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RESOLUTION 243 (WRC-19)

Terrestrial component of International Mobile Telecommunications in the frequency bands 37-43.5 GHz and 47.2-48.2 GHz

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

considering

- a) that International Mobile Telecommunications (IMT), including IMT-2000, IMT-Advanced and IMT-2020, is intended to provide telecommunication services on a worldwide scale, regardless of location and type of network or terminal;
- b) that adequate and timely availability of spectrum and supporting regulatory provisions are essential to realize the objectives in Recommendation ITU-R M.2083;
- c) that there is a need to continually take advantage of technological developments in order to increase the efficient use of spectrum and facilitate spectrum access;
- d) that IMT systems are now being evolved to provide diverse usage scenarios and applications such as enhanced mobile broadband, massive machine-type communications and ultra-reliable and low-latency communications;
- e) that ultra-low latency and very high bit-rate applications of IMT will require larger contiguous blocks of spectrum than those available in frequency bands that are currently identified for use by administrations wishing to implement IMT;
- f) that the properties of higher frequency bands, such as shorter wavelength, would better enable the use of advanced antenna systems, including multiple-input and multiple-output (MIMO) and beam-forming techniques, in supporting enhanced broadband;
- g) that harmonized worldwide frequency bands for IMT are desirable in order to achieve global roaming and the benefits of economies of scale;
- h) that the ITU Radiocommunication Sector (ITU-R) has studied, in preparation for WRC-19, sharing and compatibility with services allocated in the frequency ranges 37-43.5 GHz and 47.2-48.2 GHz and their adjacent frequency bands, based on the characteristics available at that time, and the results may change if these characteristics change;
- i) that identification of frequency bands allocated to the mobile service for IMT may change the sharing situation regarding applications of services to which the frequency band is already allocated, and may require regulatory actions;
- j) that there is a need to protect existing services and to allow for their continued development;
- k) that it is assumed that a very limited number of IMT base stations will be communicating with a positive elevation angle towards IMT indoor mobile stations;
- l) that the use of this frequency band by the mobile service for IMT is intended for land mobile service use and sharing studies were conducted based on that assumption,

noting

- a) Recommendation ITU-R M.2083, which provides the “IMT Vision – Framework and overall objectives of the future development of IMT for 2020 and beyond”;
- b) that Report ITU-R M.2320 addresses future technology trends of terrestrial IMT systems;
- c) that Report ITU-R M.2370 addresses trends impacting future IMT traffic growth beyond the year 2020 and estimates global traffic demand for the period 2020 to 2030;
- d) that Resolution **143 (Rev.WRC-19)** establishes the guidelines for the implementation of high-density applications in the fixed-satellite service (HDFSS) in frequency bands identified for these applications,

recognizing

- a) that timely availability of wide and contiguous blocks of spectrum is important to support the development of IMT;
- b) Resolutions 176 (Rev. Dubai, 2018) and 203 (Rev. Dubai, 2018) of the Plenipotentiary Conference;
- c) the identification of HDFSS in the space-to-Earth direction in the frequency bands 39.5-40 GHz in Region 1, 40-40.5 GHz in all Regions, 40.5-42 GHz in Region 2 and 47.5-47.9 GHz in Region 1 (see No. **5.516B**);
- d) that No. **5.149** applies for the purpose of protecting the radio astronomy service (RAS) in the frequency band 42.5-43.5 GHz, which is allocated on a primary basis;
- e) that the frequency band 47.2-48.2 GHz is allocated to the fixed, mobile and fixed-satellite services, including planned non-geostationary-satellite (non-GSO) uplinks,

resolves

- 1 that administrations wishing to implement IMT consider use of the frequency band 37-43.5 GHz, or portions thereof, and the frequency band 47.2-48.2 GHz, identified for IMT in No. **5.550B** and No. **5.553B**, and the benefits of harmonized utilization of the spectrum for the terrestrial component of IMT taking into account the latest relevant ITU-R Recommendations;
- 2 that, in order to ensure coexistence between IMT in the frequency bands 37-43.5 GHz and 47.2-48.2 GHz as identified by this conference in Article **5** and other services to which the frequency band is allocated, including the protection of these other services, administrations shall apply the following condition(s):
 - 2.1 in order to protect the Earth exploration satellite service (EESS) (passive) in the frequency band 36-37 GHz, the following unwanted emissions of IMT stations operating in the frequency band 37-40.5 GHz apply as specified in Table 1 below:

TABLE 1

Frequency band for the EESS (passive)	Frequency band for IMT stations	Unwanted emission mean power for IMT stations ¹	Recommended limits for IMT stations ¹
36-37 GHz	37-40.5 GHz	-43 dB(W/MHz) and -23 dB(W/GHz) within the frequency band 36-37 GHz	-30 dB(W/GHz)

¹ The unwanted emission power level is considered in terms of total radiated power (TRP). The TRP is to be understood here as the integral of the power transmitted from all antenna elements in different directions over the entire radiation sphere.

2.2 protection of space research service (SRS) earth stations in the frequency band 37-38 GHz and RAS stations in the frequency band 42.5-43.5 GHz from IMT stations should be facilitated through bilateral agreements for cross-border coordination as necessary;

2.3 protection of and coexistence with fixed-satellite service (FSS) earth stations within the frequency ranges 37.5-43.5 GHz and 47.2-48.2 GHz should be facilitated through bilateral agreements for cross-border coordination as necessary;

2.4 take practical measures to ensure the transmitting antennas of outdoor base stations are normally pointing below the horizon, when deploying IMT base stations within the frequency bands 42.5-43.5 GHz and 47.2-48.2 GHz; the mechanical pointing needs to be at or below the horizon;

2.5 as far as practicable, sites for IMT base stations in the frequency bands 42.5-43.5 GHz and 47.2-48.2 GHz employing values of equivalent isotropically radiated power (e.i.r.p.) per beam exceeding 30 dB(W/200 MHz) should be selected so that the direction of maximum radiation of any antenna will be separated from the geostationary-satellite orbit, within line-of-sight of the IMT base station, by ± 7.5 degrees;

3 that IMT stations within the frequency ranges 37-43.5 GHz and 47.2-48.2 GHz are used for applications of the land mobile service,

invites administrations

to ensure that, when considering the spectrum to be used for IMT, due attention is paid to the need for spectrum for ubiquitous earth stations at unspecified points, as well as those used for gateways, taking into account spectrum identified in the frequency bands 39.5-40 GHz in Region 1, 40-40.5 GHz in all Regions, 40.5-42 GHz in Region 2 and 47.5-47.9 GHz in Region 1 for the HDFSS as per No. **5.516B**,

encourages administrations

1 to ensure that provisions for the implementation of IMT allow for the continued development of EESS, SRS, FSS and broadcasting-satellite service (BSS) earth stations and RAS stations and their future development;

2 to keep the antenna pattern of IMT base stations within the limits of the approximation envelope according to Recommendation ITU-R M.2101,

encourages administrations of Region 1

to consider implementing IMT in the frequency band 40.5-43.5 GHz in order to better accommodate the needs of other services below 40.5 GHz, taking into account protection of the FSS within the frequency band 37.5-40.5 GHz in Region 1,

invites the ITU Radiocommunication Sector

1 to develop harmonized frequency arrangements to facilitate IMT deployment in the frequency bands 37-43.5 GHz and 47.2-48.2 GHz, taking into account the results of sharing and compatibility studies conducted in preparation for WRC-19;

2 to continue providing guidance to ensure that IMT can meet the telecommunication needs of the developing countries;

3 to develop an ITU-R Recommendation on methodologies for calculating coordination zones around SRS earth stations in order to avoid harmful interference from IMT systems in the frequency band 37-38 GHz;

4 to develop ITU-R Reports and Recommendations, as appropriate, to assist administrations in ensuring coexistence between IMT and BSS and FSS, including HDFSS as per No. **5.516B**, within the frequency ranges 37-43.5 GHz and 47.2-48.2 GHz, as appropriate;

5 to develop a new ITU-R Recommendation, as appropriate, to provide information and assistance to the concerned administrations on possible coordination and protection measures for the RAS in the frequency band 42.5-43.5 GHz from IMT deployment;

6 to regularly review, as appropriate, the impact of evolving technical and operational characteristics of IMT systems (including base-station density) and those of systems of space services on sharing and compatibility, and to take into account the results of these reviews in the development and/or revision of ITU-R Recommendations/Reports addressing, *inter alia*, if necessary, applicable measures to mitigate the risk of interference into space receivers,

instructs the Director of the Radiocommunication Bureau

to bring this Resolution to the attention of relevant international organizations.