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Sent: Monday, January 10, 2022 9:57:22 AM

Subject: Hughes Response to TRAI's Consultation Paper on Auctioning of spectrum in frequency bands identified for IMT/5G

Dear Sir,

We thank you for bridging out the various issues on the auctioning of spectrum in frequency bands identified for IMT/5G. We are pleased to submit our response to the consultation paper.

If you have any questions please do not hesitate to contact us.

Thanks & best regards,
Krishna

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Suggested Response to TRAI's Consultation Paper on Auctioning of spectrum in frequency bands identified for IMT/5G

Q8: Whether entire available spectrum referred by DoT in each band should be put to auction in the forthcoming auction? Kindly justify your response.

For the frequency range 27.5-28.5 GHz, we would propose TRAI to recommend the following

- The spectrum from 27.5-28.5 should be excluded from the auction for IMT/5G
- Limit use of the above mentioned frequency range only to private captive network on a non interference basis to satellite systems
- However, in the event in spite of all of the satellite industry expressing its concerns, if the Government decides to allocate the 1 GHz (27.5-28.5 GHz) for IMT, then the least that has to be ensured is the following
 - Maintain access to the band for FSS and especially gateway feeder links - Gateways need to be protected by an exclusion zone of minimum 2 Km and with the conditions put on IMT base stations that they operate only below the horizon as any operation above the horizon can cause interference to the satellites that are orbiting.
 - The total radiated power of the IMT base stations if operated in this band, should not exceed 91 dBw/M2/MHz at 5 meters above the ground level in the band from 27.5-28.5 GHz
 - Maintain access to ESIMs (In-flight and maritime terminals) in the band 27.5-28.5 GHz with appropriate sharing conditions
 - Maintain access to subscriber terminals in the band 27.5-28.5 GHz with appropriate coordination criteria (secondary basis).

We would like to present the following justification

- The frequency range 27.5-28.5 GHz is already used in many of the satellites that are either launched or in the build stage. The allocation of this range to IMT/5G will severely impair these satellites and curtail the capacity available from these satellites.
- Considering the propagation characteristics of the 27.5-28.5 GHz frequency range, it is best suited for capacity enhancement in urban areas. However, satellites use the 27.5-28.5 GHz for service coverage all across the country. Additionally this band is used by satellite for providing coverage to subscribers who live in unserved and underserved areas.
- Countries which have allocated the band from 27.5-28.5 GHz to satellite have a much smaller geographical area that has been adequately fiberised. However, this is not the case with India. More than 70% of the population lives outside the urban areas and do not have access to broadband.

- The recent pandemic has demonstrated that while the urban population switched to an on-line mode of learning, the population living outside the urban areas struggled to receive education. The single biggest factor being lack of quality broadband in the areas that have been poorly served by terrestrial communications.
- The Indian Space Research Organization (ISRO) has already manufactured satellites that use this band for the rural connectivity projects of the Government that use this band. If this band is allocated for IMT/5G, some of these programs will be set back by several years and will severely impact the rural connectivity initiatives of the Government.
- In the year 2018, the Government announced the Flight & Maritime Connectivity rules based on recommendations put forth by TRAI. These rules allow the frequency band from 27.5-28.5GHz for use by these services. Service providers have made investments to launch services using this band. This sudden u-turn in the regulations will severely impact investor confidence and will set a wrong precedence.
- 4G/5G services need backhuls to reach the remote areas of the country. These backhuls are provided by satellites very effectively. The TRAI recognized this need and further simplified the regulations to provide backhuls via satellite. However without access to the frequency band from 27.5-28.5 GHz, the capacity available to provide these backhuls will be severely reduced.
- Allocation of 1 GHz to IMT from the crucial satellite spectrum (27.5-28.5 GHz) will impair all of the present and future satellites over India at least by 50% in terms of capacity. In addition the paired band (17.7-18.7 GHz) would be wasted.
- The frequency band from 24.25-27.5GHz has been allocated for IMT/5G use. This gives 3.25 GHz of total spectrum in this band. Considering that there are four operators, a 800 MHz assignment is possible to each operator for immediate deployments. The World Radio Congress that was held in 2019, additional allocations (37-43.5 GHz, 45.5-47 GHz, 47.2-48.2 GHz, 66-76 GHz, 81-86 GHz) amounting to a total of 14 GHz were identified for IMT/5G deployments. With this there is adequate spectrum for the growth of IMT/5G services. A possible allocation of the 27.5-28.5GHz band could always be considered at a second stage, based on an assessment of actual usage in the 26GHz band and other bands allocated to IMT.
- Furthermore, the satellite community is very concerned by the reference to a possible auction mechanism for satellite spectrum (as in sections 1.51-1.53 of the consultation document). This would be unprecedented in mm-wave frequency bands.
The parallel between “access spectrum” for satellite and terrestrial networks does not stand, as the spectrum sharing mechanism is completely different. Spectrum assignment for satellite services should be based on an administrative process, which is standard procedure elsewhere. In fact, spectrum assignment by auction is not suitable for spectrum that can be shared between multiple satellite operators (such as in C/Ku/Ka band). Such efficient sharing of spectrum is made possible also thanks to the directivity of antennas. Spectrum assignment by auction to satellite services in these bands would lead to unnecessary spectrum segmentation and, therefore, a terribly inefficient use of spectrum.

It is a very different situation from spectrum assignment to terrestrial mobile operators where spectrum cannot be shared amongst the mobile operators and has to be managed by a single operator.

In summary, a spectrum auction for satellite spectrum would artificially limit the number of satellite operators sharing the spectrum and exclude them from the market, while satellite operators can (differently from terrestrial mobile operators) coexist in the same frequency range.

Q.21 What should be associated roll-out conditions for the allocation of spectrum in 24.25 to 28.5 GHz frequency range? Kindly justify your response

The text in the consultation states in Sec. 2.67 that “24.25 – 28.5 GHz (mmWave) spectrum is likely to be used for provision of 5G use cases/applications requiring very high data rates and ultra-low latency. Therefore, the TSPs would be deploying it selectively in the areas where the demand for such use cases/applications exists.

Further, the technical characteristics of high band are such that it cannot be used for meeting coverage requirements.”

As such it is clear that, given the contention in the band and its high value for satellite services, nationwide allocation to 5G of the 27.5-28.5GHz band is not a sensible way forward, as it would unnecessarily sterilize valuable spectrum in areas where 5G will never be deployed using these frequencies.

In the most unfortunate case that 27.5-28.5GHz were auctioned nationwide for 5G on an exclusive basis, the spectrum denial to other services would also be nationwide. Such 5G spectrum allocation should therefore be associated with strict nationwide roll-out conditions. Spectrum unused within a certain timeframe, according to the rollout conditions, should be promptly recovered and its use reconsidered.

Q.71 Whether some spectrum should be earmarked for localized private captive networks in India? Kindly justify your response

As mentioned in the reply to Q.8 and for the same reasons therein described, the 27.5-28.5GHz (rather than the 28.5-29.5GHz band indicated in 4.40 of the consultation document) could, because be earmarked for localized captive networks in India on a non-interference basis to satellite systems.