

## RESOLUTION 213 (WRC-23)

**Use of high-altitude platform stations as International Mobile  
Telecommunications base stations in the frequency  
band 694-960 MHz, or portions thereof<sup>1</sup>**

The World Radiocommunication Conference (Dubai, 2023),

*considering*

- a)* that the favourable propagation characteristics of the frequency band 694-960 MHz are beneficial to provide cost-effective solutions for coverage, including for large areas of low population density;
- b)* that the operation of high-altitude platform stations (HAPS) as International Mobile Telecommunications (IMT) base stations (HIBS) in the same geographical area with existing services may create compatibility issues;
- c)* that it is necessary to adequately protect existing services in this frequency band;
- d)* that there is growing demand for access to mobile broadband, requiring more flexibility in approaches to expanding the capacity and coverage provided by IMT systems;
- e)* that 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;
- f)* that HIBS would offer a new means of providing IMT services with minimal network infrastructure, as they are capable of providing service to a large footprint together with a dense coverage;
- g)* that the use of HIBS is optional for administrations, and that such use should not have any priority over other terrestrial IMT use;
- h)* that the mobile station 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;
- i)* that, under certain deployment scenarios, platform transmissions in the frequency band 694-960 MHz may occur at altitudes down to 18 km, and some sensitivity studies have shown that the difference of interference at this altitude would be negligible;

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<sup>1</sup> HIBS: High-altitude platform station as IMT base station. The conditions in this Resolution refer to these platforms operating between 18 km and 25 km.

j) that the ITU Radiocommunication Sector (ITU-R) has addressed sharing and compatibility between HIBS and existing systems of primary allocated services in the frequency band 694-960 MHz, and services in the adjacent bands,

*recognizing*

a) that, in Article 5, the frequency band 694-960 MHz, or parts thereof, is allocated on a primary basis to various services;

b) that the use of the frequency band 470-862 MHz by the broadcasting service and other primary services in Region 1 (except Mongolia) and the Islamic Republic of Iran is covered by the GE06 Agreement;

c) that a HAPS 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;

d) that the frequency band 694-960 MHz, or parts thereof, are identified for IMT in accordance with Nos. 5.313A and 5.317A;

e) that these frequency bands are allocated to the fixed and mobile services on a co-primary basis,

*emphasizing*

that the requirements of the different services to which the frequency band is allocated, including the mobile, aeronautical radionavigation (in accordance with Nos. 5.312 and 5.323), fixed and broadcasting services, shall be taken into account,

*resolves*

1 that use of the frequency band 694-960 MHz in accordance with Nos. 5.312B and 5.314A is subject to agreement obtained under No. 9.21 with respect to the affected aeronautical radionavigation service (ARNS) in countries listed in Nos. 5.312 and 5.323 based on the criteria contained in Annex 1 to this Resolution;

2 that HIBS operating in the frequency band 694/698-862 MHz shall not cause harmful interference to, nor claim protection from, the broadcasting service; where the GE06 Agreement applies, the power flux-density (pfd) level per HIBS shall not exceed  $-135.8 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ , produced in the territory of other administrations, at a height of 10 metres unless explicit agreement of the affected administration is provided at the time of the notification of HIBS;

3 that, where the GE06 Agreement does not apply, the use of the frequency band 694/698-862 MHz by HIBS is subject to agreement obtained under No. 9.21 with respect to the broadcasting service in the territory of other administrations; the coordination threshold of a pfd level of  $-135.8 \text{ dB(W/(m}^2 \cdot \text{MHz))}$ , produced in the territory of other administrations, per HIBS shall be used at a height of 10 metres;

4 that administrations wishing to implement HIBS shall comply with the following:

4.1 for the purpose of protecting the mobile service, including IMT terrestrial systems, in the territory of neighbouring administrations in the frequency band 694-960 MHz, the following limits shall apply:

- the pfd level per HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limit for the protection of IMT mobile stations, unless explicit agreement of the affected administration is provided:

$$-114 \quad \text{dB(W/(m}^2 \cdot \text{MHz))} \quad \text{for} \quad 0^\circ < \theta \leq 90^\circ$$

where  $\theta$  is the angle of arrival of the incident wave above the horizontal plane, in degrees;

- the pfd level per HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limit for the protection of IMT base stations, unless explicit agreement of the affected administration is provided:

$$-136 + 0.21 (\theta)^2 \quad \text{dB(W/(m}^2 \cdot \text{MHz))} \quad \text{for} \quad 0^\circ \leq \theta \leq 8.3^\circ$$

$$-121.8 + 0.08 (\theta) \quad \text{dB(W/(m}^2 \cdot \text{MHz))} \quad \text{for} \quad 8.3^\circ < \theta \leq 90^\circ$$

where  $\theta$  is the angle of arrival of the incident wave above the horizontal plane, in degrees<sup>2</sup>;

4.2 for the purpose of protecting mobile services including IMT terrestrial systems in the territory of Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, the Democratic People's Republic of Korea, Tajikistan and Turkmenistan in the frequency band 694-960 MHz, the pfd level per HIBS produced at the surface of the Earth in the territory of the countries listed above in this *resolves* shall not exceed the following limits, unless explicit agreement of the affected administration is provided:

$$-150 \quad \text{dB(W/(m}^2 \cdot \text{MHz))} \quad \text{for} \quad 0^\circ \leq \theta < 11^\circ$$

$$-150 + 0.3912 (\theta - 11) \quad \text{dB(W/(m}^2 \cdot \text{MHz))} \quad \text{for} \quad 11^\circ \leq \theta < 80^\circ$$

$$-123 \quad \text{dB(W/(m}^2 \cdot \text{MHz))} \quad \text{for} \quad 80^\circ \leq \theta \leq 90^\circ$$

where  $\theta$  is the angle of arrival of the incident wave above the horizontal plane, in degrees;

4.3 for the purpose of protecting fixed services in the territory of Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, the Democratic People's Republic of Korea, Tajikistan and Turkmenistan in the frequency band 694-960 MHz, the pfd level per HIBS produced at the surface of the Earth in the territory of the countries listed above in this *resolves* shall not exceed the following limits, unless explicit agreement of the affected administration is provided:

$$-150 \quad \text{dB(W/(m}^2 \cdot \text{MHz))} \quad \text{for} \quad 0^\circ \leq \theta < 11^\circ$$

$$-150 + 0.3912 (\theta - 11) \quad \text{dB(W/(m}^2 \cdot \text{MHz))} \quad \text{for} \quad 11^\circ \leq \theta < 80^\circ$$

$$-123 \quad \text{dB(W/(m}^2 \cdot \text{MHz))} \quad \text{for} \quad 80^\circ \leq \theta \leq 90^\circ$$

where  $\theta$  is the angle of arrival of the incident wave above the horizontal plane, in degrees;

<sup>2</sup> The pfd levels to protect IMT base stations will apply unless the affected administration informs the Radiocommunication Bureau that only terminal stations need to be protected.

5 that administrations intending to implement HIBS systems shall notify, in accordance with Article 11, the frequency assignments to transmitting and receiving HIBS by submitting all mandatory elements of Appendix 4 to the Radiocommunication Bureau for the examination of compliance with the conditions specified in the *resolves* above;

6 that the notifying administration of HIBS at the time of submission of the Appendix 4 information shall provide a firm, objective, actionable, measurable and enforceable commitment to the Bureau to immediately eliminate unacceptable interference to existing primary services or reduce it to an acceptable level should such interference occur,

*invites administrations*

1 to adopt appropriate frequency arrangements for HIBS in order to consider the benefits of harmonized utilization of the spectrum for HIBS and protection of existing services and systems operating on a primary basis taking into account the *resolves* above and the relevant ITU-R Recommendations and Reports;

2 to review their entries for the broadcasting service in the Master International Frequency Register in the frequency band above 694 MHz and to remove those no longer required according to Article 8,

*instructs the Director of the Radiocommunication Bureau*

to take all necessary measures to implement this Resolution.

## ANNEX 1 TO RESOLUTION 213 (WRC-23)

### **Criteria for identifying potentially affected administrations with respect to the aeronautical radionavigation service in countries listed in Nos. 5.312 and 5.323**

To identify potentially affected administrations when applying the procedure for seeking agreement under No. 9.21 for HIBS in the mobile service with respect to the aeronautical radionavigation service (ARNS) station operating in countries mentioned in Nos. 5.312 and 5.323, the coordination distances (between a HIBS in the mobile service and a potentially affected ARNS station) indicated below should be used.

When applying the procedure for seeking agreement under No. **9.21**, notifying administrations may indicate in the notice sent to the Radiocommunication Bureau the list of administrations with which a bilateral agreement has already been reached. The Bureau shall take this into account in determining the administrations with which coordination under No. **9.21** is required.

Coordination distances for transmitting HIBS of MS (km)	Coordination distances for receiving HIBS of MS (km)
$4.1(\sqrt{h_1} + \sqrt{h_2})$	$4.1(\sqrt{h_1} + \sqrt{h_3}) + R$

$h_1$  is ARNS stations height (10 000 m).

$h_2$  is HIBS stations height (between 18 000 and 25 000 m).

$h_3$  is IMT mobile stations height (1.5 m).

$R$  is radius of HIBS service area in km.