**UNITED STATES OF AMERICA**

DRAFT PROPOSALS FOR THE WORK OF THE CONFERENCE

**Agenda Item 1.13**

**Agenda Item 1.13:** *to consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution***238 (WRC-15)**

**Background Information:**

Both terrestrial and satellite broadband services play a crucial role in providing access to businesses and consumers worldwide and will be critical components of 5G networks. For continuity, resiliency and broad connectivity solutions, satellite broadband is an indispensable part of the broadband environment. Because of increased demand for satellite broadband services, there is a need for additional spectrum being made available to support its growing user base.

Broadband satellite systems require access to unencumbered uplink spectrum to operate widely deployed transmitting user terminals. To satisfy this minimum requirement, ITU Radio Regulation No. 5.516B identifies 2 GHz of uplink spectrum for high-density fixed-satellite service (HDFSS) operations in ITU Region 2 in the 48.2-50.2 GHz fixed-satellite service (FSS) band (Earth-to-space), paired with the 40-42 GHz FSS band (space-to-Earth) (see Resolution **143 (Rev. WRC-07)**). Ubiquitously-deployed IMT operations may not be compatible with ubiquitously-deployed co-frequency/co-coverage HDFSS or other FSS operations. As FSS operations are conducted on a regional and worldwide basis by both geostationary-satellite orbit (GSO) and non-GSO networks and systems, and access to core spectrum facilitates such operations, the 48.2-50.2 GHz band should remain unencumbered for FSS use worldwide.

HDFSS operations provide access to a wide range of broadband telecommunication applications, including broadband services and machine-to-machine (M2M) communications, both independently and in complement with other telecommunication systems. Growth in the satellite M2M market is expected to reach US$2.9 billion by 2026, driven by 6.8 million in-service terminals.[[1]](#footnote-1) These terminals will be deployed over urban, suburban and rural areas of large geographical extent, and the practicability of techniques to successfully manage co-frequency sharing with ubiquitous terrestrial services, such as IMT, has not been demonstrated.

HDFSS systems require flexible, rapid and ubiquitous deployment of large numbers of cost-optimized earth stations employing small antennas and having common technical characteristics. The identification of bands for HDFSS facilitates its implementation and maximizes global/regional access and economies of scale noting the different bands identified for HDFSS in different regions as per No. 5.516B.

Given the current state of satellite technology, these systems would need access to spectrum where satellite end user devices can operate and be freely deployed uplink user terminals across in a given country. To this end, the band 48.2-50.2 GHz worldwide should not be identified for ubiquitously-deployed IMT use.

Additionally, there is a recognition that IMT will require access to the 47.2-48.2 GHz portion of the 47.2-50.2 GHz band for ubiquitously-deployed terminals. Such use would be under the condition that use of the mobile service allocation by IMT does not preclude the use of this frequency band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. FSS earth stations are planning to use the 47.2-48.2 GHz band, along with other co-primary services, so it is necessary to provide technical and operational conditions on the IMT designation in the mobile service, in the form of an associated Resolution, to assure that FSS use is not effectively or otherwise precluded. Further, no change is proposed to the 47.5-47.9 GHz segment in ITU Region 1, due to the regional HDFSS allocation in the space-to-Earth direction.

# Proposals:

ARTICLE 5

**Frequency allocations**

**Section IV – Table of Frequency Allocations**(See No. **2.1**)

**MOD USA/1.13/1**

**40-47.5 GHz**

|  |  |  |
| --- | --- | --- |
| **Allocation to services** | | |
| Region 1 | Region 2 | Region 3 |
| 47.2-47.5 FIXED  FIXED-SATELLITE (Earth-to-space) 5.552  MOBILE ADD 5.H113  5.552A | | |

**47.5-51.4 GHz**

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 47.5-47.9  FIXED  FIXED-SATELLITE (Earth-to-space) 5.552 (space-to-Earth) 5.516B 5.554A  MOBILE | 47.5-47.9  FIXED  FIXED-SATELLITE (Earth-to-space) 5.552  MOBILE ADD 5.H113 | |
| 47.9-48.2 FIXED  FIXED-SATELLITE (Earth-to-space) 5.552  MOBILE ADD 5.H113  5.552A | | |
| \* \* \* | | |

Reasons: Adds an identification for IMT to the mobile service allocation in 47.2-48.2 GHz in ITU Regions 2 and 3, and 47.2-47.5 and 47.9-48.2 GHz in ITU Region 1, with conditions to permit continued deployment of fixed-satellite service earth stations and protection of fixed-satellite service space stations.

**ADD USA/1.13/2**

5.H113In ITU Regions 2 and 3, the frequency band 47.2-48.2 GHz is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). In ITU Region 1, the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz are identified for use by administrations wishing to implement the terrestrial component of IMT. This identification does not preclude the use of this frequency band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. The use of this frequency band by the mobile service for IMT is limited to the land mobile service. Resolutions **[B113-IMT 47 GHZ] (WRC‑19)** and **750 (Rev.WRC‑19)** shall apply. (WRC‑19)

**Reasons**: Establishes conditions to permit continued deployment of fixed-satellite service earth stations and protection for fixed-satellite service space stations.

**ADD USA/1.13/3**

DRAFT NEW RESOLUTION [B113-IMT 47 GHZ] (WRC‑19)

International Mobile Telecommunications in the frequency band   
47.2-48.2 GHz

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

considering

*a)* that International Mobile Telecommunications (IMT) is intended to provide telecommunication services on a worldwide scale, regardless of location and type of network or terminal;

*b)* that IMT encompasses IMT‑2000, IMT-Advanced, and IMT‑2020 collectively, as described in Resolution ITU‑R 56;

*c)* that International Mobile Telecommunications (IMT), including IMT-2000, IMT‑Advanced and IMT‑2020, is the ITU vision of global mobile access;

*d)* that IMT systems are now being evolved to provide diverse usage scenarios and applications such as enhanced mobile broadband, machine-type communications and ultra-reliable and low-latency communications;

*e)* that there is a need to take advantage of technological developments in order to increase the efficient use of spectrum and facilitate spectrum access;

*f)* that the properties of higher frequency bands, such as millimeter wavelength bands in the 47 GHz range, would better enable the use of advanced antenna systems including MIMO and beam-forming techniques in supporting enhanced broadband;

*g)* that the frequency bands 450-470 MHz, 694-960 MHz, 1 427-1 518 MHz, 1 710-1 885 MHz, 1 885-2 025 MHz, 2 110-2 200 MHz, 2 300-2 400 MHz, 2 500-2 690 MHz, 3 400-3 600 MHz, or parts thereof, are identified for use by administrations wishing to implement IMT;

*h)* that timely availability of spectrum is important to support future applications

*i)* that harmonized worldwide bands for IMT are desirable in order to achieve global roaming and the benefits of economies of scale;

*j)* that harmonized worldwide bands and harmonized frequency arrangements for IMT are highly desirable in order to achieve global roaming and the benefits of economies of scale;

*k)* that ITU‑R has studied, in preparation for WRC‑19, sharing and compatibility with services allocated in the frequency band 47.2-48.2 GHz;

*l)* that the results of ITU‑R compatibility studies of IMT‑2020 systems are probabilistic, and therefore the deployment parameters of IMT‑2020 systems that affect compatibility with satellite receivers may vary during practical implementation and deployment of IMT‑2020 networks;

*m)* that WRC‑19 identified the frequency band 47.2-48.2 GHz for IMT in ITU Regions 2 and 3, and the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz for IMT in ITU Region 1, with certain regulatory conditions to address protection of services to which the band is allocated on a primary basis in No. 5.H113;

*considering further*

*a)* that the identification of the frequency band 47.2-48.2 GHz for IMT takes into account the use of the bands by other services and the evolving needs of these services;

*b)* that the identification of frequency bands for IMT‑2020 requires technical and regulatory measures to ensure compatibility with and future development of incumbent services having an allocation in identified frequency bands,

noting

*a)* Resolutions **223 (Rev.WRC‑15)**, **224 (Rev.WRC‑15)** and **225 (Rev.WRC‑12)**, which also relate to IMT;

*b)* that Resolution ITU‑R 65 addresses the principles for the process of development of IMT for 2020 and beyond, and that Question ITU‑R 77‑7/5 considers the needs of developing countries in the development and implementation of IMT;

*c)* that Question ITU‑R 229/5 seeks to address the further development of IMT;

*d)* that IMT encompasses IMT‑2000, IMT-Advanced, and IMT‑2020 collectively, as described in Resolution ITU‑R 56‑2;

*e)* Recommendation ITU‑R M.2083, on the framework and objectives of the future development of IMT for 2020 and beyond;

*f)* thatRecommendation ITU‑R M.2083 provides IMT Vision – “Framework and overall objectives of the future development of IMT for 2020 and beyond,” and that adequate and timely availability of spectrum and supporting regulatory provisions is essential to realize the objectives in Recommendation ITU‑R M.2083;

*g)* that Report ITU‑R M.2320 addresses future technology trends of terrestrial IMT systems;

*h)* Report ITU‑R M.2376, on technical feasibility of IMT in the frequency bands above 6 GHz;

*i)* that Report ITU‑R M.2370 analyses trends impacting future IMT traffic growth beyond the year 2020 and estimates global traffic demands for the period 2020 to 2030;

*j)* that there are ongoing studies within ITU‑R on the propagation characteristics for mobile systems in higher frequency bands;

*k)* that the identification of a frequency band for IMT does not establish priority in the Radio Regulations and does not preclude the use of the frequency band by any application of the services to which it is allocated,

recognizing

*a)* that there should be no additional regulatory or technical constraints imposed on services to which the band is currently allocated on a primary basis;

*b)* that, due to the effect of aggregation of interference from IMT‑2020 systems, the protection of satellite receivers is possible only if all administrations will follow the agreed technical characteristics and parameters of the deployment of IMT‑2020 systems;

*c)* that the identification of high-density applications in the fixed-satellite service in the space-to-Earth direction in the bands 39.5-40 GHz in Region 1, 40-40.5 GHz in all Regions and 40.5-42 GHz in Region 2 and in the Earth-to-space direction in the bands 47.5-47.9 GHz in Region 1, 48.2-48.54 GHz in Region 1, 49.44-50.2 GHz in Region 1 and 48.2-50.2 GHz in Region 2 (see No. **5.516B**) does not preclude the use of the same or other FSS bands in other regions for high-density applications,

resolves

1 in order to ensure that IMT in the mobile service frequency band 47.2-48.2 GHz does not cause unacceptable interference to other services to which the frequency band is allocated, the following conditions on IMT use shall apply:

1a that the antenna pattern shall comply with Recommendation ITU‑R M.2101 and IMT base stations shall comply with the Total Radiated Power (TRP) limits given in Table 2:

Table 2

TRP limits for IMT base stations

|  |  |
| --- | --- |
| Frequency bands | dB(W/200 MHz) |
| 47.2-48.2 GHz | [14/TBD][[2]](#footnote-2) |

1b that, when deploying outdoor IMT base stations in the frequency band 47.2-48.2 GHz, administrations shall ensure that each antenna transmits only with the main beam pointing below the horizon and that the transmitting antenna shall have mechanical and electrical pointing below the horizon;

2 to ensure that, when considering, nationally or regionally, the spectrum to be used for IMT, due attention is paid to the need for spectrum for earth stations that could be deployed in a ubiquitous manner (i.e. small user earth stations) and for earth stations that could be coordinated (i.e. gateways) in both downlink and uplink directions in the 47.2-48.2 GHz band, taking into account spectrum identified for the HDFSS as per No. **5.516B**,

invites ITU‑R

to develop an ITU‑R Recommendation to assist administrations in ensuring the protection of existing and future FSS earth stations in the frequency band 47.2-48.2 GHz from IMT deployments in neighbouring countries.

# NOC USA/1.13/4

ARTICLE 5

Frequency allocations

**47.5-51.4 GHz**

|  |  |  |
| --- | --- | --- |
| **Allocation to services** | | |
| **Region 1** | **Region 2** | **Region 3** |
| **48.2-48.54**  FIXED  FIXED-SATELLITE  (Earth-to-space) 5.552  (space-to-Earth) 5.516B  5.554A 5.555B  MOBILE | **48.2-50.2**  FIXED  FIXED-SATELLITE (Earth-to-space) 5.516B 5.338A 5.552  MOBILE  5.149 5.340 5.555 | |
| **48.54-49.44**  FIXED  FIXED-SATELLITE  (Earth-to-space) 5.552  MOBILE  5.149 5.340 5.555 |
| **49.44-50.2**  FIXED  FIXED-SATELLITE  (Earth-to-space) 5.338A 5.552  (space-to-Earth) 5.516B  5.554A 5.555B  MOBILE |

**Reason**: An IMT identification at 48.2-50.2 GHz is incompatible with the HDFSS identifications in the same band, which provides dedicated spectrum for ubiquitously deployed user terminals for broadband and M2M services. The current state of satellite technology requires access to spectrum where satellite end user devices can operate and be freely deployed without constraints caused by ubiquitous terrestrial services in the same band.

1. Alan Weissberger, IEEE Communication Society Blog, *NSR: Satellite IoT market forecast at $2.9B by 2026* (Oct. 1, 2017) (*available at* <http://techblog.comsoc.org/2017/10/01/nsr-satellite-iot-market-forecast-at-2-9b-by-2026/>). [↑](#footnote-ref-1)
2. Note: The definition of Total Radiated Power is still under consideration in Working Party 1A. The value of 14 dBW/200 MHz is proposed with a definition of TRP as “the sum of all power radiated by an antenna connected to a transmitter.” This level applies for all foreseen modes of operation (i.e. maximum in-band power, electrical pointing, carrier configurations). A different definition may necessitate a different value. [↑](#footnote-ref-2)