MHz band (band pertaining to PMRTS/ CMRTS) will be vacated. BSNL is of the view that since the business of PMRTS is unlikely to expand and as such frequency allocation to NCRTC, if required, should be considered in the likely to be vacated spectrum of PMRTS. This will lead to win-win situation for all.
16. For the long term perspective, the spectrum allocation in 600 MHz which has almost 40 MHz (paired) spectrum or similar allocation in 440-470 MHz band can be considered or outcome of the harmonization activities may be seen for any further action.

The Hon'ble Authority is requested to consider the above comments of BSNL with respect to this consultation paper.

Regards,



(Ved Prakash Verma)
DGM (Regulation-II)