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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 2 to Document 85(Add.4)-E** | |
|  | | **22 October 2023** | |
|  | | **Original: Russian** | |
|  | | | |
| Regional Commonwealth in the field of Communications Common Proposals | | | |
| PROPOSALS FOR THE WORK OF THE CONFERENCE | | | |
|  | | | |
| Agenda item 1.4 | | | |

1.4to consider, in accordance with Resolution **247 (WRC‑19)**, the use of high-altitude platform stations as IMT base stations (HIBS) in the mobile service in certain frequency bands below 2.7 GHz already identified for IMT, on a global or regional level;

Introduction

The RCC Administrations are of the view that the use of high-altitude platform stations as International Mobile Telecommunications (IMT) base stations (HIBS) in the frequency band 1 710-1 885 MHz must not cause interference or impose additional constraints on the enjoyment of protection of incumbent services. That should include:

− to protect the mobile-satellite service (MSS) earth stations in the frequency band 2 170-2 200 MHz from out-of-band emissions of HIBS, a limit should be imposed on the power flux-density produced at the surface of the Earth;

− to protect the meteorological-satellite service in the frequency band 1 670-1 710 MHz from HIBS operating in the frequency band 1 710-1 785 MHz, HIBS operations should be restricted to reception;

− to protect the fixed service (FS) stations in the frequency band 1 785-1 980 MHz from the main emissions of HIBS, a limit should be imposed on the power flux-density produced at the surface of the Earth.

The RCC Administrations are of the view that, as regards Question B, "HIBS in the frequency band 1 710-1 885 MHz", Method B3 of the CPM report can be taken as the basis for a solution for WRC-23 agenda item 1.4, taking into account the requirements to be set out in Resolution **221** **(Rev.WRC-23)**.

Proposals

ARTICLE 5

Frequency allocations

Section IV – Table of Frequency Allocations  
(See No. 2.1)

MOD RCC/85A4A2/1#1427

1 710-2 170 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 1 710-1 930 FIXED  MOBILE 5.384A MOD 5.388A 5.388B  5.149 5.341 5.385 5.386 5.387 5.388 | | |
| ... | | |

**Reasons:** HIBS can make use of the frequency band 1 710-1 885 MHz on the condition that incumbent services are protected. Protection of incumbent services is to be ensured by the application of Resolution **221 (Rev.WRC-23)**.

MOD RCC/85A4A2/2#1430

5.388A The frequency bands 1 710-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz in Regions 1 and 3, and the frequency bands 1 710-1 980 MHz and 2 110-2 160 MHz in Region 2 are identified for use by high-altitude platform stations as International Mobile Telecommunications (IMT) base stations (HIBS). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. Resolution **221 (Rev.WRC‑23)** shall apply. HIBS shall not claim protection from existing primary services.No. **5.43A** does notapply. The notifying administration of HIBS at the time of submission of the Appendix **4** information shall send an objective, measurable and enforceable commitment undertaking that if unacceptable interference is caused it shall immediately reduce the interference to the acceptable level or cease the emission. Such use of HIBS in the frequency bands 1 710-1 785 MHz in Regions 1 and 2, and 1 710-1 815 MHz in Region 3 is limited to reception by HIBS, and in the frequency band 2 110-2 170 MHz is limited to transmission from HIBS.     (WRC‑23)

**Reasons:** HIBS can make use of the frequency band 1 710-1 885 MHz on the condition that incumbent services are protected. Protection of incumbent services is to be ensured by the application of Resolution **221 (Rev.WRC-23)**.

MOD RCC/85A4A2/3#1436

RESOLUTION 221 (Rev.WRC‑23)

Use of high-altitude platform stations as International Mobile Telecommunications base stations (HIBS) in the frequency bands 1 710‑1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz

The World Radiocommunication Conference (Dubai, 2023),

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) will 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 HIBS will 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;

*d)* that the use of HIBS is optional for administrations, and that such use should not have any priority over other terrestrial IMT use;

*e)* 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;

*f)* that, under certain deployment scenarios, HIBS could operate at an altitude down to 18 km;

*g)* that some sensitivity studies have shown that the difference of interference from HIBS at altitudes between 18 km and 20 km would be negligible;

*h)* that ITU‑R has addressed sharing and compatibility between HIBS and existing systems of primary allocated services, and adjacent services in the frequency bands 1 710-2 025 MHz and 2 110-2 200 MHz;

*i)* that the conclusion of the compatibility studies between HIBS operating above 1 710 MHz and meteorological satellite (MetSat) operations in the adjacent frequency band 1 670-1 710 MHz has been assuming that the use of HIBS in the frequency band 1 710-1 785 MHz is limited to reception by HIBS;

*j)* that spectrum needs, usage and deployment scenarios, and typical technical and operational characteristics for HIBS are provided in the WDPDN Report ITU‑R M.[HIBS-CHARACTERISTICS];

*k*) that the conclusion of the compatibility studies between HIBS operating above 2 110 MHz and SRS/SOS/EESS operations in the adjacent frequency band 2 025-2 110 MHz and the conclusion of the sharing studies between HIBS and SRS in the frequency band 2 110-2 120 MHz have both been assuming that the use of HIBS in the frequency band 2 110-2 170 MHz is limited to transmission from HIBS,

considering further

*a)* that such IMT stations may experience unacceptable interference effects due to the aggregate interference from HIBS and other services,

recognizing

*a)* that a high-altitude platform station (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;

*b)* that in Regions 1 and 3, the frequency bands 1 710-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz and, in Region 2, the frequency bands 1 710-1 980 MHz and 2 110-2 160 MHz are included in No. **5.388A** for the use of HIBS;

*c)* that the frequency bands 1 710‑1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz, or parts thereof, are identified for IMT in accordance with Nos. **5.384A** and **5.388**;

*d)* that these frequency bands are allocated to the fixed and mobile services on a co‑primary basis,

resolves

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

1.1 in some countries (see No. **5.388B**), for the purpose of protecting fixed and mobile services, including IMT mobile stations, in their territories from co-channel interference caused by HIBS in accordance with No. **5.388A** in neighbouring countries, the limits of No. **5.388B** shall apply;

1.2 for the purpose of protecting mobile service systems including IMT terrestrial systems in the territory of other administrations in the frequency bands 1 710-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz, the aggregate power flux-density (pfd) level from HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limits, unless explicit agreement of the affected administration is provided:

−145 dB(W/(m2 · MHz)) for 0° ≤ θ < 11°

−145 + 0.4347 (θ − 11) dB(W/(m2 · MHz)) for 11° ≤ θ < 80°

−115 dB(W/(m2 · MHz)) for 80° ≤ θ < 90°

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees;

1.3 (not used);

1.4 for the purpose of protecting mobile earth stations within the satellite component of IMT in the territory of other administrations in the frequency bands 2 100-2 160 MHz in Region 2 and 2 100-2 170 MHz in Regions 1 and 3, the pfd level per HIBS operating in the frequency bands 2 160-2 200 MHz in Region 2 and 2 170‑2 200 MHz in Regions 1 and 3 produced at the surface of the Earth in the territory of other administrations shall not exceed the following out-of-band limit:

−165 dB(W/(m2 · 4 kHz)),

1.5 a HIBS, in order to protect fixed stations from interference, shall not exceed the following limits of out-of-band power flux-density (pfd) at the Earth’s surface in the frequency band 2 025-2 110 MHz:

− −165  dB(W/(m2 · MHz)) for 0° < θ ≤ 5°

− −165 + 1.75 (θ − 5)  dB(W/(m2 · MHz)) for  5° < θ ≤ 25°

− −130  dB(W/(m2 · MHz)) for 25° < θ ≤ 90°

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees;

1.6 for the purpose of protecting fixed-service systems in the territory of other administrations in the frequency bands 1 710-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz, the aggregate pfd level from HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limits, unless explicit agreement of the affected administration is provided:

−165 dB(W/(m2 · MHz)) for 0° < θ ≤ 5°

−165 + 1.75 (θ − 5) dB(W/(m2 · MHz)) for  5° < θ ≤ 25°

−130 dB(W/(m2 · MHz)) for 25° < θ ≤ 90°

1.7 for the purpose of protecting airborne aeronautical mobile service systems in the territory of other administrations in the frequency band 1 780-1 850 MHz, any HIBS shall maintain a separation distance of 1 135 km from the border of the affected administration, unless explicit agreement of the affected administration is provided;

1.8 for the purpose of protecting ground-based aeronautical mobile service systems in the territory of other administrations in the frequency band 1 780-1 850 MHz, any HIBS shall maintain a separation distance of 490 km from the border of the affected administration, unless explicit agreement of the affected administration is provided;

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

invites administrations

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 *resolves* above and the relevant ITU‑R Recommendations and Reports,

instructs the Director of the Radiocommunication Bureau

to take all necessary measures to implement this Resolution.

ARTICLE 11

Notification and recording of frequency   
assignments1, 2, 3, 4, 5, 6, 7    (WRC‑19)

Section I − Notification

MOD RCC/85A4A2/4

11.26A Notices relating to assignments for high altitude platform stations as IMT base stations in the bands identified in 5.388A shall reach the Bureau not earlier than three years before the assignments are brought into use.     (WRC‑23)

APPENDIX 4 (REV.WRC‑19)

Consolidated list and tables of characteristics for use in the  
application of the procedures of Chapter III

ANNEX 1

Characteristics of stations in the terrestrial services[[1]](#footnote-2)1

Footnotes to Tables 1 and 2

MOD RCC/85A4A2/5#1461

TABLE 2   (Rev.WRC-23)

Characteristics for frequency assignments to high-altitude platform stations (HAPS) and high-altitude platform stations as IMT base stations (HIBS)   
in the terrestrial services

| **Item identifier** | ***1 \_ GENERAL CHARACTERISTICS OF THE HAPS/HIBS*** | **Transmitting station in the frequency bands listed in No. 5.388A for the application of No. 11.2** | **Receiving station in the frequency bands listed in No.  5.388A for the application of No. 11.9** | **Transmitting station in the frequency bands listed in Nos. 5.457, 5.537A, 5.530E, 5.532AA, 5.534A, 5.543B, 5.550D and 5.552A for the application of No. 11.2** | **Receiving station in the frequency bands listed in Nos.  5.457, 5.534A, 5.543B, 5.550D and 5.552A for the application of No. 11.9** | **Item identifier** | |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **GENERAL INFORMATION** |  | | | | | |
| ... | ... | **...** | **...** | **...** | **...** | ... | |
|  | **COMPLIANCE WITH TECHNICAL OR OPERATIONAL LIMITS** |  | | | | | |
| 1.14.b | a commitment that the HAPS does not exceed an out-of-band pfd of −165 dB(W/(m2 · 4 kHz)) at the Earth’s surface in the bands 2 160-2 200 MHz in Region 2 and 2 170‑2 200 MHz in Regions 1 and 3 (see Resolution **221** **(Rev.WRC‑23)**) | **X** |  |  |  | 1.14.b | |
| 1.14.ba | a commitment that, for the purpose of protecting mobile services including IMT terrestrial systems in the territory of other administrations in the frequency bands 1 710-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz, the aggregate level of pfd from HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed ‑145 dB(W/m² · MHz) for angles of arrival from 0° to 11°, ‑145+0.4347 (θ-11) dB(W/m² · MHz)) for angles of arrival θ from 11° to 80°, and ‑116 dB(W/m² · MHz)) for angles of arrival from 80° to 90°, unless explicit agreement of the affected administration is provided (see Resolution 221 (Rev.WRC‑23)) | **X** |  |  |  | 1.14.ba |
| 1.14.bc | a commitment that, for the purpose of protecting fixed-service systems in the territory of other administrations in the frequency bands 1 710-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz, the aggregate level of pfd from HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed ‑165 dB(W/m² · MHz)) for angles of arrival from 0° to 5°, ‑165+1.75 (θ-5) dB(W/m² · MHz) for angles of arrival θ from 5° to 25° and ‑130 dB(W/m² · MHz)) for angles of arrival from 25° to 90°, unless explicit agreement of the affected administration is provided (see Resolution **221** **(Rev.WRC‑23)**) | **X** |  |  |  | 1.14.bc |
| ... | ... | **...** | **...** | ... | ... | ... | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Item identifier** | ***2 \_ CHARACTERISTICS TO BE PROVIDED FOR EACH INDIVIDUAL OR COMPOSITE HAPS ANTENNA BEAM*** | **Transmitting station in the frequency bands listed in No. 5.388A for the application of No. 11.2** | **Receiving station in the frequency bands listed in No. 5.388A for the application of No. 11.9** | **Transmitting station in the frequency bands listed in Nos. 5.457, 5.537A, 5.530E, 5.532AA, 5.534A, 5.543B, 5.550D and 5.552A for the application of No. 11.2** | **Receiving station in the frequency bands listed in Nos. 5.457, 5.534A, 5.543B, 5.550D and 5.552A for the application of No. 11.9** | **Item identifier** |
|  | **IDENTIFICATION AND DIRECTION OF THE HAPS ANTENNA BEAM** |  | | | | |
| ... | ... | **...** | **...** | **...** | **...** | ... |
|  | **ANTENNA CHARACTERISTICS** |  | | | | |
| 2.9.e | the height of the antenna above ground level, in metres, in the case of a HAPS transmitting ground station  Required for an assignment in the frequency bands shared with space services (space-to-Earth) |  |  |  | **+** | 2.9.e |
| 2.9.f | antenna diameter, in metres, in the case of a HAPS transmitting ground station  Required in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz |  |  |  | **+** | 2.9.f |
| ... | ... | ... | ... | ... | ... | ... |

| **Item identifier** | ***3 \_ CHARACTERISTICS TO BE PROVIDED FOR EACH FREQUENCY ASSIGNMENT FOR EACH INDIVIDUAL OR COMPOSITE HAPS ANTENNA BEAM*** | **Transmitting station in the frequency bands listed in No. 5.388A for the application of No. 11.2** | **Receiving station in the frequency bands listed in No. 5.388A for the application of No. 11.9** | **Transmitting station in the frequency bands listed in Nos. 5.457, 5.537A, 5.530E, 5.532AA, 5.534A, 5.543B, 5.550D and 5.552A for the application of No. 11.2** | **Receiving station in the frequency bands listed in Nos.  5.457, 5.534A, 5.543B, 5.550DB and 5.552A for the application of No. 11.9** | **Item identifier** |
| --- | --- | --- | --- | --- | --- | --- |
|  | **ASSIGNED FREQUENCY** |  | | | | |
| ... | ... | **...** | **...** | **...** | **...** | ... |
|  | **LOCATION OF THE ASSOCIATED ANTENNA(S)** |  | | | | |
| 3.5.c | the geographical coordinates of the ground station(s) in the fixed service  Required in the frequency bands 6 560-6 640 MHz and 25.25-27 GHz, 31-31.3 GHz, and 38-39.5 GHz;  Required in the other frequency bands, if neither the geographical coordinates of a given zone (3.c.a) nor a geographical area (3.5.d) nor a circular area (3.5.e and 3.5.f) are provided |  |  | **+** | **+** | 3.5.c |
|  | **For an area in which associated transmitting/receiving ground station(s) operate:** |  |  |  |  |  |
| 3.5.c.a | the geographical coordinates of a given zone  A minimum of six geographical coordinates are required, in degrees, minutes and seconds  *Note* – For the fixed service in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz the geographical coordinates are provided for each of the UAC, SAC and if applicable RAC (see the most recent version of Recommendation ITU‑R F.1500)  Required if neither a circular area (3.5.e and 3.5.f) nor a geographical area (3.5.d) are provided | **+** | **+** | **+** | **+** | 3.5.c.a |
| 3.5.d | the code of the geographical area (see the Preface)  *Note* – For the fixed service in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz separate geographical areas are provided for each of the UAC, SAC and if applicable RAC (see the most recent version of Recommendation ITU‑R F.1500)  Required if neither a circular area (3.5.e and 3.5.f) nor the geographical coordinates of a given zone (3.5.c.a) are provided | **+** | **+** | **+** | **+** | 3.5.d |
| 3.5.e | the geographical coordinates of the centre of the circular area in which the associated ground station(s) are operating  The latitude and longitude are provided in degrees, minutes and seconds  *Note* – For the fixed service in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz different centres of the circular area may be provided for the UAC, SAC and if applicable RAC (see the most recent version of Recommendation ITU‑R F.1500)  Required if neither a geographical area (3.5.d) or geographical coordinates of a given zone (3.5.c.a) are provided | **+** | **+** | **+** | **+** | 3.5.e |
| 3.5.f | the radius, in km, of the circular area  *Note* – For the fixed service in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz, a separate radius is provided for each of the UAC, SAC and if applicable RAC (see the most recent version of Recommendation ITU‑R F.1500)  Required if neither a geographical area (3.5.d) nor geographical coordinates of a given zone (3.5.c.a) are provided | **+** | **+** | **+** | **+** | 3.5.f |
| ... | ... | **...** | **...** | **...** | **...** | ... |
|  | **POWER CHARACTERISTICS OF THE TRANSMISSION** |  | | | | |
| 3.8 | the symbol (X, Y or Z, as appropriate) describing the type of power (see Article **1**) corresponding to the class of emission | **X** | **X** | **X** | **X** | 3.8. |
| 3.8b | the radiated power, in dBW, in one of the forms described in Nos. 1.161 to 1.163  *Note* – For a receiving HAPS, the radiated power refers to the associated transmitting mobile station(s) |  | **X** |  |  | 3.8b |
| 3.8.aa | the power delivered to the antenna, in dBW, excluding the level of power control in 3.8.BA under clear-sky conditions  *Note* – For a receiving HAPS, the power delivered to the antenna refers to the associated transmitting ground station(s) | **X** |  | **X** | **X** | 3.8.aa |
| 3.8.AB | the power density1 averaged over the worst 1 MHz band delivered to the antenna under clear-sky conditions | **X** |  | **X** |  | 3.8AB |
| 3.8.BA | the range of power control, in dB  *Note* – For a receiving HAPS, the power control refers to its use by the associated transmitting ground station(s)  In the case of a transmitting HAPS, required in the frequency bands, 21.4-22 GHz, 24.25-25.25 GHz, 27-27.5 GHz, 31-31.3 GHz, 38-39.5 GHz, 47.2-47.5 GHz and 47.9-48.2 GHz  In the case of a receiving HAPS, required in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz | **X** |  | **+** | **+** | 3.8.BA |
|  | **POLARIZATION AND RECEIVING SYSTEM NOISE TEMPERATURE** |  | | | | |
| 3.9.d | the code indicating the type of polarization (see the Preface) | **X** | **X** | **X** | **X** | 3.9.d |
| 3.9.j | the reference radiation pattern of the associated ground station(s)  Required in the frequency bands 47.2-47.5 GHz and 47.9‑48.2 GHz |  |  | **+** | **+** | 3.9.j |
| 3.9.k | the lowest total receiving system noise temperature, in kelvins, referred to the output of the receiving antenna |  | **X** |  | **X** | 3.9.k |
|  | **HOURS OF OPERATION** |  | | | | |
| 3.10.b | the regular hours of operation (in hours and minutes from ... to ...) of the frequency assignment, in UTC | **X** | **X** | **X** | **X** | 3.10.b |

**Reasons:**

SUP RCC/85A4A2/6#1462

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

**Reasons:** There is no need to maintain Resolution **247 (WRC-19)** in the Radio Regulations.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. 1 The Radiocommunication Bureau shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Appendix and related decisions of future conferences. Additional information on the items listed in this Annex together with an explanation of the symbols is to be found in the Preface to the BR IFIC (Terrestrial Services). [↑](#footnote-ref-2)