GLOBAL SATELLITE COALITION

Agenda Item 1.13 40/50GHz

APRIL 2019

WRC-19 Agenda Item 1.13: IMT & Satellite User Terminals in the 40/50 GHz range

Overview: **WRC-19 Agenda item 1.13** calls for sharing and compatibility studies for a possible identification to IMT in more than 33 GHz of spectrum between 24 and 86 GHz. This documents addresses the following bands:

37-40.5 GHz	BAND C
40.5-42.5 GHz	BAND D
42.5-43.5 GHz	BAND E
45.5-47.0 GHz	BAND F
47.0-47.2 GHz	BAND G
47.2-50.2 GHz	BAND H
50.4-52.6 GHz	BAND I

From the 33.25 GHz considered, only 4 are identified for high density deployment of user terminals (HDFSS) in Region 2 and similar amounts of spectrum in Regions 1 and 3 are planned for ubiquitous satellite terminal deployments. The GSC recommends that this core satellite spectrum for ubiquitous earth station deployment (40-42 GHz and 48.2-50.2 GHz in Region 2, 37-40.5 GHz in Regions 1 and 3 for FSS and FS) not be identified for IMT.

The remaining FSS spectrum is utilized by lower density applications in the FSS, i.e. gateways earth stations for which station locations are generally knowable in advance. The known locations and station characteristics of such gateway FSS earth stations and IMT base stations may allow for sharing under certain conditions. The GSC believes that the 37-40 GHz frequency bands may be identified for IMT in ITU Region 2, subject to the adoption of power and pointing limitations for IMT base stations (that do not put undue constraints on IMT) in FSS uplink bands, as well as provisions for ensuring continued, viable access by gateway FSS earth stations to use these frequency bands. Similarly, the 40.5-43.5 GHz bands in Regions 1 and 3 could be identified for IMT with similar conditions to enable sharing with the FSS. This will provide IMT access to substantial spectrum in each Region in the broader 37-43.5 GHz frequency range, allowing both terrestrial and satellite broadband services to play a crucial role in providing access to businesses and consumers worldwide and be critical components of 5G networks.

Background and ITU-R Studies: Broadband satellite systems require access to unencumbered spectrum to operate widely deployed transmitting and receiving user terminals. To satisfy this minimum requirement, footnote 5.516B of the Radio Regulations (RR) identifies the bands 48.2-50.2 GHz (Earth-to-space) and 40-42 GHz (space-to-Earth) for high-density fixed-satellite service (HDFSS) operations in Region 2 (see Resolution 143 (Rev. WRC-07)). In other regions, a core amount of HDFSS spectrum is identified in this footnote, but it is left to administrations to determine which additional bands should be used in their countries to provide ubiquitous broadband satellite services. The GSC believes that parts of the 37-40.5 GHz band should similarly be reserved for ubiquitous earth station deployments in Regions 1 and 3.

To provide satellite broadband services directly to ubiquitously deployed end users, these advanced satellite systems require flexible, rapid and unrestricted deployment of large numbers of cost-optimized earth stations employing small antennas. The identification of bands for ubiquitous earth station deployment facilitates the implementation of such broadband services and maximizes global access and economies of scale.

ITU-R studies demonstrated that co-existence between the IMT and FSS is feasible in the case of FSS earth stations at specified locations, assuming the systems operate in accordance with the studied parameters. In the case where small FSS earth stations are to be deployed at unspecified locations, however, co-existence could not be ensured between both services. Therefore, co-frequency operations of FSS user terminals and other ubiquitous terrestrial services in the same geographical area cannot be considered feasible at this time.

The other spectrum in the 37-43.5 GHz band (i.e. 40.5-43.5 GHz in Regions 1 and 3, and 37-40 GHz in Region 2) provides wide bandwidths that are particularly valuable to satellite systems requiring large amounts of spectrum to support broadband connectivity. As this spectrum is generally planned for use by individually licensed FSS earth stations, it is feasible to share with terrestrial services, but only if measures are adopted to allow for the continued and future deployment of the FSS services. As a result, if WRC-19 makes an IMT identification in these bands, it is important to include provisions to facilitate compatibility with existing and future satellite services. Two scenarios must be addressed: (1) protection of reception at the satellite from aggregate interference from numerous IMT transmitters deployed on the territories of countries within the satellite coverage area; and (2) continued access for FSS earth stations that might cause interference to or receive interference from nearby IMT deployments.

The GSC recommends that WRC-19 adopt a balanced solution for the identification of IMT in the 40/50 GHz bands.

- In Region 2, the Conference should not identify for IMT the spectrum identified for HDFSS (40-42 GHz and 48.2-50.2 GHz), as per Methods C1, D1, & H1 in the CPM Report. GSC supports an identification for IMT in the 37-40 GHz band.
- In Regions 1 and 3, the GSC supports identification for IMT in the 40.5-43.5 GHz bands, and No Change to the Radio Regulations in the 37-40.5 GHz band to preserve spectrum for other services such as HDFSS and FS.

Protection measures for FSS in sub-bands proposed for IMT identification:

Appropriate parts of spectrum allocated to the FSS could be identified for IMT on a shared basis with the FSS, with suitable conditions to ensure compatibility. Specifically, we recommend that any method to identify IMT in the 37-40 GHz (Region 2) and 40.5-43.5 GHz (Regions 1 and 3) frequency bands include:

- Power and pointing limitations on IMT base stations to protect FSS satellite receivers, that do not put undue constraints on IMT.
- Assistance to administrations in defining measures for future FSS earth station deployment, including required separation distances.

Methods and Options for the protection of FSS in sub-bands proposed for IMT identification:

For the 37-40 GHz (R2 – band C) band, these measures are contained in Method C2 of the CPM text, Resolution [B113-IMT 40/50 GHz] and Condition C2b Option 1 (allowing future FSS earth station deployments).

For the 40.5-42.5 GHz (R1/R3 – band D) band, these measures are contained in Method D2 of the CPM text, Resolution [B113-IMT 40/50 GHz] and Condition D2a Option 1 (allowing future FSS earth station deployments).

For the 42.5-43.5 GHz (R1/R3 – Band E) band these measures are contained in Method E2 of the CPM text, Resolution [B113-IMT 40/50 GHz], Condition E2a Option 2 with a level of 40 dBm/200 MHz (protecting FSS receiving satellites) (note that this power level is significantly higher than that put forward by IMT proponents in the ITU studies, and thus not constraining on IMT deployments) and Condition E2d Option 1(allowing future FSS earth station deployment).

In the bands 45.5 –47.0 GHz (band F) and 47.0-47.2 GHz (band G) for which no studies were conducted in TG5/1, no change to the RR is recommended (Methods F1 and & G1).

In the bands 47.2 –50.2 GHz (band H) and 50.4-52.6 GHz (band I) no change to the RR is recommended, since already large amounts of spectrum are supported for IMT identification in the bands 24.25-27.5 GHz globally, 40.5-43.5 GHz in R1 and R3 and 37-40 GHz in R2, and 66-71 GHz globally.

If however an IMT identification were to be considered by WRC-19 in the 47.2-48.2 GHz band (band H) or 50.4-52.6 GHz (band I), measures similar to the ones for 42.5-43.5 GHz band, as described above, should be adopted.

In summary, if an IMT identification is to be proposed to WRC-19 in the 40/50 GHz band, this should only be made with a clear requirement this would not provide a barrier/deterrent to the FSS.

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Agenda Item
1.13
40/50GHz