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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 3 toDocument 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 International Mobile Telecommunications (IMT) base stations (HIBS) in the frequency bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz should not cause interference or impose additional constraints on the protection enjoyed by existing services. This being the case:

– to protect mobile-satellite service (MSS) earth stations in the frequency band 2 170-2 200 MHz from out-of-band HIBS emissions, a restriction should be applied in the form of a power flux-density level at the Earth’s surface;

– to protect the space operation service (SOS), space research service (SRS) and Earth exploration-satellite service (EESS) in the frequency band 2 025-2 110 MHz from HIBS operating in the frequency band 2 110-2 170 MHz, HIBS operations should be restricted to transmission;

– to protect fixed service (FS) stations in the frequency band 2 025-2 110 MHz from out-of-band HIBS emissions a power flux-density level should be applied at the Earth’s surface;

– to protect FS stations in the frequency bands 2 010-2 025 MHz and 2 110-2 170 MHz from main HIBS emissions, a restriction should be applied in the form of a power flux-density level at the Earth’s surface.

The RCC Administrations consider that for Issue C, “HIBS in the frequency bands 1 885-1 980 MHz, 2 010-2 025 MHz, and 2 110-2 170 MHz”, Method C3 in the CPM Report could be used as a basis for satisfying item 1.4 of the WRC-23 agenda, 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/85A4A3/1#1439

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 |
| 1 930-1 970FIXEDMOBILE MOD 5.388A 5.388B | 1 930-1 970FIXEDMOBILE MOD 5.388A 5.388BMobile-satellite (Earth-to-space) | 1 930-1 970FIXEDMOBILE MOD 5.388A 5.388B |
| 5.388 | 5.388 | 5.388 |
| 1 970-1 980 FIXED MOBILE MOD 5.388A 5.388B 5.388 |
| ... |
| 2 010-2 025FIXEDMOBILE MOD 5.388A 5.388B | 2 010-2 025FIXEDMOBILEMOBILE-SATELLITE(Earth-to-space) | 2 010-2 025FIXEDMOBILE MOD 5.388A 5.388B |
| 5.388 | 5.388 5.389C 5.389E | 5.388 |
| ... |
| 2 110-2 120 FIXED MOBILE MOD 5.388A 5.388B SPACE RESEARCH (deep space) (Earth-to-space) 5.388 |
| 2 120-2 160FIXEDMOBILE MOD 5.388A 5.388B | 2 120-2 160FIXEDMOBILE MOD 5.388A 5.388BMobile-satellite (space-to-Earth) | 2 120-2 160FIXEDMOBILE MOD 5.388A 5.388B |
| 5.388 | 5.388 | 5.388 |
| 2 160-2 170FIXEDMOBILE MOD 5.388A 5.388B | 2 160-2 170FIXEDMOBILEMOBILE-SATELLITE(space-to-Earth) | 2 160-2 170FIXEDMOBILE MOD 5.388A 5.388B |
| 5.388 | 5.388 5.389C 5.389E | 5.388 |

**Reasons:** HIBS may be used in the frequency bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz on condition that existing services are protected. In order to ensure protection for existing services, Resolution **221 (Rev.WRC-23)** should apply.

MOD RCC/85A4A3/2#1444

5.388A 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 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, in the event of unacceptable interference being caused, it shall immediately reduce the interference to an acceptable level or cease the emission. The use of HIBS in the frequency band 2 110-2 170 MHz is limited to transmission from HIBS.     (WRC‑23)

**Reasons:** HIBS may be used in the frequency bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz on condition that existing services are protected. In order to ensure protection for existing services, Resolution **221 (Rev.WRC-23)** should apply.

MOD RCC/85A4A3/3#1445

RESOLUTION 221 (Rev.WRC‑23)

Use of high-altitude platform stations as International Mobile Telecommunications (IMT) base stations (HIBS) in the frequency bands 1 885-1 980 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) 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 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;

*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 the ITU Radiocommunication Sector (ITU‑R) has addressed sharing and compatibility between HIBS and existing systems of services with primary allocations, and adjacent services in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz;

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

*j)* 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 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz and, in Region 2, the frequency bands 1 885-1 980 MHz and 2 110-2 160 MHz are included in No. **5.388A** for the use of HIBS;

*c)* that the frequency bands 1 885‑1 980 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 the 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 set in 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 1 885-1 980 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 is received from the administration affected:

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

 −145 + 0.45 (θ − 11) dB(W/(m2 · MHz)) for 11° ≤ θ < 80°

 −114 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 power flux-density (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 for 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 1 885-1 980 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 is received from the administration affected:

 −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°

2 that administrations intending to implement a 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 administrationsto 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/85A4A3/4

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/85A4A3/5#1461

TABLE 2   (Rev.WRC-23)

Characteristics for high-altitude platform stations (HAPS) frequency assignments, and also high-altitude platform stations as base stations (HIBS) frequency assignments,
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 frequency 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 pfd level of −145 dB(W/(m2 · MHz)) for angles of arrival between 0° and 11°, −145+0.4347 (θ – 11) dB(W/(m2 · MHz)) for angles of arrival θ between 11° and 80° and −116 dB(W/(m2 · MHz)) for angles of arrival between 80° and 90° from HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limit, unless explicit agreement is received from the administration affected (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 pfd level of −165 dB(W/(m2 · MHz)) for angles of arrival between 0° and 5°, −165+1.75 (θ – 5) dB(W/(m2 · MHz)) for angles of arrival θ between 5° and 25° and −130 dB(W/(m2 · MHz)) for angles of arrival between 25° and 90° from HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limits, unless explicit agreement is received from the administration affected (see Resolution **221** **(Rev.WRC‑23)**) | **X** |  |  |  | 1.14.bc |
| ... | ...  | **...** | **...** | ... | ... | ... |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Item identifier** | ***2 \_ CHARACTERISTICS TO BE PROVIDED FOR EACH INDIVIDUAL OR COMPOSITEHAPS 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 stationRequired 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 FOREACH INDIVIDUAL OR COMPOSITEHAPS 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 serviceRequired 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 zoneA 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 operatingThe 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 GHzIn 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**: To ensure protection for existing services, amendments are proposed to RR Appendix **4**.

SUP RCC/85A4A3/6#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)**.

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

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)