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| A close up of a sign  Description automatically generated | **World Radiocommunication Conference (WRC-23) Dubai, 20 November - 15 December 2023** | |  |
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| PLENARY MEETING | | **Addendum 9 to Document 44(Add.27)-E** | |
|  | | **13 October 2023** | |
|  | | **Original: English** | |
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| Member States of the Inter-American Telecommunication Commission (CITEL) | | | |
| PROPOSALS FOR THE WORK OF THE CONFERENCE | | | |
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| 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)**,

Part 9

Background

The demand for connectivity has increased considerably in the past several years, mainly due to the development of new applications and technologies that require more bandwidth to work properly. The recent identifications of frequency bands for International Mobile Telecommunications (IMT) help to achieve this goal, but there are still many places, especially in rural and remote areas, that remain unconnected.

Similarly to previous IMT frameworks, such as IMT-2000 and IMT-advanced, in the IMT-2020 ecosystem, 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 use-cases.

In this context, satellite component will basically contribute to extend the coverage of the IMT-2020 service in under and unserved areas, where complementing the terrestrial component is most relevant. Moreover, the two types of network components will contribute to increase the overall reliability of the IMT-2020 systems[[1]](#footnote-1). As expressed by the recently approved Report ITU‑R M.2514-0 on vision, requirements and evaluation guidelines for satellite radio interface(s) of IMT‑2020, the new satellite-based service categories are reflected in the enhanced Mobile Broadband (eMBB-s), massive Machine Type Communications (mMTC-s) and High Reliability Communications (HRC-s) usage scenarios for the satellite component of IMT-2020. The mMTC-s and eMBB-s usage scenarios are variants of the mMTC and eMBB usage scenarios defined for the terrestrial IMT-2020 under Recommendation ITU‑R M.2083. Certain aspects of IMT-2020 are not expected to be served by the satellite radio interface for IMT-2020, for example very high data throughputs of eMBB, very high connection density of mMTC and low latency for URLLC, given the inherent distance of satellites to associated terminals or earth stations and the challenge of resulting greater latency compared to terrestrial operations. It is to be noted also that these usage scenarios have been and are being provided by mobile-satellite networks and systems, without these satellite services being part of the satellite component of IMT, which might, somehow, limit the possibility of a seamless experience by the end user. It is worth mentioning that Report ITU‑R M.2514 also details the three types of mobile satellite terminals in use for the satellite component of IMT-2020: handheld, directional terminal and Machine type device (MTD).

In terms of additional spectrum needs for mobile-satellite service (MSS), in especial for the use of satellite component of IMT, previous ITU-R studies[[2]](#footnote-2), along with recent market dynamics and trends of new satellite Direct-to-Device (D2D) and IoT, clearly indicates a need for further updated studies on additional MSS allocations in bands already identified for IMT in the Radio Regulations. The lack of harmonized spectrum seems to be so radical that, recently, some players have been inclusively seeking more extreme paths by deploying commercial MSS systems under the Radio Regulations (RR) No. **4.4**. It should not be forgotten that this problem was also brought to the attention of WRC‑23 by the Radio Regulations Board (RRB)[[3]](#footnote-3) which raised in its report to the Conference that as of June 2023, that there were more than 1 600 groups of frequency assignments associated with 488 satellite networks and systems recorded in the MIFR using RR No. **4.4**. Among these, there are satellite systems which communicate directly with subscriber terminals of terrestrial communication networks to support IMT (direct-to-cell) or IoT (direct-to-device) applications in frequency bands allocated to the mobile service but not allocated to space services. This movement by itself materializes somehow the fact that there is a real lack of MSS spectrum available today, which turns the invocation of RR No. **4.4** for MSS commercial applications into an option for administrations, in order to meet a legitimate market demand.

As also extracted from the Board´s report to WRC‑23, there is an increased reliance on RR No. **4.4** by administrations and operators as a way to secure access to spectrum and orbital resources they wished to use for operating MSS satellite networks or systems that plan to provide commercial services on a long-term basis. Commercial satellite operators often used RR No. **4.4** to launch prototypes to be first to use a frequency band while awaiting an upcoming WRC decision that would allocate the band for a space service that would provide future operations with the necessary international recognition and protection. However, in recent years, the Board noted that an increasing number of satellite operators planning to use a frequency band under RR No. **4.4**, deployed their system or network and began offering commercial services without seeking any decision from a WRC. For these satellite systems, in particular non-GSO systems, the interference situation was uncertain due to the large number of orbital planes and satellites.

Within the technologies using the satellite component of IMT, devices seamlessly transition to satellite connectivity when the terminal is out of coverage of a terrestrial IMT network. Recently, some mobile operators have partnered with existing satellite system operators to provide service directly to mobile terminals when end users are outside terrestrial IMT coverage. These initial services are currently restricted to emergency communication, or very limited text messaging service, based on access to insufficient existing MSS allocations that are also identified for the satellite component of IMT. An enhanced communication can be provided to end users through increased capacity resulting from new MSS allocations, when using the satellite component of IMT. Especially with the growth of non-GSO satellite constellations, the use of MSS to provide the satellite component of IMT may be even more attractive, considering benefits in terms of link budget and latency offered by non-GSO systems in relation to the GSO satellites.

Taking all these aspects into account, studies on additional MSS allocations on frequency bands already identified for IMT are necessary. Considering the frequency bands already identified for IMT in Region 2, and taking into account that the use of frequency bands below 5 GHz is desirable in terms of coverage and deployment, it is suggested the study of the frequency bands specified in the “*resolves to invite the ITU Radiocommunication Sector*” part of the proposed draft new Resolution below, to ensure coexistence and compatibility between the terrestrial component of IMT (in the MS) and the satellite component of IMT (in the MS and the MSS) and also to ensure the protection of existing primary services in the band and also in adjacent bands, as appropriate.

Proposals

ADD IAP/44A27A9/1

Draft New Resolution [AI10-MSS-NEW-ALLOCATION] (WRC‑23)

Studies for additional allocations to the mobile-satellite service to enable the use of the satellite component of International Mobile Telecommunications

The World Radiocommunication Conference (Dubai, 2023),

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, in order to support emerging new scenarios and applications of IMT‑2020 and/or IMT‑2030, the terrestrial and satellite components of IMT should fulfil their own role, in an integrated and interoperable manner;

*c)* that the additional allocations of the mobile-satellite service (MSS) in frequency bands already allocated to the mobile service (MS), including those identified for IMT, could enable satellite operators to provide mobile-satellite connectivity services to different terminal types, such as handheld, directional and machine type devices (MTD), in order to complement the terrestrial IMT network coverage;

*d)* that the frequency bands 1 980-2 010 MHz (Earth-to-space) and 2 170-2 200 MHz (space-to-Earth) that are allocated to both the MS and MSS, and identified for IMT, are already being considered for the use of terrestrial and satellite components of IMT;

*e)* that there is an additional allocation to the MSS on a primary basis in Region 2, in the frequency band 806-890 MHz, and to the MSS, except aeronautical mobile-satellite service on a primary basis in Region 3, in the frequency bands 806-890 MHz and 942-960 MHz;

*f)* that the frequency bands 2 500-2 520 MHz and 2 670-2 690 MHz are allocated in Region 3 to the MSS (space-to-Earth) and MSS (Earth-to-space) respectively;

*g)* the need to protect existing services when considering possible additional allocation to any service in any frequency band;

*h)* that the systems operating in the new allocation should not impose constraints on the existing systems of primary services, including in adjacent frequency bands;

*i)* that the satellite component of IMT may be used as a part of terrestrial IMT networks to provide mobile connectivity to underserved communities and in rural and remote areas;

*j)* that the use of satellite component of IMT should not have any priority and shall not cause any undue constraints which result in regulatory changes to mobile services, including terrestrial IMT systems,

noting

*a)* that the availability of the satellite component of IMT simultaneously with the MS, including the terrestrial component of IMT, would improve the overall implementation and the attractiveness of IMT;

*b)* that co-coverage, co-frequency deployment of independent satellite and terrestrial IMT components is not feasible unless techniques, such as the use of an appropriate guardband or other mitigation techniques, are applied to ensure coexistence and compatibility between the terrestrial and satellite components of IMT;

*c)* that the integrated usage of terrestrial and satellite components of IMT shall be considered complementary in terms of services provision and coverage, in accordance with Recommendations ITU‑R M.1167 and ITU‑R M.2083;

*d)* that Recommendations ITU‑R M.1167 and ITU‑R M.818-2 established the framework for the satellite component of IMT‑2000 and the conditions for satellite operation within IMT‑2020;

*e)* Recommendation ITU‑R M.1182, on the provision of architectures for integration of terrestrial and satellite mobile;

*f)* Recommendation ITU‑R M.2014, on the technical basis for global circulation of IMT satellite terminals;

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

*h)* Report ITU‑R M.2514, on the vision, requirements and evaluation guidelines for satellite radio interface(s) of IMT-2020;

*i)* Recommendation ITU‑R SA.1154, on provisions to protect the space research, space operations and Earth exploration-satellite services,

recognizing

*a)* that new MSS allocations in MS frequency bands would help to improve the interoperability between the terrestrial and satellite components of IMT;

*b)* that the harmonization of MSS allocations in some frequency bands would help to further develop MSS systems and user equipment to achieve the benefits of economies of scale, noting the global nature of the service;

*c)* that, in order to improve the coverage of IMT networks in unserved and underserved areas, in a complementary way with the terrestrial and satellite components of IMT, it is necessary to allocate additional spectrum to the MSS,

resolves to invite the ITU Radiocommunication Sector

1 to conduct and complete, in time for WRC‑27, the appropriate studies related to the possible new global allocations to the MSS in the following frequency bands, or parts thereof, in order to enable the possibility of using the satellite component of IMT:

– 694-960 MHz;

– 1 710-2 025 MHz;

– 2 110-2 200 MHz;

– 2 300-2 400 MHz;

– 2 500-2 690 MHz;

2 to consider, in the studies mentioned above, the possible technical, operational and regulatory measures to ensure coexistence and compatibility between the MS and the MSS, in particular for the deployment of complementary use of the terrestrial and the satellite components of IMT, and to ensure the protection of existing primary services, as appropriate,

invites the 2027 World Radiocommunication Conference

to consider, based on the results of the studies conducted under *resolves to invite the ITU Radiocommunication Sector* above, additional spectrum allocations to the MSS on a primary basis, and to determine the appropriate regulatory actions, taking into account that there should be no additional regulatory or technical constraints imposed on the deployment of the MS, including the terrestrial IMT systems,

invites administrations

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

ATTACHMENT

Proposal for WRC‑27 agenda item for additional allocations to the mobile-satellite service to enable the use of the satellite component of   
International Mobile Telecommunications

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| **Subject:** Proposed future WRC‑27 agenda item for additional allocations to the mobile-satellite service to enable the use of the satellite component of International Mobile Telecommunications. | |
| **Origin:** CITEL | |
| ***Proposal*:**  To develop studies for additional allocations to the mobile-satellite service on the following frequency bands: 694-960 MHz, 1 710-2 025 MHz, 2 110-2 200 MHz, 2 300-2 400 MHz, 2 500-2 690 MHz. | |
| ***Background/reason*:**  The Mobile Service (MS), through its terrestrial component of International Mobile Telecommunications (IMT), enables high-speed communication to the population in many areas, mainly in the most populated areas. However, there are many unserved and underserved areas all over the world, especially in remote and/or rural locations. In this regard, expanding the Mobile-Satellite Service (MSS) allocations to enable new use cases of the satellite component of IMT can help to expand the communication into these areas, improving connectivity.  Recently, some mobile operators have partnered with existing satellite system operators to provide direct-to-device (D2D) satellite communication services when end users are outside terrestrial IMT coverage. These services are currently limited to emergency communication or very limited text messaging service, but enhanced communication can be provided to end users through new MSS allocations, when using the satellite component of IMT. In addition, studies for additional MSS allocations are also required for the use of IMT satellite component by handheld, directional terminal and Machine type devices (MTD) in order to complement the terrestrial IMT network coverage. Therefore, this contribution invites CITEL member states to consider a new WRC‑27 agenda item to study the feasibility of additional allocations for MSS in the frequency bands below 5 GHz already allocated to the Mobile Service and identified for use of IMT. Spectrum needs and coexistence with incumbent services will need to be studied during the next WRC cycle to ensure efficient use of spectrum and protection of existing services. New MSS allocations for the use of the satellite component of IMT will encourage the expansion and coverage of the IMT services in unserved and underserved areas. | |
| ***Radiocommunication services concerned*:**  mobile-satellite, mobile, IMT systems and other services in band and on adjacent bands. | |
| ***Indication of possible difficulties*:**  in some cases, the coexistence between the MSS and MS, when using the satellite and terrestrial components of IMT could be difficult to achieve, especially when both associated services (MS and MSS) are allocated on primary basis. | |
| ***Previous/ongoing studies on the issue*:**  Working Party 4C | |
| ***Studies to be carried out by*:** Working Party 4C | ***with the participation of*:** Administrations and Sector members of the ITU-R |
| ***ITU‑R study groups concerned*:**  Study Groups 4 and 5 | |
| ***ITU resource implications, including financial implications (refer to CV126)*:**  This proposed agenda item will be studied within the normal ITU‑R procedures and planned budget. | |
| ***Common regional proposal*:** Yes | ***Multicountry proposal*:** No  ***Number of countries*:** |
| ***Remarks*** | |

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1. Concepts extracted from Report [ITU‑R M.2514](https://www.itu.int/pub/R-REP-M.2514-2022) which defines visions on the satellite component of IMT-2020 for an efficient IMT service delivery with respect to application scenarios, services, system, radio and network interface aspects. In addition, the Report provides evaluation criteria and methodology on the requirements in order to produce Recommendations for the development of the satellite radio interface(s) of IMT-2020. [↑](#footnote-ref-1)
2. Report [ITU‑R M.2077-0](https://www.itu.int/pub/R-REP-M.2077-2006) (2006) in Table 17 indicated forecast needs (for 2020) the requirement for global MSS spectrum new allocations in 1-6 GHz range for the satellite component of IMT of 257 MHz (space-to-Earth) and 90 MHz (Earth-to-space) in high traffic scenarios. Report [ITU‑R M.2218-0](https://www.itu.int/pub/R-REP-M.2218-2011) (2011) estimated the spectrum requirement for future development of MSS broadband between 240 MHz and 355 MHz. [↑](#footnote-ref-2)
3. Section 4.14 of the [RRB Report to WRC‑23 on Resolution 80 (Document 50)](https://www.itu.int/md/R23-WRC23-C-0050/en). [↑](#footnote-ref-3)