# RESOLUTION 242 (REV.WRC-23)

## Terrestrial component of International Mobile Telecommunications in the frequency band 24.25-27.5 GHz

The World Radiocommunication Conference (Dubai, 2023),

*considering*

*a)* that International Mobile Telecommunications (IMT), including IMT-2000, IMT-Advanced and IMT-2020, is the ITU vision of global mobile access and is intended to provide telecommunication services on a worldwide scale, regardless of location and type of network or terminal;

*b)* that the evolution of IMT is being studied within the ITU Radiocommunication Sector (ITU-R);

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

*d)* that IMT systems are now being evolved to support diverse usage scenarios 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, multiple output (MIMO) and beam-forming techniques, in supporting enhanced broadband;

*g)* 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;

*h)* that there is a need to protect existing services and to allow for their continued development;

*i)* that ITU-R has studied, in preparation for WRC-19, sharing and compatibility with services allocated in the frequency band 24.25-27.5 GHz and its adjacent band, based on characteristics available at that time, and results may change if these characteristics change;

*j)* 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;

*k)* that the allocations of frequency bands to the Earth exploration-satellite service (EESS) (passive) are defined solely by the fundamental properties of the Earth and its atmosphere, and related measurements are beneficial and used globally and extensively in meteorology, climatology and other scientific purposes for the protection of human life and natural resources; and although EESS (passive) satellites and sensors are operated by few countries, they benefit the whole international community and are hence to be protected on a worldwide basis;

*l)* that sharing studies were conducted considering applications in the land mobile service,

*noting*

*a)* that Recommendation ITU-R M.2083 provides the framework and overall objectives of the future development of IMT for 2020 and beyond;

*b)* that Recommendation ITU-R SA.2142 provides the methodologies for calculating coordination areas around EESS and space research service (SRS) earth stations to avoid harmful interference from IMT-2020 systems in the frequency bands 25.5-27 GHz and 37-38 GHz;

*c)* that Recommendation ITU-R M.2161 provides guidelines to assist administrations to mitigate in-band interference from FSS earth stations operating in the frequency bands 24.65-25.25 GHz, 27-27.5 GHz, 42.5-43.5 GHz and 47.2-48.2 GHz into IMT stations,

*recognizing*

*a)* 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;

*b)* Resolutions 176 (Rev. Bucharest, 2022) and 203 (Rev. Bucharest, 2022) of the Plenipotentiary Conference;

*c)* that Resolution **750 (Rev.WRC-19)** establishes limits on unwanted emissions in the frequency band 23.6-24 GHz from IMT base stations and IMT mobile stations within the frequency band 24.25-27.5 GHz;

*d)* that the spurious emission limits of Recommendation ITU-R SM.329 Category B (−60 dB(W/MHz)) are sufficient to protect the EESS (passive) in the frequency bands 50.2-50.4 GHz and 52.6-54.25 GHz from the second harmonic of IMT base station emissions in the frequency band 24.25-27.5 GHz;

*e)* that ITU-R has conducted sharing studies between IMT and the inter-satellite service (ISS)/fixed-satellite service (FSS) (Earth-to-space) in the frequency band 24.25-27.5 GHz based on a number of baseline assumptions, (e.g. equivalent isotropically radiated power (e.i.r.p.) of 18 dB(W/200 MHz), base station densities of 1 200 per 10 000 $km^2$ and other deployment scenarios), as well as sensitivity analysis for some of them, and these baseline assumptions, as well as other assumptions, influence the sharing study results;

*f)* that the frequency bands immediately below the passive frequency band 23.6-24 GHz are not intended to be used for high-density mobile applications,

*resolves*

1 that administrations wishing to implement IMT consider use of the frequency band 24.25-27.5 GHz identified for IMT in No. **5.532AB**, 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 administrations shall apply the following conditions for the frequency band 24.25-27.5 GHz:

2.1 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 band 24.25-27.5 GHz; the mechanical pointing needs to be at or below the horizon;

2.2 as far as practicable, sites for IMT base stations within the frequency band 24.45-27.5 GHz employing values of 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 protection of EESS/SRS earth stations in the frequency band 25.5-27 GHz and radio astronomy service (RAS) stations in the frequency band 23.6-24 GHz and coexistence between FSS earth stations in the frequency bands 24.65-25.25 GHz and 27-27.5 GHz and IMT stations should be facilitated through bilateral agreements for cross-border coordination as necessary;

4 that the operation of IMT within the frequency band 24.25-27.5 GHz shall protect existing and future EESS (passive) systems in the frequency band 23.6-24 GHz;

5 that IMT stations within the frequency range 24.25-27.5 GHz are used for applications of the land mobile service,

*encourages administrations*

1 to ensure that provisions for the implementation of IMT allow for the continued use of EESS, SRS and FSS earth stations and their future development;

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

3 to apply the spurious emission limits of Recommendation ITU-R SM.329 Category B for the frequency bands 50.2-50.4 GHz and 52.6-54.25 GHz when making the frequency band 24.25-27.5 GHz available for IMT;

4 that for the future development of EESS (passive) in the frequency band 23.6-24 GHz, administrations should consider additional mitigation techniques (e.g. guardbands) beyond the limits specified in Resolution **750 (Rev.WRC-19)**, as appropriate,

*invites the ITU Radiocommunication Sector*

1 to update existing ITU-R Recommendations or 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 23.6-24 GHz from IMT deployment;

2 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.