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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 4 toDocument 161-E** |
|  | **30 October 2023** |
|  | **Original: English** |
|  |
| South Africa (Republic of) |
| 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

This document presents the proposal from South Africa for WRC‑23 agenda item 1.4. It proposes regulatory provisions applying to HIBS in order to enable their use of the frequency bands 694-960 MHz, 1 710-1 885 MHz and 2 500-2 690 MHz while protecting other services and applications in these frequency bands as well as in the adjacent bands as necessary. Existing provisions for HIBS use of the frequency bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz, contained in No. **5.388A** of the Radio Regulations (RR) and Resolution **221 (Rev.WRC-07)**, are also proposed to be revised. The regulatory provisions proposed to ensure protection of existing services are in terms of geographical coordination, pfd masks, and limitation of HIBS transmissions to a specific direction as they apply to a given service.

It is proposed that the use of HIBS should be enabled at an altitude lower than 20 km, down to a minimum of 18 km, since ITU‑R studies have confirmed that there is a negligible difference in terms of impact to other services.

Proposal

South Africa supports Methods A3, B3, C3 and D3 which identify the following frequency bands for use by high-altitude platform stations as International Mobile Telecommunications (IMT) base stations (HIBS) with the related conditions, among others, as follows:

ARTICLE 5

Frequency allocations

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

MOD AFS/161A4/1#1414

460-890 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 470-694BROADCASTING5.149 5.291A 5.294 5.296 5.300 5.304 5.306 5.312 | 470-512BROADCASTINGFixedMobile5.292 5.293 5.295 | 470-585FIXEDMOBILE 5.296ABROADCASTING5.291 5.298 |
| 512-608BROADCASTING5.295 5.297  |
| 585-610FIXEDMOBILE 5.296ABROADCASTINGRADIONAVIGATION5.149 5.305 5.306 5.307 |
| 608-614RADIO ASTRONOMYMobile-satellite exceptaeronautical mobile-satellite(Earth-to-space) |
| 610-890FIXEDMOBILE 5.296A 5.313A 5.317A ADD 5.C14 ADD 5.D14BROADCASTING |
| 614-698BROADCASTINGFixedMobile5.293 5.308 5.308A 5.309  |
| 694-790MOBILE except aeronautical mobile 5.312A 5.317A ADD 5.C14BROADCASTING5.300 5.312 |
| 698-806MOBILE 5.317A ADD 5.C14BROADCASTINGFixed5.293 5.309  |
| 790-862FIXEDMOBILE except aeronautical mobile 5.316B 5.317A ADD 5.C14BROADCASTING5.312 5.319 |
| 806-890FIXEDMOBILE 5.317A ADD 5.C14BROADCASTING |
| 862-890FIXEDMOBILE except aeronauticalmobile 5.317A ADD 5.C14BROADCASTING 5.322 |
| 5.319 5.323 | 5.317 5.318 | 5.149 5.305 5.306 5.3075.320 |

MOD AFS/161A4/2#1415

890-1 300 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 890-942FIXEDMOBILE except aeronautical mobile 5.317A ADD 5.C14BROADCASTING 5.322Radiolocation5.323 | 890-902FIXEDMOBILE except aeronautical mobile 5.317A ADD 5.C14Radiolocation5.318 5.325 | 890-942FIXEDMOBILE 5.317A ADD 5.C14BROADCASTINGRadiolocation5.327 |
| 902-928FIXEDAmateurMobile except aeronautical mobile 5.325A ADD 5.C14Radiolocation5.150 5.325 5.326 |
| 928-942FIXEDMOBILE except aeronautical mobile 5.317A ADD 5.C14Radiolocation5.325 |
| 942-960FIXEDMOBILE except aeronautical mobile 5.317A ADD 5.C14BROADCASTING 5.3225.323 | 942-960FIXEDMOBILE 5.317A ADD 5.C14 | 942-960FIXEDMOBILE 5.317A ADD 5.C14BROADCASTING5.320 |

**Reasons:** To identify the frequency band 694-960 MHz for use by HIBS with the related conditions.

ADD AFS/161A4/3#1416

5.C14 The frequency band 698-960 MHz, or portions thereof, in Region 2, the frequency band 694-790 MHz, or portions thereof, in Region 1, and the frequency band 790-960 MHz, or portions thereof, in Regions 1 and 3, 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 it is allocated and does not establish priority in the Radio Regulations. 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 case of unacceptable interference is caused shall immediately reduce the interference to the acceptable level or cease the emission. Resolution **[A14-HIBS 694-960 MHZ] (WRC‑23)** shall apply. Such use of HIBS in the frequency bands 694-728 MHz and 830-835 MHz is limited to reception by HIBS.     (WRC‑23)

**Reasons:** To identify the frequency band 694-960 MHz for use by HIBS with the related conditions.

ADD AFS/161A4/4#1417

5.D14 The frequency band 698-790 MHz, or portions thereof, in the countries listed in No. **5.313A**, which are allocated to the mobile service on a primary basis, is identified for use by high-altitude platform stations as International Mobile Telecommunications (IMT) base stations (HIBS). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. 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 case of unacceptable interference is caused shall immediately reduce the interference to the acceptable level or cease the emission. Resolution **[A14-HIBS 694-960 MHZ] (WRC‑23)** shall apply. Such use of HIBS in the frequency band 698-728 MHz is limited to reception by HIBS.     (WRC‑23)

**Reasons:** To identify the frequency band 698-790 MHz in Region 3 countries for use by HIBS with the related conditions.

MOD AFS/161A4/5#1442

1 710-2 170 MHz

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| 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 |
| 1 980-2 010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389B 5.389F |
| 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 |
| 2 025-2 110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392 |
| 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:** To identify the frequency bands 1 710-1 885 MHz, 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz for use by HIBS with the related conditions.

MOD AFS/161A4/6#1444

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. Such use of HIBS in the frequency band 2 110-2 170 MHz is limited to transmission from HIBS. 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 case of unacceptable interference is caused shall immediately reduce the interference to the acceptable level or cease the emission.     (WRC‑23)

**Reasons:** To identify the frequency bands 1 710-1 885 MHz, 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz for use by HIBS with the related conditions.

MOD AFS/161A4/7#1451

2 170-2 520 MHz

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| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 2 500-2 520FIXED 5.410MOBILE except aeronautical mobile 5.384A ADD 5.M14 | 2 500-2 520FIXED 5.410FIXED-SATELLITE (space-to-Earth) 5.415MOBILE except aeronautical mobile 5.384A ADD 5.M14 | 2 500-2 520FIXED 5.410FIXED-SATELLITE (space-to-Earth) 5.415MOBILE except aeronautical mobile 5.384A ADD 5.M14MOBILE-SATELLITE (space-to-Earth) 5.351A 5.407 5.414 5.414A |
| 5.412 |  | 5.404 5.415A |

MOD AFS/161A4/8#1452

2 520-2 700 MHz

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| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 2 520-2 655FIXED 5.410MOBILE except aeronauticalmobile 5.384A ADD 5.M14BROADCASTING-SATELLITE5.413 5.416 | 2 520-2 655FIXED 5.410FIXED-SATELLITE(space-to-Earth) 5.415MOBILE except aeronauticalmobile 5.384A ADD 5.M14BROADCASTING-SATELLITE5.413 5.416 | 2 520-2 535FIXED 5.410FIXED-SATELLITE(space-to-Earth) 5.415MOBILE except aeronauticalmobile 5.384A ADD 5.M14BROADCASTING-SATELLITE5.413 5.416 |
|  |  | 5.403 5.414A 5.415A |
|  |  | 2 535-2 655FIXED 5.410MOBILE except aeronauticalmobile 5.384A ADD 5.M14BROADCASTING-SATELLITE5.413 5.416 |
| 5.339 5.412 5.418B 5.418C | 5.339 5.418B 5.418C | 5.339 5.418 5.418A 5.418B 5.418C |
| 2 655-2 670FIXED 5.410MOBILE except aeronauticalmobile 5.384A ADD 5.M14BROADCASTING-SATELLITE5.208B 5.413 5.416Earth exploration-satellite(passive)Radio astronomySpace research (passive) | 2 655-2 670FIXED 5.410FIXED-SATELLITE(Earth-to-space)(space-to-Earth) 5.415MOBILE except aeronauticalmobile 5.384A ADD 5.M14BROADCASTING-SATELLITE5.413 5.416Earth exploration-satellite(passive)Radio astronomySpace research (passive) | 2 655-2 670FIXED 5.410FIXED-SATELLITE(Earth-to-space) 5.415MOBILE except aeronauticalmobile 5.384ABROADCASTING-SATELLITE 5.208B 5.413 5.416 Earth exploration-satellite(passive)Radio astronomySpace research (passive) |
| 5.149 5.412 | 5.149 5.208B | 5.149 5.420 |
| 2 670-2 690FIXED 5.410MOBILE except aeronautical mobile 5.384A ADD 5.M14Earth exploration-satellite(passive)Radio astronomySpace research (passive) | 2 670-2 690FIXED 5.410FIXED-SATELLITE(Earth-to-space)(space-to-Earth) 5.208B 5.415MOBILE except aeronauticalmobile 5.384A ADD 5.M14Earth exploration-satellite(passive)Radio astronomySpace research (passive) | 2 670-2 690FIXED 5.410FIXED-SATELLITE(Earth-to-space) 5.415MOBILE except aeronauticalmobile 5.384AMOBILE-SATELLITE(Earth-to-space) 5.351A 5.419Earth exploration-satellite(passive)Radio astronomySpace research (passive) |
| 5.149 5.412 | 5.149 | 5.149 |

**Reasons:** To identify the frequency band 2 500-2 690 MHz for use by HIBS with the related conditions.

ADD AFS/161A4/9#1453

5.M14The frequency band 2 500-2 690 MHz in Regions 1 and 2, and the frequency band 2 500-2 655 MHz in Region 3 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 it is allocated and does not establish priority in the Radio Regulations. Resolution **[B14-HIBS 2 500-2 690 MHz] (WRC‑23)** shallapply. Such use of HIBS in the frequency bands 2 500-2 510 MHz in Regions 1 and 2, and 2 500-2 535 MHz in Region 3 is limited to reception by HIBS. 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 case of unacceptable interference is caused shall immediately reduce the interference to the acceptable level or cease the emission.     (WRC‑23)

**Reasons:** To identify the frequency band 2 500-2 690 MHz for use by HIBS with the related conditions.

ARTICLE 11

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

Section I − Notification

MOD AFS/161A4/10#1460

11.26ANotices relating to assignments for high-altitude platform stations as IMT base stations in the frequency bands identified in Nos. **5.C14**, **5.D14**, **5.M14** and **5.388A** shall reach the Bureau not earlier than three years before the assignments are brought into use.     (WRC‑23)

**Reasons:** To identify the frequency bands 694-960 MHz, 1 710-1 885 MHz, 1 885-1 980 MHz, 2 010-2 025 MHz, 2 110-2 170 MHz and 2 500-2 690 MHz for use by HIBS with the related conditions.

ADD AFS/161A4/11#1424

DRAFT NEW RESOLUTION [A14-HIBS 694-960 MHZ] (WRC‑23)

Use of high-altitude platform stations as International Mobile Telecommunications base stations (HIBS) in the frequency
band 694-960 MHz, or portions thereof

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 large areas of low population density;

*b)* that the operation of high-altitude platform stations 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 the approaches to expand 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, HIBS could operate at an altitude down to 18 km;

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

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

*l)* 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],

recognizing

*a)* that, in Article **5** of the Radio Regulations, 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 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;

*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;

*f)* that second harmonics of the HIBS downlink transmissions in the frequency band 805.3-806.9 MHz may cause harmful interference to radio astronomy observations in the frequency band 1 610.6-1 613.8 MHz,

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, in the frequency band 694-862 MHz in accordance with Nos. **5.C14** and **5.D14**, and based on the criteria contained in Annex 1 to this Resolution, administrations implementing HIBS shall seek agreement under No. **9.21** with respect to the aeronautical radionavigation service in the countries mentioned in No. **5.312** of the Radio Regulations;

2 that, in the frequency band 862-960 MHz in accordance with No. **5.C14**, and based on the criteria contained in Annex 2 to this Resolution, administrations implementing HIBS shall seek agreement under No. **9.21** with respect to the aeronautical radionavigation service in the countries mentioned in No. **5.323** of the Radio Regulations;

3 that administrations shall take into account the need to protect existing and planned broadcasting stations, both analogue and digital, except analogue in the GE06 planning area, in the frequency band 470-806/862 MHz, as well as other primary terrestrial services;

4 that, in Region 1 (excluding Mongolia) and in the Islamic Republic of Iran, the implementation of HIBS is subject to the application of procedures contained in the GE06 Agreement; in so doing:

4.1 administrations that deploy HIBS operating in the frequency band 694/698-862 MHz for which coordination was not required, or without having obtained the prior consent of those administrations that may be affected, shall not cause unacceptable interference to, nor claim protection from, stations of the broadcasting service of administrations operating in conformity with the GE06 Agreement; this should include a signed commitment as required under § 5.2.6 of the GE06 Agreement;

4.2 for the implementation of *resolves* 4.1 above, the notifying administrations of HIBS at the time of submission of Appendix**4** information to the Radiocommunication Bureau (BR) shall also submit an objective, measurable and enforceable commitment that, in case of causing unacceptable interference, it undertakes to immediately reduce the interference to an acceptable level or cease that interference; as for enforceability referred to in this *resolves*, should the interference not be ceased or reduced to acceptable level, the assignments in question shall be submitted by the Bureau to the Radio Regulations Board to review for suppression from the Master International Frequency Register (MIFR) and the Bureau’s database;

4.3 administrations that deploy HIBS for which coordination was not required, or without having obtained the prior consent of those administrations that may be affected, shall not object to nor prevent the entry into the GE06 Plan or recording in the Master International Frequency Register (MIFR) of additional future broadcasting allotments or assignments of any other administration in the GE06 Plan with reference to those HIBS;

4.4 the coordination threshold of the power flux-density (pfd) level of −135.8 dB(W/(m2 · Hz)) per HIBS shall be used, instead of those given in Appendix **1** of the GE06 Agreement, which is produced in the territory of other administrations, at the highest of the clutter height or 10 m;

5 that, where the GE06 Agreement does not apply, use of the frequency band 728‑862 MHz by HIBS is subject to agreement obtained under No. **9.21** with respect to the broadcasting service. The coordination threshold of the pfd level of −135.8 dB(W/(m2 · MHz)) which is produced in the territory of other administrations, at the highest of the clutter height or 10 m, per HIBS shall be used;

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

6.1 for the purpose of protecting IMT mobile stations in the territory of other administrations in the frequency band 694-960 MHz, the pfd level per HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limit, unless explicit agreement of the affected administration is provided:

 −114 dB(W/(m2 · MHz)) for 0° < θ ≤ 90°

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

6.2 for the purpose of protecting IMT base stations in the territory of other administrations in the frequency band 694-960 MHz, the pfd level per HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limit, unless explicit agreement of the affected administration is provided:

 −136 + 0.21 (θ)2 dB(W/(m2 · MHz)) for  0° ≤ θ ≤ 8.3°

 −121.8 + 0.08 (θ) dB(W/(m2 · MHz)) for 8.3° < θ ≤ 90°

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

6.3 for the purpose of protecting radio astronomy stations in the frequency band 1 610.6-1 613.8 MHz, the pfd of HIBS downlinks operating in the frequency band 805.3-806.9 MHz shall not exceed the following value in the frequency band 1 610.6-1 613.8 MHz at any radio astronomy station without the explicit agreement of the affected administrations:

 −194 dB(W/(m2 · 20 kHz));

6.4 that *resolves* 6.3 applies at any radio astronomy station that was in operation prior to XX November 2023 and has been notified to the BR in the frequency band 1 610.6-1 613.8 MHz before XX May 2024, or at any radio astronomy station that was notified before the date of receipt of the complete Appendix **4** information for notification, for the HIBS system to which *resolves* 6.3 applies; radio astronomy stations notified after this date may seek an agreement with administrations that have authorized HIBS;

7 that administrations intending to implement 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 the *resolves* above,

resolves further

that, HIBS may operate in the frequency band 694-960 MHz with an altitude from 18 to 20 km, on the condition that HIBS shall not cause harmful interference nor claim protection from existing and planned primary services,

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 MIFR 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 DRAFT NEW RESOLUTION [A14-HIBS 694-960 MHZ] (WRC‑23)

The criteria for identifying potentially affected administrations with respect to the aeronautical radionavigation service in countries listed in No. 5.312

To identify potentially affected administrations when applying the procedure for seeking agreement under No. **9.21** by HIBS in the mobile service with respect to the affected aeronautical radionavigation service (ARNS) station operating in countries mentioned in No.**5.312**, 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 BR the list of administrations with which bilateral agreement has already been reached. BR shall take this into account in determining the administrations with which coordination under No. **9.21** is required.

|  |  |  |
| --- | --- | --- |
| ARNS type | System type code | Coordination distance between nadir of HIBS and ARNS station |
| RSBN | AA8 | 325 km |
| RLS 2 (Type 2) (airborne receiver) | BC | 100 km |
| RLS 2 (Type 2) (ground receiver) | AA2 | 584 km |
| RLS 1 (Type 1 and 2) | AB | 597 km |

ANNEX 2 to DRAFT NEW RESOLUTION [A14-HIBS 694-960 MHZ] (WRC‑23)

The criteria for identifying potentially affected administrations with respect to the aeronautical radionavigation service in countries listed in No. 5.323

To identify potentially affected administrations when applying the procedure for seeking agreement under No. **9.21** by HIBS in the mobile service with respect to the affected aeronautical radionavigation service (ARNS) station operating in countries mentioned in No. **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 BR the list of administrations with which bilateral agreement has already been reached. BR shall take this into account in determining the administrations with which coordination under No. **9.21** is required.

|  |  |  |
| --- | --- | --- |
| ARNS type | System type code | Coordination distance between nadir of HIBS and ARNS station |
| RSBN | AA8 | 325 km |
| RLS 2 (Type 2) (airborne receiver) | BC | 100 km |
| RLS 2 (Type 2) (ground receiver) | AA2 | 584 km |
| RLS 1 (Type 1 and 2) | AB | 597 km |

**Reasons:** To identify the frequency band 694-960 MHz for use by HIBS, with conditions to protect the broadcasting service, IMT mobile stations and base stations, and radio astronomy stations in the frequency band 1 610.6-1 613.8 MHz from second harmonics of the HIBS downlink transmissions in the frequency band 805.3-806.9 MHz. Additionally, to allow HIBS use of the 694‑960 MHz frequency band at altitude between 18 km and 20 km.

MOD AFS/161A4/12#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) 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 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,

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

 −111 dB(W/(m2 · MHz)) for 0° < θ ≤ 90°

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

1.3 for the purpose of protecting IMT base stations in the territory of other administrations in the frequency bands 1 850-1 880 MHz, 1 920-1 980 MHz and 2 010-2 025 MHz, the pfd level per HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limit, unless explicit agreement of the affected administration is provided:

 −131 + 0.21 (θ)2 dB(W/(m2 · MHz)) for  0° ≤ θ ≤ 8.3°

 −116.8 + 0.08 (θ) dB(W/(m2 · MHz)) for 8.3° < θ ≤ 90°

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

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 Region 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 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 pfd level per 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:

 −144 dB(W/(m2 · MHz)) for 0° < θ ≤ 10°

 −144 + 1.6 (θ − 10) dB(W/(m2 · MHz)) for  10° < θ ≤ 25°

 −120 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;

2 that administrations intending to implement 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 the *resolves* above,

resolves further

that HIBS may operate in the frequency bands 1 710‑1 980 MHz, 2 010-2 025 MHz and 2 110‑2 170 MHz with an altitude from 18 to 20 km, on the condition that HIBS shall not cause harmful interference nor claim protection from existing and planned primary services,

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 the *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.

**Reasons:** To identify the frequency bands 1 710-1 885 MHz, 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz for use by HIBS with the related conditions to protect existing primary services.

ADD AFS/161A4/13#1459

DRAFT NEW RESOLUTION [B14-HIBS 2 500-2 690 MHz] (WRC‑23)

Use of high-altitude platform stations as International Mobile Telecommunications base stations (HIBS) in the frequency
band 2 500-2 690 MHz, or portions thereof

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 IMT 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 primary allocated services, and adjacent services in the frequency band 2 500-2 690 MHz;

*i)* 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];

*j)* that the frequency band 2 690-2 700 MHz is allocated to the Earth exploration-satellite service (EESS) (passive), the space research service (SRS) (passive) and the radio astronomy service (RAS), and that No. **5.340** applies in this frequency band;

*k)* that in Regions 1 and 2, the use of the frequency band 2 500-2 510 MHz is limited to reception by HIBS, in accordance with No. **5.M14**,

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 2, the frequency band 2 500-2 690 MHz (2 500-2 510 MHz is limited to reception by HIBS in Regions 1 and 2), and in Region 3, the frequency band 2 500-2 655 MHz (2 500-2 535 MHz is limited to reception by HIBS in Region 3) are included in No. **5.M14** for the use of HIBS;

*c)* that the frequency band 2 500-2 690 MHz, or parts thereof, is identified for IMT in accordance with No. **5.384A**;

*d)* that this frequency band is allocated to the fixed and mobile services on a co-primary basis;

*e)* that, in the frequency band 2 700-2 900 MHz, ground-based meteorological radar stations under the radiolocation service are authorized to operate on a basis of equality with stations of the aeronautical radionavigation service per No. **5.423**,

resolves

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

1.1 for the purpose of protecting IMT mobile stations in the territory of other administrations in the frequency band 2 500-2 690 MHz, the power flux-density (pfd) level per HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limit, unless explicit agreement of the affected administration is provided:

 −109 dB(W/(m2 · MHz)) for 0° < θ ≤ 90°

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

1.2 for the purpose of protecting IMT base stations in the territory of other administrations in the frequency band 2 500-2 690 MHz, the pfd level per HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limit, unless explicit agreement of the affected administration is provided:

 −131 + 0.21 (θ)2 dB(W/(m2 · MHz)) for  0° ≤ θ ≤ 8.3°

 −116.8 + 0.08 (θ) dB(W/(m2 · MHz)) for 8.3° < θ ≤ 90°

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

1.3 for the purpose of protecting fixed-service systems in the territory of other administrations in the frequency band 2 500-2 690 MHz, the pfd level per 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:

 −135 dB(W/(m2 · MHz)) for 0° < θ ≤ 20°

 −135 + 0.7 (θ − 20) dB(W/(m2 · MHz)) for  20° < θ ≤ 47°

 −116 dB(W/(m2 · MHz)) for 47° < θ ≤ 90°

1.4 for the purpose of protecting the broadcasting satellite services in the territory of other administrations in the frequency band 2 520-2 630 MHz, the pfd level per HIBS produced at the surface of the Earth in the territory of other administrations shall not exceed the following limit, unless explicit agreement of the affected administration is provided:

 −130.5 dB(W/(m2 · MHz)) for 0° < θ ≤ 20°

 −139.8 dB(W/(m2 · MHz)) for  20° < θ < 90°

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

1.5 for the purpose of protecting aeronautical-radionavigation service systems in the territory of other administrations in the frequency band 2 700-2 900 MHz, the pfd level from HIBS operating in the frequency band 2 500-2 690 MHz produced at the surface of the Earth in the territory of other administrations shall not exceed the following unwanted emissions limit, unless explicit agreement of the affected administration is provided:

 −156.2 dB(W/(m2 · MHz)) for θ ≤ 7°

 −163 + 15 · *log10* (θ − 4) dB(W/(m2 · MHz)) for  7° < θ < 30.5°

 −141 + 2.7 · *log10* (θ − 4) dB(W/(m2 · MHz)) for   θ = 30.5°

 −157 + 14 · *log10* (θ − 4) dB(W/(m2 · MHz)) for  30.5° < θ ≤ 40.5°

 −101.5 dB(W/(m2 · MHz)) for θ > 40.5°

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

1.6 for the purpose of protecting radiolocation service systems in the territory of other administrations, in particular those systems operating in accordance with No. **5.423**, in the frequency band 2 700-2 900 MHz, the pfd level from HIBS operating in the frequency band 2 500-2 690 MHz produced at the surface of the Earth in the territory of other administrations shall not exceed the following unwanted emissions limit, unless explicit agreement of the affected administration is provided:

 −165.6 dB(W/(m2 · MHz)) for θ ≤ 37°

 −165.6 + 5.5 (θ − 37) dB(W/(m2 · MHz)) for  37° < θ < 45°

 −121.6 + (θ − 45) / 3 dB(W/(m2 · MHz)) for  45° < θ ≤ 90°

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

1.7 for the purpose of protecting radio astronomy service stations in the frequency band 2 690-2 700 MHz, the pfd level of HIBS operating in the frequency band 2 500-2 690 MHz produced at any radio astronomy observatory site shall not exceed the following unwanted emissions limit, unless explicit agreement of the affected administration is provided:

 −177 dB(W/(m2 · 10 MHz))

1.8 that *resolves* 1.7 applies at any radio astronomy station that was in operation prior to XX November 2023 and has been notified to the Radiocommunication Bureau (BR) in the frequency band 2 690-2 700 MHz before XX May 2024, or at any radio astronomy station that was notified before the date of receipt of the complete Appendix **4** information for notification, for the HIBS system to which *resolves* 1.7 applies; radio astronomy stations notified after this date need to seek an agreement with administrations that have notified HIBS;

1.9 that for the purpose of protecting the mobile-satellite service (space-to-Earth) and radiodetermination-satellite service (space-to-Earth) in the frequency band 2 483.5-2 500 MHz, the use of HIBS platform in the frequency band 2 500-2 690 MHz shall comply with an unwanted emission limit of −13 dBm/MHz in the frequency band 2 483.5-2 500 MHz;

2 that administrations intending to implement 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 the *resolves* above,

resolves further

that HIBS may operate in the frequency band 2 500-2 690 MHz with an altitude from 18 to 20 km, on the condition that HIBS shall not cause harmful interference nor claim protection from existing and planned primary services,

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 the *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.

**Reasons:** To identify the frequency band 2 500-2 690 MHz for use by HIBS with the related conditions to protect existing primary services. Additionally, to protect the radiolocation service, radio astronomy service, as well as mobile-satellite service and radiodetermination-satellite service in adjacent bands.

SUP AFS/161A4/14#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:** Resolution **247 (WRC-19)**, which established this agenda item, is not necessary after WRC‑23.

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