|  |  |  |
| --- | --- | --- |
| A close up of a sign  Description automatically generated | **World Radiocommunication Conference (WRC-23)Dubai, 20 November - 15 December 2023** |  |
|  |  |
|  |  |
| PLENARY MEETING | **Document 186-E** |
|  | **31 October 2023** |
|  | **Original: English** |
|  |
| Papua New Guinea |
| PROPOSALS FOR THE WORK OF THE CONFERENCE |
|  |
| Agenda item 10 |

10to recommend to the ITU Council items for inclusion in the agenda for the next world radiocommunication conference, and items for the preliminary agenda of future conferences, in accordance with Article 7 of the ITU Convention and Resolution **804 (Rev.WRC‑19)**,

Background

WRC-23 agenda item 10 will recommend to the Council items for inclusion in the agenda for WRC-27 and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, in accordance with Article 7 of the Convention and Resolution **804 (Rev.WRC-19)**. In late 2022, satellite operators, mobile network operators, mobile chipset and device manufacturers and infrastructure manufacturers announced collaborations and plans to develop and deploy technology for applications envisaged for the satellite component of IMT-2020. In some countries, satellite operators and device manufacturers have taken the first step and launched messaging applications operating directly between terrestrial mobile devices and satellites. These direct-to-device (D2D) applications are forerunners that validate use-cases and increasing demands for satellite based IMT-2020 for enhanced mobile broadband, high-reliability communications and massive machine communications. The satellite component of IMT-2020 may be used to provide:

- Global connectivity to end user devices

- Network resilience through high availability combined with high reliability

- Connectivity for transportation purposes

- Emergency and public safety responses

- Content delivery in broadcast or multicast mode to end user devices.

The utility of the mobile-satellite service (MSS) in the target frequency bands, the proximity of these frequency bands to existing frequency bands identified for the satellite and terrestrial components of IMT-2020, the advantage of global allocations and identifications for globally-focused services such as the MSS and the satellite component of IMT-2020, strongly indicate that an agenda item at WRC-27 is required and that the satisfaction of such an agenda item will contribute definitively towards the UN Sustainable Development Goals the ITU is addressing, such as affordable and clean energy, responsible production and consumption, climate action and sustainable cities and communities. This input contribution proposes a new WRC-27 agenda item “to consider the primary allocation of the frequency bands 2 010-2 025 MHz (Earth-to-space) and 2 160-2 170 MHz (space-to-Earth) in Regions 1 and 3, and 2 200-2 215 MHz (space-to-Earth) on a global basis to the mobile-satellite service for the satellite component of IMT-2020”.

Views and proposals

The proponents of this paper propose a new WRC-27 agenda item “to consider the primary allocation of the frequency bands 2 010-2 025 MHz (Earth-to-space) and 2 160-2 170 MHz (space-to-Earth) in Regions 1 and 3, and 2 200-2 215 MHz (space-to-Earth) on a global basis to the mobile-satellite service for the satellite component of IMT-2020”. Full details of the proposal in the prescribed ITU format can be found in the Attachment below.

ADD PNG/186/1

Draft New Resolution [PNG/WRC‑27 Agenda-XXX] (WRC‑23)

Agenda for the 2027 World Radiocommunication Conference

The World Radiocommunication Conference (Dubai, 2023),

…

resolves

...

1.X to consider the primary allocation of the frequency bands 2 010-2 025 MHz (Earth-to-space) and 2 160-2 170 MHz (space-to-Earth) in Regions 1 and 3, and 2 200-2 215 MHz (space-to-Earth) on a global basis to the mobile-satellite service for the satellite component of IMT-2020, in accordance with Resolution **[XXX] (Rev. WRC‑23)**;

...

ADD PNG/186/2

Draft New RESOLUTION [XXX] (WRC‑23)

Studies on frequency-related matters of the bands 2 010-2 025 MHz and 2 160-2 170 MHz in Regions 1 and 3, and 2 200-2 215 MHz globally for the future development of mobile-satellite systems and an identification
for the satellite component of International
Mobile Telecommunications 2020

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* that International Mobile Telecommunications (IMT) is comprised of a terrestrial and a satellite component;

*b)* IMT is intended to provide telecommunication services on a worldwide scale, regardless of location and type of network or terminal;

*c)* that satellite systems have been deployed to provide the satellite component of IMT;

*d)* that mobile-satellite service (MSS) communications have the ability to overcome the practical and logistical difficulties associated with terrestrial installations;

*e)* that MSS, is a proven, practical and cost-effective method of providing a telecommunication services to remote and rural areas;

*f)* that MSS communications contribute to global economic and social development especially in remote areas and rural communities;

*g)* that MSS communications are an effective means to narrow the digital divide;

*h)* that the 3rd Generation Partnership Project (3GPP) has completed the specification of 5G new radio-based non-terrestrial networks (NTN) in Release 17, and is undertaking enhancements for Release 18;

*i)* that 5G new radio-based NTN are expected to be candidate radio access technologies for the satellite component of IMT-2020;

*j)* that the satellite component to IMT-2020 will provide diverse usage scenarios including satellite variants of enhanced mobile broadband, massive machine type communications and ultra-reliable and satellite specific high reliability communications service categories;

*k)* that contiguous spectrum for the satellite component of IMT will enable efficiencies in spectrum management;

*l)* that the number of mobile-satellite systems is growing and the spectrum demand for suitable MSS allocations is increasing;

*m)* the need for regulatory certainty regarding the available spectrum for both satellite and earth station design and planning purposes,

noting

*a)* that Report ITU‑R M.2514‑0 “Vision, requirements and evaluation guidelines for satellite radio interface(s) of IMT-2020” has been adopted;

*b)* that ITU‑R is implementing a process to evaluate candidate radio access technologies for the satellite component of IMT with an expected conclusion prior to 2025,

recognizing

*a)* in accordance with No. **5.388** the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement IMT. Such use does not preclude the use of these frequency bands by other services to which they are allocated. The frequency bands should be made available for IMT in accordance with Resolution **212 (Rev.WRC‑19)**;

*b)* that the frequency band 2 010-2 025 MHz is allocated to the MSS on a primary basis for Earth-to-space operations in Region 2;

*c)* that the frequency band 2 160-2 170 MHz is allocated to the MSS on a primary basis for space-to-Earth operations in Region 2;

*d)* that both the terrestrial and satellite components of IMT have already been deployed or are being planned for deployment within the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz;

*e)* that the frequency bands 2 010-2 025 MHz, 2 160-2 170 MHz, and 2 200-2 215 MHz are adjacent to bands that are allocated to the mobile satellite service on a primary basis and identified for the satellite component of IMT-2020;

*f)* that the introduction of the applications of the possible new MSS allocation should not impose constraints on other existing allocated primary services in the frequency bands under consideration and adjacent frequency bands operating in accordance with the Radio Regulations,

resolves to invite the ITU Radiocommunication Sector

1 to conduct and complete in time for WRC‑27 the appropriate studies of technical, operational and regulatory issues pertaining to the possible use of the satellite component of IMT in the frequency bands 2 010-2 025 MHz (Regions 1 and 3), 2 160-2 170 MHz (Regions 1 and 3), and 2 200-2 215 MHz taking into account:

– evolving needs to meet the emerging demand for the satellite component of IMT-2020;

– technical and operational characteristics of satellite IMT-2020 systems that would operate in the specific frequency bands, including the evolution of satellite IMT-2020 through advances in technology and spectrally efficient techniques;

– the deployment scenarios envisaged for satellite IMT-2020 systems and the related requirements of coverage and capacity;

– the needs of developing countries;

– the time-frame in which the spectrum would be needed;

2 to conduct and complete in time for WRC‑27 the appropriate sharing and compatibility studies with a view to ensuring the protection of existing services allocated on a primary basis in the frequency bands 2 010-2 025 MHz (Regions 1 and 3), 2 160-2 170 MHz, and 2 200-2 215 MHz (Regions 1 and 3), and also as appropriate in adjacent frequency bands,

resolves

to invite WRC‑27 to consider, based on the results of the above studies, additional spectrum allocations to the MSS on a primary basis and to consider identification of the frequency bands for the satellite component of IMT-2020,

invites administrations

to participate actively in these studies by submitting contributions to the ITU Radiocommunication Sector.

ANNEX

Template for the submission of proposals for agenda items

|  |
| --- |
| **Subject:** Globally harmonized mobile satellite service allocations for the satellite component of International Mobile Telecommunications (IMT) in the 2 GHz S-band |
| **Origin:** TBD |
| ***Proposal*:** To consider the allocation and global harmonization of the frequency bands 2 010-2 025 MHz (Earth-to-space) and 2 160-2 170 MHz (space-to-Earth) in Regions 1 and 3 (already allocated to the mobile-satellite service in Region 2), and 2 200-2 215 MHz (space-to-Earth) globally to the mobile-satellite service (MSS) for the satellite component of IMT. |
| ***Background/reason*:**Satellite communications are an effective method to deliver communication services to rural, remote, unserved and underserved areas, thereby serving as a mechanism to reduce the digital divide and support the widespread adoption of digital economies. In this respect development of satellite communication services support the UN Sustainable Development Goals (SDGs) to reduce inequality within and among countries, to build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. Satellite services also contribute indirectly to other SDGs that the ITU is addressing, such as affordable and clean energy, responsible production and consumption, climate action and sustainable cities and communities. In 2021, 5.3 billion people subscribed to mobile services, representing 67% of the global population[[1]](#footnote-1). Many of the remaining 33% are in hard to reach rural, remote, unserved and underserved areas. These underserved areas are precisely where device to device (D2D) satellite services are most critical. As defined in [Resolution ITU‑R 56-2](http://www.itu.int/pub/R-RES-R.56), International Mobile Telecommunications-2020 (IMT-2020) systems are mobile systems that include new radio interface(s) which support the new capabilities of systems beyond IMT-2000 and IMT-Advanced.As one of the radio access technologies of IMT-2020, the satellite access will support mobility through integration at the terminal, network and service level. Satellite network components are envisioned to provide worldwide ubiquitous coverage to end user equipment to meet the usage scenarios defined for the satellite component of IMT-2020.The use and objective of satellite radio interfaces is expected to be complementary to terrestrial IMT-2020 operations, given satellites’ unique ability to address coverage challenges and complex use-cases. The vast footprints of satellite systems make global harmonization of spectrum even more critical than for terrestrial systems. Global harmonization of spectrum also serves to maximize the economies of scale, minimize the potential for interference and thus creates manufacturing and deployment efficiencies, whilst also minimizing network and device costs.Furthermore, for many years, the ITU‑R has recognized the use of mobile-satellite service systems, and complementary ground component (CGC) for relief operations in the event of natural disasters and similar emergencies, and this is illustrated clearly in ITU‑R Recommendation M.1854-1 “Use of mobile-satellite service in disaster response and relief” and Report ITU‑R M.2149 “Use of mobile-satellite service systems for relief operation in the event of natural disasters and similar emergencies”. Over the last decade, the increasing interest in MSS has been clear through the growing number of filings at the Radiocommunication Bureau for geostationary and non-geostationary orbit (non-GSO) MSS systems from various ITU administrations. The need for additional MSS spectrum is hardly surprising, since the total existing spectrum allocated for MSS is small compared with that of other radiocommunication services. In fact, the last time that an ITU world conference identified spectrum for the satellite component of IMT was at WARC‑92, and since then considerable changes in technology have evolved for the MSS industry. For example, rapid technology improvements including the initial deployment of D2D systems and the development of international specifications (such as the completion of 3GPP Release 17 which includes complete specifications for 5G Non-Terrestrial Networks (NTN)) are creating new demand for MSS, especially in relation to the satellite component of IMT. Enhancements to the specifications for 5G NTN, such as improvements in position determination, are expected in 3GPP Release 18. In September 2022, ITU‑R considered these developments in satellite technology and specifications when it adopted Report ITU‑R M.2514-0 “Vision, requirements and evaluation guidelines for satellite radio interface(s) of IMT-2020”. The ITU‑R is now implementing a process for the evaluation of Radio Access Technologies that will form the satellite component of IMT-2020 which is scheduled to conclude in 2025. The Recommendation ITU‑R M.2083 on IMT-2020 vision, identifies *inter alia* usage scenarios for IMT-2020 and beyond: enhanced mobile broadband (eMBB), massive machine type communications (mMTC) and Ultra-reliable and low latency communications (URLLC). Satellite networks will provide eMBB-s and mMTC-s use case service categories that are satellite variants of eMBB and mMTC defined in Recommendation ITU-R M.2083. The satellite component of IMT‑2020 will not address the URLLC, but will cover the satellite specific High Reliability Communications (HRC-s) service category.The satellite component may be used to provide, for example:- Global connectivity to end user devices - Network resilience through high availability combined with high reliability for HRC-s- Connectivity for transportation purposes - Emergency responseContent delivery in broadcast or multicast mode to end user devices.In late 2022, satellite operators, mobile network operators, mobile chipset and device manufacturers and infrastructure manufacturers announced collaborations and plans to develop and deploy technology for applications envisaged for the satellite component of IMT-2020. In some countries, satellite operators and device manufacturers have taken the first step and launched messaging applications operating directly between terrestrial mobile devices and satellites. These D2D applications are forerunners that validate use-cases and increasing demands for satellite based IMT-2020 for enhanced mobile broadband, high-reliability communications and massive machine communications.The utility of the MSS in the target frequency bands, the proximity of these frequency bands to existing frequency bands identified for the satellite and terrestrial components of IMT-2020, the advantage of global allocations and identifications for globally-focused services such as the MSS and the satellite component of IMT-2020, strongly indicate that an agenda item at WRC‑27 is required and that the satisfaction of such an agenda item will contribute definitively towards the UN SDGs. |
| ***Radiocommunication services concerned*:**The mobile-satellite service for consideration of new allocations in the frequency bands 2 010-2 025 MHz (Earth-to-space) and 2 160-2 170 MHz (space-to-Earth) in Regions 1 and 3 (already allocated to the MSS in Region 2), and 2 200-2 215 MHz (space-to-Earth) globally.The fixed and mobile services for consideration as incumbent services in Regions 1 and 3 in the frequency bands 2 010-2 025 MHz and 2 160-2 270 MHz. The fixed, mobile, space operation (space-to-Earth) (space-to-space), Earth exploration-satellite (space-to-Earth)(space-to-space), space research (space-to-Earth) (space-to-space) Services as incumbent services in the frequency band 2 200-2 215 MHz. |
| ***Indication of possible difficulties*:**None identified |
| ***Previous/ongoing studies on the issue*:**No prior co-existence studies have been undertaken in the ITU on the subject of “the use of the satellite component of IMT” in the targeted frequency bands. Previous studies addressed only the spectrum requirements for the satellite component of International Mobile Telecommunications (IMT) - IMT-2000 and systems beyond IMT-2000 (Report ITU‑R M.2077), as well as spectrum requirements for new broadband MSS applications in the 4-16 GHz frequency range (Reports ITU‑R M.2218 and ITU‑R M.2221). |
| ***Studies to be carried out by*:** WP 4C | ***with the participation of*:** WP 4A, WP 4B, WP 5A, WP 5D, WP 7B, WP 7C |
| ***ITU‑R study groups concerned*:**SG 4, SG 5, SG 7 |
| ***ITU resource implications, including financial implications (refer to CV126)*:**The resource implications of all activities/studies in relation to this agenda item proposal are expected to be covered from within existing ITU‑R financial baselines and, once agreed, the WRC‑27 financial baseline. |
| ***Common regional proposal*:** Yes/No | ***Multicountry proposal*:** Yes/No***Number of countries*:** |
| ***Remarks*** |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. “The Mobile Economy”, GSMA 2022, [www.gsma.com/mobileeconomy](http://www.gsma.com/mobileeconomy). [↑](#footnote-ref-1)