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## RESOLUTION 247 (WRC-19)

**Facilitating mobile connectivity in certain frequency bands below 2.7 GHz  
using high-altitude platform stations as International Mobile  
Telecommunications base stations**

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

*considering*

- a) that there is growing demand for access to mobile broadband, requiring more flexibility in the approaches to expand the capacity and coverage provided by International Mobile Telecommunications (IMT) systems;
- b) that high-altitude platform stations as IMT base stations (HIBS) would be used as part of terrestrial IMT networks, and may use the same frequency bands as ground-based IMT base stations in order to provide mobile-broadband connectivity to underserved communities, and in rural and remote areas;
- c) that IMT systems have evolved significantly in terms of spectrum identification, network deployment and radio access technology, with the standardization of IMT-Advanced and IMT-2020;
- d) that studies of new IMT network topologies may provide increased spectrum efficiency for the frequency bands already identified for IMT;
- e) that HIBS may be used as a part of terrestrial IMT networks to provide mobile connectivity to underserved communities and in rural and remote areas, with the ability to utilize a large footprint at low latency;
- f) that recent technological advances in battery and solar-panel technologies provide further support for the deployment of HIBS;
- g) that the user equipment to be served, whether by HIBS or ground-based IMT base stations, is the same, and currently supports a variety of the frequency bands identified for IMT;
- h) that mobile connectivity is becoming widespread, connecting not only people but also objects (e.g. IoT: Internet of Things, IoE: Internet of Everything), based on IMT technologies (e.g. eMTC: enhanced machine-type communication, NB-IoT: narrowband IoT) which are expected to be used widely, including in unpopulated areas;
- i) that the use of HIBS within the terrestrial component of IMT should not have any priority, and shall not cause any undue constraints which result in regulatory changes to the existing IMT identifications in the Radio Regulations;

- j)* that studies must be performed to demonstrate that sharing with existing services in the frequency band, including other IMT uses, is feasible, and that those existing services are protected with no new regulatory constraints on those existing uses and planned development;
- k)* that any potential new regulatory procedural considerations resulting from potential HIBS identifications should not apply to existing IMT identifications in the Radio Regulations;
- l)* that studies should be limited to sharing and compatibility between HIBS and other existing services and applications;
- m)* that the frequency bands identified for IMT below 2.7 GHz are used extensively to provide mobile-broadband services using ground-based IMT systems,

*noting*

that Recommendations ITU-R M.1456 and ITU-R M.1641 provide technical characteristics and operational conditions, as well as a methodology for the studies between HIBS and ground-based IMT systems in certain frequency bands around 1.9/2.1 GHz,

*recognizing*

- a)* that high-altitude platform station is defined in No. **1.66A** as a station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth;
- b)* that the frequency bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3 and the frequency bands 1 885-1 980 MHz and 2 110-2 160 MHz in Region 2 are included in No. **5.388A** for the use of HIBS, in accordance with the provisions of Resolution **221 (Rev.WRC-07)**;
- c)* that Nos. **5.388A** and **5.388B** and Resolution **221 (Rev.WRC-07)** stipulate technical conditions for high-altitude IMT necessary for the protection of ground-based IMT stations in neighbouring countries and other services, based on the sharing and compatibility studies with IMT-2000;
- d)* that some frequency bands below 2.7 GHz are globally or regionally identified for IMT in accordance with Nos. **5.286AA**, **5.317A**, **5.341A**, **5.341B**, **5.341C**, **5.346**, **5.346A**, **5.384A** and **5.388**;
- e)* that the ITU Radiocommunication Sector (ITU-R) is conducting co-channel sharing analysis involving IMT-Advanced systems using HIBS;
- f)* that some geostationary-satellite mobile-satellite service (MSS) networks in Region 3 have reported harmful interference affecting their uplinks in the frequency band 2 655-2 690 MHz from terrestrial IMT stations operating in some countries in Region 3 and Region 1, and ITU-R is conducting sharing and coexistence studies between the MSS and terrestrial IMT systems in the frequency band 2 655-2 690 MHz;
- g)* that the frequency bands 2 520-2 670 MHz and 2 700-2 900 MHz are allocated on a primary basis to the broadcasting-satellite service and the aeronautical radionavigation service, respectively,

*resolves to invite the ITU Radiocommunication Sector*

1 to study spectrum needs, as appropriate, for HIBS to provide mobile connectivity in the mobile service, taking into account:

- the existing identification in *recognizing b)*;
- the usage and deployment scenario envisioned for HIBS as complementary for terrestrial IMT networks;
- the technical and operational characteristics and requirements of HIBS;

2 to conduct and complete in time for WRC-23, taking into account the results of studies already performed and those in progress within ITU-R, sharing and compatibility studies to ensure the protection of services, without imposing any additional technical or regulatory constraints in their deployment, to which the frequency band is allocated on a primary basis, including other IMT uses, existing systems and the planned development of primary allocated services, and adjacent services, as appropriate, for certain frequency bands below 2.7 GHz, or portions thereof, globally or regionally harmonized for IMT, i.e.:

- 694-960 MHz;
- 1 710-1 885 MHz (1 710-1 815 MHz to be used for uplink only in Region 3);
- 2 500-2 690 MHz (2 500-2 535 MHz to be used for uplink only in Region 3, except 2 655-2 690 MHz in Region 3);

3 to study appropriate modifications to the existing footnote and associated resolution in the identification referred to in *recognizing b)* in order to facilitate the use of HIBS with the latest radio interface technologies of IMT;

4 to study the definition of HIBS, including possible modifications to the provisions of the Radio Regulations, as appropriate;

5 to develop ITU-R Recommendations and Reports, as appropriate, taking into account *resolves to invite the ITU Radiocommunication Sector 1, 2, 3 and 4 above,*

*invites the 2023 World Radiocommunication Conference*

to consider, based on the results of the above studies, the use of HIBS in certain frequency bands below 2.7 GHz already identified for IMT, on a global or regional level, and take necessary regulatory actions, as appropriate, taking into account that changes to the footnotes referred to in *recognizing d)* are outside the scope and there should be no additional regulatory or technical constraints imposed on the deployment of ground-based IMT systems in the frequency bands referred to in those footnotes,

*invites administrations*

to participate actively in these studies by submitting contributions to ITU-R.