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| **World Radiocommunication Conference (WRC-19) Sharm el-Sheikh, Egypt, 28 October – 22 November 2019** |  |
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|  |  |
| PLENARY MEETING | **Addendum 14 to Document 33-E** |
|  | **1 October 2019** |
|  | **Original: English** |
|  | |
| France | |
| Proposals for the work of the conference | |
|  | |
| Agenda item 1.14 | |

1.14 to consider, on the basis of ITU-R studies in accordance with Resolution **160 (WRC‑15)**, appropriate regulatory actions for high-altitude platform stations (HAPS), within existing fixed-service allocations;

Introduction

There are interests in the development of HAPS applications in the French territories of Region 2. Therefore, France is pleased to submit this proposal addressing agenda item 1.14 of the 2019 World Radiocommunication Conference on facilitating access to broadband applications by high-altitude platform stations (HAPS) in Region 2 in the bands 21.4-22 GHz, 24.25-27.5 GHz.

Background

*Resolves* 4 of Resolution **160 (WRC-15)**, invites ITU-R to study frequency bands for new HAPS identifications*.* Two of the frequency bands listed are limited to Region 2: 21.4-22 GHz and 24.25-27.5 GHz. Based on the results of the sharing studies, France supports the identification of HAPS in the bands:

– 21.4-22GHz (limited to downlink), 24.25-25.25 GHz (limited to downlink), 25.25-25.5 GHz (limited to uplink) and 27-27.5 GHz (limited to downlink).

In addition, based on the results of the sharing studies, France proposes that the identifications be accompanied by appropriate protection of:

– Earth exploration-satellite service (EESS) (passive) in the frequency bands 21.2‑21.4 GHz, 22.21-22.5 GHz and 23.6-24 GHz,

– EESS and space research service (SRS) (space-to-Earth) in the frequency band 25.5-27 GHz,

– Inter-satellite service (ISS) in the frequency band 24.45-24.75 GHz,

– ISS in the frequency band 25.25-27.5 GHz,

– FSS in the frequency bands 24.75‑25.25 GHz and 27-27.5 GHz.

It is noted that France fully supports under agenda item 1.13 the worldwide identification of the frequency band 24.25-27.5 GHz for IMT.

The proposals are based on the following methods of the CPM:

| Annex | Bands/Topics | CPM Report corresponding section  (1/1.14/) | Corresponding CPM Method |
| --- | --- | --- | --- |
| Annex 1 | 21.4-22 GHz in Region 2 | 4.3/5.3 | B2 option 1a |
| Annex 2 | 24.25-27.5 GHz in Region 2 | 4.4/5.4 4.5/5.5 | 24.25-25.25 GHz : B3 option 1 25.25-27.5 GHz : B2 option 1 |
| Annex 3 | MOD to Article 11 | 5.10 |  |
| Annex 4 | MOD to Appendix 4 | 5.11 |  |
| Annex 5 | MOD to Appendix 7 | 5.12 |  |

Proposals

WRC-19 is invited to consider the proposal for the identification of High Altitude Platform Stations (HAPS), within existing fixed-service allocations, in Region 2 in the bands 21.4-22 GHz, 24.25-25.5 GHz and 27-27.5 GHz.

**Attachment:** 5 annexes

annex 1

Bands 21.4-22 GHz

ARTICLE 5

Frequency allocations

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

MOD F/33A14/1#49745

18.4-22 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 21.4-22  FIXED  MOBILE  BROADCASTING-SATELLITE 5.208B  5.530A 5.530B 5.530D | 21.4-22  FIXED ADD 5.B114  MOBILE  5.530A | 21.4-22  FIXED  MOBILE  BROADCASTING-SATELLITE 5.208B  5.530A 5.530B 5.530D 5.531 |

ADD F/33A14/2#49746

5.B114The allocation to the fixed service in the band 21.4-22 GHz is identified for use in Region 2 by high-altitude platform stations (HAPS). Such use of the fixed-service allocation by HAPS is limited to the HAPS-to-ground direction and shall be in accordance with the provisions of Resolution**[F/A114] (WRC‑19)**.     (WRC‑19)

ADD F/33A14/3#49749

DRAFT NEW RESOLUTION [F/A114] (WRC‑19)

Use of the bands 21.4-22 GHz by high-altitude platform   
stations in the fixed service for Region 2

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

considering

*a)* that WRC‑15 considered that there is a need for greater broadband connectivity in underserved communities and in rural and remote areas, that current technologies can be used to deliver broadband applications by high-altitude platform stations (HAPS), which can provide broadband connectivity and disaster recovery communications with minimal ground network infrastructure;

*b)* that WRC‑15 decided to study additional spectrum needs for fixed HAPS links to provide broadband connectivity, including within the band 21.4-22 GHz in Region 2, recognizing that the existing HAPS identifications were established without reference to today’s broadband capabilities;

*c)* that HAPS can provide broadband connectivity with minimal ground network infrastructure;

*d)* that ITU‑R has conducted studies dealing with compatibility between systems using HAPS and existing services in the band 21.4-22 GHz in Region 2 leading to Report ITU‑R F.[HAPS-21],

recognizing

Note: No text has been developed, it may be proposed in contributions to WRC-19.

resolves

1 that for the purpose of protecting fixed service systems in territory of other administrations in the band 21.4-22 GHz, the power flux-density level per HAPS at the surface of the Earth in territory of other administrations shall not exceed the following limits, under clear-sky conditions, unless the explicit agreement of the affected administration is provided at the time of notification of HAPS:

0.7 θ − 135 dB(W/(m² · MHz)) for 0° ≤ θ < 10°

2.4 θ − 152 dB(W/(m² · MHz)) for 10° ≤ θ < 20°

0.45 θ − 113 dB(W/(m² · MHz)) for 20° ≤ θ < 60°

−86 dB(W/(m² · MHz)) for 60° ≤ θ ≤ 90°

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

The pfd mask above is derived under clear sky conditions, therefore, in order to compensate for additional propagation impairments in the boresight of any beam due to rain, the HAPS can be operated so that the e.i.r.p. of the corresponding beam (i.e. suffering the rain fade) can be increased by a value only equivalent to the level of rain fading and limited to a maximum of 20 dB above the e.i.r.p. corresponding to the pfd mask.

To verify the compliance with the proposed pfd mask the following equation shall be used:



where:

*d*: distance in metres between the HAPS and the ground (elevation angle dependent);

*e.i.r.p.*: HAPS nominal e.i.r.p. density in dB(W/MHz) (dependent to the elevation angle θ);

*pfd*(θ): is the power flux-density at the Earth’s surface per HAPS in dB(W/(m2 · MHz)).

2 that for the purpose of protecting the Earth exploration-satellite (passive) service in the bands 21.2-21.4 GHz and 22.21-22.5 GHz, the e.i.r.p. density in the bands 21.2-21.4 GHz and 22.21-22.5 GHz per HAPS operating in the band 21.4-22 GHz, shall not exceed:

−0.76 θ − 9.5 dB(W/100 MHz) for −4.53° ≤ θ < 35.5°

−36.5 dB(W/100 MHz) for 35.5° ≤ θ ≤ 90°

where θ is the elevation angle (°) at the platform height;

3 that in order to ensure the protection of the radio astronomy service, the unwanted emission power flux density produced by HAPS downlink transmissions shall not exceed −176 dB(W/(m2 · 290 MHz)) for continuum observations, and −192 dB(W/(m2 · 250 kHz)) for spectral line observations in the band 22.21-22.5 GHz at an RAS station location at a height of 50 m. This limit relates to the power flux-density which would be obtained using a time percentage of 2% in the relevant propagation model;

To verify the compliance, the following formula shall be used:



where:

*e.i.r.p.*nominal *clear sky*: is the nominal unwanted emission e.i.r.p. density towards the RAS station at which the HAPS operates under clear-sky conditions in dB(W/290 MHz) for continuum observations and in dB(W/250 kHz) for spectral line observations in the band 22.21-22.5 GHz;

*Az*: is the azimuth from the HAPS toward the RAS station;

θ: is the elevation angle at the HAPS towards the RAS station;

*Att*618*p=*2%: is the attenuation from Recommendation ITU-R P.618 corresponding to *P* = 2% of the time at the radio astronomy location;

*d*: is the separation distance in m between the HAPS platform;

*GasAtt*(θ): is gaseous attenuation for elevation θ (Rec. ITU‑R SF.1395).

4 that *resolves*3 shall apply at any radio astronomy station that was in operation prior to 22 November 2019; and that has been notified to the Bureau in the band 22.21-22.5 GHz before 22 May 2020, or at any radio astronomy station that was notified before the date of receipt of the complete Appendix **4** information for notification for the HAPS system to which *resolves* 3 applies. Radio astronomy stations notified after this date may seek an agreement with administrations that have notified HAPS;

5 that administrations planning to implement a HAPS system in the 21.4-22 GHz shall notify the frequency assignments by submitting all mandatory elements of Appendix **4** to the Bureau for the examination of compliance with respect to the Radio Regulations with a view to their registration in the Master International Frequency Register,

instructs the Director of the Radiocommunication Bureau

to take all necessary measures to implement this Resolution.

ANNEX 2

Band 24.25-27.5 GHz

ARTICLE 5

Frequency allocations

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

MOD F/33A14/4#49752

22-24.75 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 24.25-24.45  FIXED | 24.25-24.45  FIXED ADD 5.C114  RADIONAVIGATION | 24.25-24.45  RADIONAVIGATION  FIXED  MOBILE |
| 24.45-24.65  FIXED  INTER-SATELLITE | 24.45-24.65  FIXED ADD 5.C114  INTER-SATELLITE  RADIONAVIGATION | 24.45-24.65  FIXED  INTER-SATELLITE  MOBILE  RADIONAVIGATION |
|  | 5.533 | 5.533 |
| 24.65-24.75  FIXED  FIXED-SATELLITE (Earth-to-space) 5.532B  INTER-SATELLITE | 24.65-24.75  FIXED ADD 5.C114  INTER-SATELLITE  RADIOLOCATION- SATELLITE (Earth-to-space) | 24.65-24.75  FIXED  FIXED-SATELLITE (Earth-to-space) 5.532B  INTER-SATELLITE  MOBILE |
|  |  | 5.533 |

MOD F/33A14/5#49753

24.75-29.9 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 24.75-25.25  FIXED  FIXED-SATELLITE (Earth-to-space) 5.532B | 24.75-25.25  FIXED ADD 5.C114  FIXED-SATELLITE (Earth-to-space) 5.535 | 24.75-25.25  FIXED  FIXED-SATELLITE (Earth-to-space) 5.535  MOBILE |

MOD F/33A14/6

24.75-29.9 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 25.25-25.5 FIXED ADD 5.D114  INTER-SATELLITE 5.536  MOBILE  Standard frequency and time signal-satellite (Earth-to-space) | | |
| 25.5-27EARTH EXPLORATION-SATELLITE (space-to Earth) 5.536B  FIXED  INTER-SATELLITE 5.536  MOBILE  SPACE RESEARCH (space-to-Earth) 5.536C  Standard frequency and time signal-satellite (Earth-to-space)  5.536A | | |
| 27-27.5  FIXED  INTER-SATELLITE 5.536  MOBILE | 27-27.5  FIXED ADD 5.D114  FIXED-SATELLITE (Earth-to-space)  INTER-SATELLITE 5.536 5.537  MOBILE | |

ADD F/33A14/7#49754

5.C114The allocation to the fixed service in the band 24.25-25.25 GHz is identified for and limited to use in Region 2 by high-altitude platform stations (HAPS). Such use of the fixed-service allocation by HAPS is limited to the HAPS-to-ground direction, and shall be in accordance with the provisions of Resolution **[F/B114] (WRC‑19)**.     (WRC‑19)

ADD F/33A14/8#49760

5.D114The allocation to the fixed service in the bands 25.25-25.5 GHz and 27‑27.5 GHz is identified for use in Region 2 by high-altitude platform stations (HAPS). Such use of the fixed-service allocation by HAPS is limited to the ground-to-HAPS direction in the band 25.25‑25.5 GHz, to the HAPS-to-ground direction in the band 27-27.5 GHz, and is subject to the provisions of Resolution **[F/B114] (WRC‑19)**.     (WRC‑19)

ADD F/33A14/9#49756

DRAFT NEW RESOLUTION [F/B114] (WRC‑19)

Use of the bands 24.25-25.5 GHz and 27-27.5 GHz by high-altitude   
platform stations in the fixed service in Region 2

The World Radiocommunication Conference (Sharm el-Sheikh, 2019),

considering

*a)* that WRC‑15 considered that there is a need for greater broadband connectivity in under-served communities and in rural and remote areas, that current technologies can be used to deliver broadband applications by high-altitude platform stations (HAPS), which can provide broadband connectivity and disaster recovery communications with minimal ground network infrastructure;

*b)* that WRC‑15 decided to study additional spectrum needs for fixed HAPS links to provide broadband connectivity, including the band 24.25-27.5 GHz in Region 2, recognizing that the existing HAPS identifications were established without reference to today’s broadband capabilities;

*c)* that HAPS can provide broadband connectivity with minimal ground network infrastructure;

*d)* that ITU‑R has conducted studies dealing with compatibility between HAPS systems and systems in existing services in the 24.25-27.5 GHz band and in adjacent band in Region 2 leading to Report ITU‑R F.[HAPS-25 GHz],

recognizing

*a)* that in the bands 24.75-25.25 GHz and 27.0-27.5 GHz with respect to earth stations in the fixed-satellite service (Earth-to-space) and HAPS ground station receivers which operate in the fixed service, No. **9.17** applies;

*b)* that HAPS is defined in No. **1.66A** of the Radio Regulations as a station located on an object at an altitude of 20-50 km and at a specified, nominal, fixed point relative to the Earth, and is subject to No. **4.23**,

resolves

1 that for the purpose of protecting the fixed service systems in territory of other administrations in the bands 27-27.5 GHz, the power flux-density limit per HAPS at the surface of the Earth in territory of other administrations shall not exceed the following limits, under clear-sky conditions, unless the explicit agreement of the affected administration is provided at the time of notification of HAPS:

0.39 θ − 132.12 dB(W/(m2 ⋅ MHz)) for 0° ≤ θ < 13°

2.715 θ − 162.3 dB(W/(m2 ⋅ MHz)) for 13° ≤ θ < 20°

0.45 θ − 117 dB(W/(m2 ⋅ MHz)) for 20° ≤ θ < 60°

−90 dB(W/(m2 ⋅ MHz)) for 60° ≤ θ ≤ 90°

where θ is the elevation angle in degrees (angles of arrival above the horizontal plane).

The pfd mask above is derived under clear sky conditions, therefore, in order to compensate for additional propagation impairments in the boresight of any beam due to rain, the HAPS can be operated so that the e.i.r.p. of the corresponding beam (i.e. suffering the rain fade) can be increased by a value only equivalent to the level of rain fading and limited to a maximum of 20 dB above the e.i.r.p. corresponding to the pfd mask.

To verify the compliance with the proposed pfd mask the following equation shall be used:



where:

*e.i.r.p.*: is the nominal HAPS e.i.r.p. density level in dB(W/MHz) (dependent to the elevation angle θ);

*d*: is the distance in metres between the HAPS and the ground (elevation angle dependent);

*pfd*(θ):power flux-density at the Earth’s surface per HAPS in dB(W/(m2 · MHz));

2 that for the purpose of protecting the mobile service systems in territory of other administrations in the bands 24.25-25.25 GHz and 27-27.5 GHz, the power flux-density limit per HAPS at the surface of the Earth in territory of other administrations shall not exceed the following limits, under clear-sky conditions, unless the explicit agreement of the affected administration is provided at the time of notification of HAPS:

0.95 θ − 114 dB(W/(m2 · MHz)) for 0° ≤ θ < 5.7°

0.6 θ − 112 dB(W/(m2 · MHz)) for 5.7° ≤ θ ≤ 20°

−100 dB(W/(m2 · MHz)) for 20° ≤ θ ≤ 90°

where θ is the elevation angle in degrees (angle of arrival above the horizontal plane).

The pfd mask above is derived under clear sky conditions, therefore, in order to compensate for additional propagation impairments in the boresight of any beam due to rain, the HAPS can be operated so that the e.i.r.p. of the corresponding beam (i.e. suffering the rain fade) can be increased by a value only equivalent to the level of rain fading.

To verify the compliance with the proposed pfd mask the following equation shall be used:



where:

*d*: distance in metres between the HAPS and the ground (elevation angle dependent);

*e.i.r.p*.: HAPS nominal e.i.r.p. spectral density in dB(W/MHz) at a specific elevation angle;

*pfd*(θ): power flux-density at the Earth’s surface per HAPS station in dB(W/(m2 · MHz));

3 that for the purpose of protecting the inter-satellite service, the e.i.r.p. density per HAPS in the frequency bands 27-27.5 GHz, shall not exceed −70.7 dB(W/Hz) for off-nadir angle higher than 85.5°;

4 that for the purpose of protecting the inter-satellite service, the e.i.r.p. density per HAPS in the frequency bands 24.45-24.75 GHz, shall not exceed −19.9 dB(W/MHz) for off-nadir angle higher than 85.5°;

5 that for the purpose of protection the inter‑satellite service, the e.i.r.p. density per HAPS ground station in the frequency band 25.25-25.5 GHz, shall not exceed 12.3 dB(W/MHz) under clear-sky conditions.

In addition, maximum e.i.r.p. density in the frequency band 25.25-25.5 GHz density of HAPS ground stations should not exceed 0.5 dB(W/MHz) in clear sky conditions in the direction of geostationary arc. It is also needed to take into account possible orbit inclination of space stations between −5° and 5°.

During raining conditions the e.i.r.p. density can be increased by a value only equivalent to the level of rain fading and limited to a maximum of 20 dB.

6 that for the purpose of protecting the fixed-satellite service, the e.i.r.p. density per HAPS , in the bands 24.75-25.25 and 27-27.5 GHz, shall not exceed −9.1 dB(W/MHz) for off‑nadir angles higher than 85.5°;

7 that for the purpose of protecting the Earth exploration-satellite (passive) service in the frequency band 23.6-24 GHz, the e.i.r.p. density in the frequency band 23.6-24 GHz per HAPS operating in the frequency band 24.25-25.25 GHz, shall not exceed:

−0.7714 θ − 16.5 dB(W/200 MHz) for −4.53° ≤ θ < 35°

−43.5 dB(W/200 MHz) for 35° ≤ θ ≤ 90°

where θ is the elevation angle in degrees (angles of arrival above the horizontal plane);

8 that in order to ensure the protection of the radio astronomy service, the power flux-density produced by unwanted emissions from HAPS downlink transmissions operating in the band 24.25-25.25 GHz shall not exceed −177 dB(W/(m2 · 400 MHz)) for continuum observations and −191 dB(W/(m2 · 250 kHz)) for spectral line observations in the band 23.6-24 GHz at an RAS station location at the height of 50 m. This limit relates to the power flux-density which would be obtained using a time percentage of 2% in the relevant propagation model;

To verify the compliance the following formula shall be used:



where:

*e.i.r.p.*nominal *clear sky*: is the nominal unwanted emission e.i.r.p. density towards the RAS station at which the HAPS operates under clear-sky conditions in dB(W/400 MHz) for continuum observations and in dB(W/250 kHz) for spectral line observations in the band 23.6-24 GHz;

*Az*: is the azimuth in degrees from the HAPS toward the RAS station;

θ: is the elevation angle in degrees at the HAPS towards the RAS station;

*Att*618*p=*2%: is the attenuation in dB from Recommendation ITU‑R P.618 corresponding to *p* = 2% of the time at the radio astronomy location;

*d*: is the separation distance in metres between the HAPS and the RAS station;

*pfd*:power flux-density at the Earth’s surface per HAPS in dB(W/(m2 · 400 MHz)) for continuum observations and in dB(W/(m2 · 250 kHz)) for spectral line observations in the band 23.6-24 GHz;

*GasAtt*(θ)*:* is gaseous attenuation for elevation θ (Rec. ITU-R SF.1395);

9 that with respect to HAPS, the provisions of No. **5.536A** shall not apply;

10 that *resolves* 8 shall apply at any radio astronomy station that was in operation prior to 22 November 2019 and has been notified to the Bureau in the band 23.6-24 GHz before 22 May 2020, or at any radio astronomy station that was notified before the date of receipt of the complete Appendix **4** information for notification, for the HAPS system to which *resolves* 8 applies. Radio astronomy stations notified after this date may seek an agreement with administrations that have authorized HAPS;

11 that administrations planning to implement a HAPS system in the bands 24.25-25.5 GHz and 27-27.5 GHz shall notify the frequency assignments by submitting all mandatory elements of Appendix **4** to the Bureau for the examination of compliance with respect to the Radio Regulations with a view to their registration in the Master International Frequency Register,

instructs the Director of the Radiocommunication Bureau

to take all necessary measures to implement this Resolution.

ANNEX 3

ARTICLE 11

Notification and recording of frequency   
assignments1, 2, 3, 4, 5, 6, 7, 8    (WRC‑15)

Section I − Notification

MOD F/33A14/10

11.26 Notices relating to assignments for high-altitude platform stations in the fixed service in the bands identified in Nos. **5.B114, 5.C114, 5.D114**,and 5.552A shall reach the Bureau not earlier than five years before the assignments are brought into use.    (WRC‑19)

ANNEX 4

APPENDIX 4 (REV.WRC‑15)

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-1)1

Footnotes to Tables 1 and 2

MOD F/33A14/11

TABLE 2

Characteristics for high altitude platform stations (HAPS) frequency assignments  
in the terrestrial services

…

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1.14.f | a commitment that the e.i.r.p. density per HAPS in the bands 21.2-21.4 GHz and 22.21-22.5 GHz does not exceed -0.76 θ – 9.5 dB(W/100 MHz) for angles of arrival between –4.53° and 35.5° and  –36.5 dB(W/100 MHz) for angles of arrival between 35.5° and 90° (see draft new Resolution **[F/A114] (WRC‑19)**)  Required in the band 21.4-22 GHz |  |  | **+** |  | 1.14.f |
| 1.14.g | a commitment that the unwanted emission power-flux density produced by HAPS does not exceed −176 dB(W/(m² · 290 MHz)) for continuum observations, and −192 dB(W/(m² ⋅ 250 kHz)) for spectral line observations in the band 22.21-22.5 GHz at an RAS station location at a height of 50 m (see draft new Resolution **[F/A114] WRC‑19)**)  Required in the band 21.4-22 GHz |  |  | **+** |  | 1.14.g |
| 1.14.h | a commitment that the e.i.r.p. density per HAPS does not exceed −70.7 dB(W/Hz) for off-nadir angles higher than 85° (see draft new Resolution  **[F/B114] (WRC‑19)**)  Required in the band 27-27.5 GHz |  |  | + |  | 1.14.h |
| 1.14.i | a commitment that the e.i.r.p. density per HAPS does not exceed −19.9 dB(W/MHz) for off-nadir angles higher than 85° (see draft new Resolution **[F/B114] (WRC‑19)**)  Required in the bands 24.45-24.75 GHz |  |  | + |  | 1.14.i |
| 1.14.j | a commitment that the e.i.r.p. density per HAPS ground station does not exceed 12.3 dB(W/MHz) under clear-sky conditions, the e.i.r.p. limit can be increased by 20 dB only to compensate for rain fade (see draft new Resolution **[F/B114] (WRC‑19)**)  Required in the bands 25.25-25.5 GHz |  |  | + |  | 1.14.j |
| 1.14.k | a commitment that the e.i.r.p. density per HAPS does not exceed −9.1 dB(W/MHz) for off-nadir angles higher than 85.5° (see draft new Resolution **[F/B114] (WRC‑19)**)  Required in the bands 24.25-25.25 and 27-27.5 GHz |  |  | + |  | 1.14.k |
| 1.14.l | a commitment that the e.i.r.p. density per HAPS in the band 23.6-24.2 GHz does not exceed −0.7714 θ − 16.5 dB(W/200 MHz) for angles of arrival between −4.53° and 35° and −43.5 dB(W/100 MHz) for angles of arrival between 35° and 90° (see draft new Resolution **[F/B114] (WRC‑19)**)  Required in the bands 24.25-25.25 GHz |  |  | + |  | 1.14.l |
| 1.14.m | a commitment that the power flux-density produced by unwanted emissions from HAPS does not exceed −177 dB(W/(m² · 400 MHz)) for continuum observations and −191 dB(W/(m² · 250 kHz)) for spectral line observations in the band 23.6-24 GHz at an RAS station location at the height of 50 m (see draft new Resolution **[F/B114] (WRC‑19)**)  Required in the bands 24.25-25.25 GHz |  |  | + |  | 1.14.m |
| 1.14.n | a commitment that the power flux-density produced by a HAPS or HAPS ground station shall not exceed the following values at the SRS/EESS earth stations:  For SRS:  For EESS NGSO:  For EESS GSO:  where is the angle of arrival () of the interfering signal above the local horizontal plane at the SRS or EESS antenna.  Required in the band 25.5-27.0 GHz. |  |  | + |  | 1.14n |

…

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 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 bands 21.4-22 GHz, 24.25-25.25 GHz, 27-27.5 GHz.…  In the case of a receiving HAPS, required in the bands 47.2-47.5 GHz and 47.9-48.2 GHz | **X** |  |  | **X** | 3.8.BA |

…

ANNEX 5

APPENDIX 7 (REV.WRC‑15)

Methods for the determination of the coordination area around an earth  
station in frequency bands between 100 MHz and 105 GHz

ANNEX 7

System parameters and predetermined coordination distances for determination of the coordination area around an earth station

# 3 Horizon antenna gain for a receiving earth station with respect to a transmitting earth station

MOD F/33A14/12#49812

TABLE 7c    (Rev.WRC‑19)

Parameters required for the determination of coordination distance for a transmitting earth station

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Transmitting space radiocommunication service designation | | Fixed- satellite | Fixed- satellite | Fixed- satellite 2 | Fixed- satellite 3 | Space research | Earth  exploration-satellite, space research | Fixed-satellite, mobile-satellite, radionavigation-satellite | Fixed- satellite 2 | |
| Frequency bands (GHz) | | 24.65-25.25 27.0-29.5 | 24.65-25.25 27-27.5 27.9-28.2 | 28.6-29.1 | 29.1-29.5 | 34.2-34.7 | 40.0-40.5 | 42.5-47 47.2-50.2 50.4-51.4 | 47.2-50.2 | |
| Receiving terrestrial  service designations | | Fixed (except HAPS), mobile | Fixed (HAPS ground station) | Fixed, mobile | Fixed, mobile | Fixed, mobile, radiolocation | Fixed, mobile | Fixed, mobile, radionavigation | Fixed, mobile | |
| Method to be used | | § 2.1 | § 2.1 | § 2.2 | § 2.2 |  | § 2.1, § 2.2 | § 2.1, § 2.2 | § 2.2 | |
| Modulation at terrestrial station 1 | | N | N | N | N |  | N | N | N | |
| Terrestrial station interference parameters and criteria | *p*0 (%) | 0.005 | 0.01 | 0.005 | 0.005 |  | 0.005 | 0.005 | 0.001 | |
| *n* | 1 | 1 | 2 | 1 |  | 1 | 1 | 1 | |
| *p* (%) | 0.005 | 0.005 | 0.0025 | 0.005 |  | 0.005 | 0.005 | 0.001 | |
| *NL* (dB) | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | |
| *Ms* (dB) | 25 | 10 | 25 | 25 |  | 25 | 25 | 25 | |
| *W* (dB) | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | |
| Terrestrial station parameters | *Gx* (dBi) 4 | 50 | 0 5 | 50 | 50 |  | 42 | 42 | 46 | |
| *Te* (K) | 2 000 | 350 | 2 000 | 2 000 |  | 2 600 | 2 600 | 2 000 | |
| Reference bandwidth | *B* (Hz) | 106 | 106 | 106 | 106 |  | 106 | 106 | 106 | |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* | −111 | −134 | −111 | −111 |  | −110 | −110 | −111 | |
| 1 A: analogue modulation; N: digital modulation.  2 Non-geostationary satellites in the fixed-satellite service.  3 Feeder links to non-geostationary-satellite systems in the mobile-satellite service.  4 Feeder losses are not included.  5 Maximum HAPS ground station antenna gain toward the horizon. | | | | | | | | | |

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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-1)