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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 99-E** |
|  | **27 October 2023** |
|  | **Original: English** |
|  |
| Japan |
| 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 Japan for WRC-23 agenda item 1.4.

Proposal

Japan supports the use of HIBS in the frequency band 694-960 MHz, or portions thereof, globally including the countries listed in No. **5.313A** of the Radio Regulations (RR) through Method A3 with the following views on Examples under the respective conditions in the draft Resolution **[A14-HIBS 694-960 MHZ]** **(WRC-23)** contained in the CPM Report.

| Provisions | Supported Example | Reasons |
| --- | --- | --- |
| *resolves* 1 and 2 | Protection measures for aeronautical radionavigation service in the countries mentioned in RR Nos. **5.312** and **5.323** | Example 1 | *The coordination thresholds were based on ITU-R studies. Example 2 would stipulate the separation distance (hard limit) for the frequency band 862-960 MHz since sharing study was not conducted. However, system characteristics of ARNS in this band was not provided by Working Party (WP) 5B. Example 1 proposes to stipulate RR No.* ***9.21*** *with the coordination distance in this band to consider the protection of ARNS case by case basis.* |
| *resolves* 3 to 5 | Protection measures for the broadcasting service in the frequency band 694-862 MHz | Example 2 | *Coordination scheme (i.e. RR No.* ***9.21****) in Example 2 would be a reasonable solution for the sharing between HIBS and the broadcasting services given the fact that such a bilateral coordination scheme has already been adopted in certain area for frequency sharing between the broadcasting services and other primary services under GE06 agreement.**Example 3 stipulates the pfd limit for the protection of the broadcasting services. However, pfd limit shall apply to all the countries which have registered the frequencies above 694 MHz for the broadcasting services in MIFR despite that some countries have already reallocated the broadcasting services to below 694 MHz. This situation would provide excessive regulatory constraints on HIBS introduction.* |
| *considering further**resolves* 6.1 and 6.2 | Protection measures for IMT in the frequency band 694-960 MHz | Example 1 for *considering further* and Example 2 for *resolves*6.1 and 6.2 | *pfd limits in Example 2 are based on ITU-R study, while example 3 are only proposed values without any technical justification. In addition, these values stipulate the unified limits to protect both UE and BS, however the value for the protection of BS is overprotective for UE since their characteristics are different. Appropriate conditions should be stipulated according to the IMT frequency arrangement that employed in each country. Furthermore, the aggregate pfd limits would not be applicable since the methodology for examining multiple HIBS to comply with these limits have not been established.* |
| *recognizing f)**resolves* 6.3 and 6.4 | Protection measures for the radio astronomy service operating in the frequency band 1 610.6-1 613.8 MHz from the second harmonic of HIBS emissions in the frequency band 805.3-806.9 MHz | Example 2 for *recognizing f)* and Example 1 for *resolves*6.3 and 6.4 | *Different views were expressed on whether the study regarding 2nd harmonics between the radio astronomy service in the frequency band 1 610.6-1 613.8 MHz and HIBS BS operating in the frequency range 694-960 MHz is outside of the scope of WRC 23 agenda item 1.4. Example 2 could be a middle ground between the two sides of the conflict. In CPM23-2, it was pointed out that there would be difficulties in areas such as Europe where a 100 km separation distance is not possible. However, there is no particular problem since the subject frequencies do not have to be used in areas where such a separation distance cannot be ensured.* |
| *resolves further* | Regulatory conditions for HIBS operation at altitude from 18 km to 20 km | Example for Methods A2 and A4 | *ITU-R study indicates that HIBS may be operated at an altitude of 18 km, and even in that case, the impact on interference would be negligible.**However, this deviates from the 20-50 km operational altitude for high altitude platform stations defined in RR No.****1.66A****. Therefore, when HIBS is operated at an altitude of 18-20 km, HIBS shall not cause harmful interference nor claim protection from existing and planned primary services,* |
| *invites administrations* 1 | Adoption of appropriate frequency arrangements for HIBS | Example 2 | *Considering that ITU-R studies were conducted based on the assumption of the same frequency arrangement as terrestrial IMT, it is appropriate to invite administrations to adopt a frequency arrangement for HIBS.* |

ARTICLE 5

Frequency allocations

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

MOD J/99A4/1#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 |

**Reasons:** It is proposed that the use of high-altitude platform stations as IMT base stations (HIBS) in the mobile service in the frequency band 694-960 MHz, or portions thereof, on a global level, including the countries listed in RR No. **5.313A**, based on Method A3 in the CPM Report.

MOD J/99A4/2

890-1 300 MHz

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| --- |
| 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:** It is proposed that the use of high-altitude platform stations as IMT base stations (HIBS) in the mobile service in the frequency band 694-960 MHz, or portions thereof, on a global level, including the countries listed in RR No. **5.313A**, based on Method A3 in the CPM Report.

ADD J/99A4/3#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 unacceptable interference is caused, it 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:** It is proposed that the use of high-altitude platform stations as IMT base stations (HIBS) in the mobile service in the frequency band 694-960 MHz, or portions thereof, on a global level, including the countries listed in RR No. **5.313A**, based on Method A3 in the CPM Report.

ADD J/99A4/4#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 unacceptable interference is caused, it 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:** It is proposed that the use of high-altitude platform stations as IMT base stations (HIBS) in the mobile service in the frequency band 694-960 MHz, or portions thereof, on a global level, including the countries listed in RR No. **5.313A**, based on Method A3 in the CPM Report.

ARTICLE 11

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

Section I − Notification

MOD J/99A4/5

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:** It is proposed that the use of high-altitude platform stations as IMT base stations (HIBS) in the mobile service in the frequency band 694-960 MHz, or portions thereof, on a global level, including the countries listed in RR No. **5.313A**, based on Method A3 in the CPM Report.

ADD J/99A4/6#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, is 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 the spurious emission limit of −85 dBW/MHz and 100 km separation distance is sufficient for ensuring the protection of the radio astronomy service operating in the frequency band 1 610.6-1 613.8 MHz from the second harmonic of HIBS emissions in the frequency band 805.3-806.9 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 an 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 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 power flux-density (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 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:

 −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 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:

 −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;

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 to, 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 (Types 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.

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

**Reasons:** It is proposed that the use of high-altitude platform stations as IMT base stations (HIBS) in the mobile service in the frequency band 694-960 MHz, or portions thereof, on a global level, including the countries listed in RR No. **5.313A**, based on Method A3 in the CPM Report.

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