|  |  |
| --- | --- |
| **World Radiocommunication Conference (WRC-19)Sharm el-Sheikh, Egypt, 28 October – 22 November 2019** |  |
|  |  |
|  | CPG(18)073 ANNEX V-14 |
| PLENARY MEETING | **Addendum 14 to****Document xxx-E** |
|  | **Date 2018** |
|  | **Original: English** |
|  |
| European Common Proposals |
| 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

– CEPT supports, while ensuring protection of existing services and their future development including other applications of the fixed service (in accordance with Resolution 160 (WRC-15)) and subject to the conclusions of the ongoing sharing and co-existence studies for the bands mentioned below and, as appropriate, in the adjacent bands:

– Worldwide identifications for transmissions from high altitude platform stations (in the downlink direction) in the bands 6 440- 6 520 MHz, 27.9-28.2 GHz.

– Worldwide identifications for transmissions to and from high altitude platform stations (in the uplink and downlink directions) in the bands 31-31.3 GHz and 38-39.5 GHz

– For the bands 6 440-6 520 MHz, 27.9-28.2 GHz, 31-31.3 GHz, 38-39.5 GHz, 47.2-47.5 GHz and 47.9-48.2 GHz, CEPT is supporting new footnotes and associated resolutions and/or appropriate modifications to the existing footnotes and associated resolutions.

– CEPT is of the view that any consideration of the frequency bands 21.4-22 GHz and 24.25-27.5 GHz in Region 2 under this Agenda item shall by accompanied by appropriate protection of: ISS in the band 24.45-24.75 GHz, ISS in the band 25.25-27.5 GHz, EESS (passive) in the bands 21.2-21.4 GHz, 22.21-22.5 GHz and 23.6-24 GHz, EESS and SRS (space-to-Earth) in the band 25.5-27 GHz and FSS in the bands 24.75-25.25 GHz and 27-27.5 GHz. In such case further information can be found in the Annex 6 to this Draft ECP.

– CEPT is of the view that any consideration of the frequency band 24.25-27.5 GHz in Region 2 under this Agenda item should not limit the possibility to identify the band for IMT on a global level under Agenda item 1.13.

Proposals are based on the above CEPT position, and on the following methods of the CPM as proposed by last WP5C meeting ([doc 5C/531 Annex 10](https://www.itu.int/dms_ties/itu-r/md/15/wp5c/c/R15-WP5C-C-0531%21N10%21MSW-E.docx)):

| Annex | Bands | Section1/1.14/ | Method |
| --- | --- | --- | --- |
| Annex 1 | 6 440- 6 520 MHz | 4.1/5.1 | 1B1 option 1 |
| Annex 1 | 6 560- 6 640 MHz | 4.2/5.2 | 2A |
| Annex 2 | 27.9-28.2 GHz | 4.2/5.6 | 6B1 option 1 |
| Annex 3 | 31.0-31.3 GHz | 4.2/5.7 | 7B1 options 1A+1B |
| Annex 4 | 38-39.5 GHz | 4.2/5.8 | 8B2 options 1A+1B |
| Annex 5 | 47.2-47.5 GHz / 47.9-48.2 GHz | 4.2/5.9 | 9B1 example 2 |

 **Proposal**

ANNEX 1

ARTICLE 5

Frequency allocations

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

MOD EUR/XXXA14/1

5 570-6 700 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 5 925-6 700 FIXED MOD 5.457 ADD 5.A114 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B MOBILE 5.457C 5.149 5.440 5.458 |

MOD EUR/XXXA14/2

5.457In Australia, Burkina Faso, Cote d'Ivoire, Mali and Nigeria, the allocation to the fixed service in the band6 560-6 640 MHz (ground-to-HAPS direction) may also be used by gateway links for high-altitude platform stations (HAPS) within the territory of these countries. Such use is limited to operation in HAPS gateway links and shall not cause harmful interference to, and shall not claim protection from, existing services, and shall be in compliance with Resolution **150 (RevWRC‑19)**. Existing services shall not be constrained in future development by HAPS gateway links. The use of HAPS gateway links in these bands requires explicit agreement with other administrations whose territories are located within 1 000 kilometres from the border of an administration intending to use the HAPS gateway links.    (WRC‑19)

**Reasons:** Limit the footnote 5.457 to the band 6 560-6 640 MHz without any other amendments and propose a new footnote 5.A114 for the band 6 440-6 520 MHz with an associated new Resolution **[EUR-A114] (WRC-19)** in order to facilitate the use of HAPS downlink on a global level.

ADD EUR/XXXA14/3

5.A114The allocation to the fixed services in the bands 6 440-6 520 MHz is identified for worldwide use by high-altitude platform stations (HAPS). Such use of the fixed-service allocation by HAPS is limited to operation in the HAPS-to-ground direction and is subject to the provisions of Resolution **[EUR-A114] (WRC‑19)**.     (WRC‑19)

**Reasons:** this footnote aims to facilitate the use of HAPS downlink on a global level by identifying the band for HAPS downlink and protect incumbent services with an associated new Resolution **[EUR-A114] (WRC-19)**.

MOD EUR/XXXA14/4

RESOLUTION 150 (WRC‑19)

Use of the band 6 560-6 640 MHz by gateway links
for high-altitude platform stations in the fixed service

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

considering

*…*

*k)* that while the deployment of HAPS gateway links in the band6 560-6 640 MHz is taken on a national basis, such deployment would affect other administrations;

*..*

recognizing

*…*

resolves

1 that the antenna pattern for HAPS gateway station in the band 6 560-6 640 MHz shall meet the following antenna beam patterns:

…

5 that for the purpose of protecting EESS passive operations over oceans, HAPS gateway stations shall maintain a minimum distance of 100 kilometres for a single HAPS gateway station and 150 kilometres for several HAPS gateway stations from coast lines;

6 that administrations planning to implement HAPS gateway links in the notification to the Bureau of the frequency assignment(s) shall submit all mandatory parameters for the examination by the Bureau for compliance with respect to *resolves* 1 to 5 above, and also the explicit agreement obtained pursuant to No. **5.457**,

invites

…

**Reasons:** Limit Resolution **150** to the band 6 560-6 640 MHz and propose a new Resolution for the band 6 440- 6 520 MHz.

ADD EUR/XXXA14/5

RESOLUTION [EUR-A114] (WRC‑19)

Use of the bands 6 440-6 520 MHz by gateway links
for high-altitude platform stations in the fixed service

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

considering

TBD

recognizing

*a)* that ITU‑R has studied technical and operational characteristics of HAPS gateway links in the fixed service in the range 6 440-6 520 MHz resulting in Report/Recommendation ITU‑R F.[BROADBAND HAPS CHARACTERISTICS];

*b)* that Report ITU‑R F.[HAPS-6GHz] contains the results of interference analyses between HAPS gateway links in the fixed service and other systems/services in the range 6 440-6 520 MHz;

*c)* that the World Summit on the Information Society has encouraged the development and application of emerging technologies to facilitate infrastructure and network development worldwide with special focus on under-served regions and areas,

resolves

1 that for the purpose of protecting the fixed service systems in neighbouring administrations in the band 6 440-6 520 MHz, the power flux density level per HAPS platform station produced at the surface of the Earth in neighbouring administrations shall not exceed the following pfd mask in dBW/m2/MHz, without the explicit agreement from the affected administration:

 *for*

 *for*

 *for*

 *for*

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

To verify that the pfd produced by a HAPS platform does not exceed the above pfd mask, the following equation shall be used:

where:

 EIRP is the maximum HAPS EIRP density level in dBW/MHz (dependent to the elevation angle);

 d is the distance in meters between the HAPS and the ground (Elevation angle dependent);

 pfd is the power flux density at the Earth’s surface per HAPS platform station in dBW/m2/MHz;

2 that for the purpose of protecting the mobile service systems in neighbouring administrations in the band 6 440-6 520 MHz, the power flux density limit at the surface of the Earth at in neighbouring administrations per HAPS platform station shall not exceed the following pfd mask in dBW/m2/MHz, without the explicit agreement from the affected administration:

where El is the elevation angle in° (angles of arrival above the horizontal plane).

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

where:

 EIRP is the maximum HAPS EIRP density level in dBW/MHz (dependent to the elevation angle (El));

 d is the distance in meters between the HAPS and the ground (Elevation angle dependent);

 pfd is the power flux density at the Earth’s surface per HAPS platform station in dBW/m2/MHz;

3 that for the purpose of protecting fixed-satellite service space station receivers in the band 6 440-6 520 MHz, the e.i.r.p. per HAPS platform transmitter shall be limited to
-17.8 dBW/MHz for off-nadir angles higher than 95°;

4 that for the purpose of protecting EESS (passive) operations over oceans, the EIRP of HAPS platforms operating over the oceans or over the land at a distance lower than 29 km from a coast line (distance between the HAPS nadir point and the coast line) shall be limited to
-34.9 dBW/200 MHz for off-nadir angle higher than 125°,

invites

TBD

instructs the Director of the Radiocommunication Bureau

to take all necessary measures to implement this Resolution.

**Reasons:** This new Resolution **[EUR-A114] (WRC-19)** includes regulatory mechanism to protect incumbent services in the band 6 440- 6 520 MHz and facilitate the use of HAPS downlink on a global level.

ANNEX 2

ARTICLE 5

Frequency allocations

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

MOD EUR/XXXA14/6

24.75-29.9 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |

|  |
| --- |
| 27.5-28.5 FIXED ADD 5.E114 FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.539 MOBILE 5.538 5.540 |

ADD EUR/XXXA14/7

5.E114The allocation to the fixed service in the band 27.9-28.2 GHz is identified for worldwide use by high-altitude platform stations (HAPS). Such use of the fixed-service allocation by HAPS is limited to operation in the HAPS-to-ground direction and is subject to the provisions of Resolution **[EUR-E114] (WRC‑19)**.     (WRC‑19)

**Reasons:** this footnote aims to facilitate the use of HAPS downlink on a global level by identifying the band for HAPS downlink and protect incumbent services with an associated new Resolution **[EUR-E114] (WRC-19)**.

SUP EUR/XXXA14/8

## **5.537A**

**Reasons:** This footnote is replaced by new footnote **5.E114** and therefore is not necessary anymore.

SUP EUR/XXXA14/9

RESOLUTION 145 (Rev.WRC‑12)

Use of the bands 27.9-28.2 GHz and 31-31.3 GHz by
high altitude platform stations in the fixed service

**Reasons:** This Resolution **145** (WRC-12) is replaced by new Resolution **[EUR-E114] (WRC-19)** and therefore is not necessary anymore.

ADD EUR/XXXA14/10

DRAFT NEW RESOLUTION [EUR-E114] (WRC‑19)

Use of the bands 27.9-28.2 GHz and 31-31.3 GHz by high altitude platform stations in the fixed service

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

considering

a) that WRC‑97 made provision for the operation of high altitude platform stations (HAPS), within a 2 x 300 MHz portion of the fixed-service allocation in the bands 47.2-47.5 GHz and 47.9-48.2 GHz;

*b)* that No. **4.23** specifies that transmissions to or from HAPS shall be limited to the bands specifically identified in Article **5**;

*c)* that at WRC‑2000, several countries in Region 3 and one country in Region 1 expressed a need for a lower frequency band for HAPS due to the excessive rain attenuation that occurs at 47 GHz in these countries;

*d)* that some countries in Region 2 have also expressed an interest in using a frequency range lower than those referred to in *considering a)*;

*e)* that, in order to accommodate the need expressed by the countries referred to in *considering c)*,WRC‑2000 adopted Nos. **5.537A** and **5.543A**, which were modified at WRC‑03 and then again at WRC‑07 to permit the use of HAPS in the fixed service in the band 27.9-28.2 GHz and in the band 31-31.3 GHz in certain Region 1 and 3 countries on a non-harmful interference, non‑protection basis;

*f)* that, in order to facilitate the use of HAPS links on a global level, WRC-2019 modified again Nos. **5.537A** and **5.543A.**

*g)* that the bands 27.9-28.2 GHz and 31-31.3 GHz are already heavily used or planned to be used by a number of different services and a number of other types of applications in the fixed service;

*h)* that while the decision to deploy HAPS can be taken on a national basis, such deployment may affect neighbouring administrations, particularly in small countries;

*i)* that the 31.3-31.8 GHz band is allocated to the radio astronomy, Earth exploration-satellite (passive) and space research (passive) services;

*j)* that ITU‑R has conducted studies dealing with sharing between systems using HAPS in the fixed service and other types of systems in the fixed service in the bands 27.9-28.2 GHz and 31‑31.3 GHz leading to Report ITU‑R F.[HAPS-31GHz];

*k)* that ITU‑R has conducted studies dealing with compatibility between systems using HAPS and the passive services in the 31.3-31.8 GHz band leading to Report ITU‑R F.[HAPS-31GHz];

*l)* that ITU‑R has produced Recommendation ITU‑R SF.1601 containing methodologies for evaluating interference from fixed-service systems using HAPS into GSO FSS systems in the band 27.9-28.2 GHz;

resolves

1 that for the purpose of protecting the fixed wireless systems in neighbouring administrations in the band 27.9-28.2 GHz, the power flux density limit per HAPS platform station at the surface of the Earth in neighbouring administrations shall not exceed the following pfd mask in dBW/m2/MHz, under clear sky condition, without the explicit agreement from the affected administration:

where El is the elevation angle in° (angles of arrival above the horizontal plane).

1. The above pfd limits are subject to the conclusion of the correspondent activity on 1.14.

In order to compensate for additional propagation impairments in the main beam of the HAPS due to rain, any exceedance of the pfd mask shall be limited by a value equivalent to the level of rain fading up to a maximum of 20 dB.

1. The wording above is subject to the conclusion of the correspondent activity on 1.14.

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

where:

 *d* is the distance in meters between the HAPS and the ground;

 *EIRP* HAPS platform nominal EIRP spectral density in dBW/MHz at a specific elevation angle

 *pfd(El)* power flux density at the Earth surface per HAPS platform station in dBW/m²/MHz;

2 that for the purpose of protecting the mobile service systems in neighbouring administrations in the band 27.9-28.2 GHz, the power flux density limit per HAPS platform station at the surface of the Earth in neighbouring administrations shall not exceed the following pfd mask in dBW/m2/MHz, under clear sky condition, without the explicit agreement from the affected administration :

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

In order to compensate for additional propagation impairments in the main beam of the HAPS due to rain, any exceedance of the pfd mask shall be limited by a value 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 meters between the HAPS and the ground (elevation angle dependent);

 *EIRP* HAPS platform nominal EIRP spectral density in dBW/MHz at a specific elevation angle;

 *pfd(El)* power flux density at the Earth surface per HAPS platform station in dB(W/m²/MHz);

3 that for the purpose of protecting the fixed satellite service (Earth-to-space) in the 27.9‑28.2 GHz, the maximum EIRP density per HAPS downlink shall be less than -9.7 dBW/MHz in any direction for off-nadir angle higher than 95°. Furthermore, HAPS operations should not impose undue constraints on the future development of the fixed satellite services in the 27.9-28.2 GHz;

4 that for the purpose of protecting the fixed service systems in neighbouring administrations in the band 31-31.3 GHz, the power flux density limit per HAPS platform station at the surface of the Earth in neighbouring administrations shall not exceed the following pfd mask in dBW/m2/MHz, under clear sky condition, without the explicit agreement from the affected administration:

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

In order to compensate for additional propagation impairments in the main beam of the HAPS due to rain, any exceedance of the pfd mask shall be limited by a value equivalent to the level of rain fading up to a maximum of 20 dB.

1. The wording above is subject to the conclusion of the correspondent activity on 1.14.

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

where:

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

 *EIRP* HAPS platform nominal EIRP spectral density in dBW/MHz at a specific elevation angle;

 *pfd(El)* power flux density at the Earth surface per HAPS platform station in dB(W/m²/MHz);

5 that in order to ensure the protection of EESS (passive), the level of unwanted power density into the HAPS ground station antenna in the band 31.3-31.8 GHz shall be limited to −83 dB(W/200 MHz) under clear-sky conditions and may be increased under rainy conditions to mitigate fading due to rain, provided that the effective impact on the passive satellite does not exceed the impact under clear‑sky conditions;

6 that in order to ensure the protection of EESS (passive) services the EIRP per HAPS platform, in the band 31.3-31.8 GHz, shall not exceed:

7 that in order to ensure the protection of the radio astronomy service, the pfd level produced by any HAPS ground station at RAS stations, shall not exceed
-141 dBW/m2/500MHz in the band 31.3-31.8 GHz;

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

where:

 *AttRe*c P.452-16 is the attenuation in dB based on Recommendation ITU-R P.452-16 propagation model with p = 2%;

 *EIRP* is the maximum HAPS EIRP density level in dBW/MHz/500MHz (dependent to the elevation angle);

 *d* is the distance in meters between the HAPS and the ground (Elevation angle dependent);

 *pfd)* power flux density at the Earth surface per HAPS platform station in dB(W/m²/500MHz);

8 that in order to ensure the protection of the radio astronomy service the pfd produced by unwanted emissions from HAPS platform downlink transmissions shall not exceed
-171 dB W/m²/500 MHz for continuum observations in the band 31.3-31.8 GHz at an RAS station location at a height of 50m, where this pfd value shall be verified considering a percentage of time of 2% in the relevant propagation model;

to verify the compliance the following formula shall be used:

where:

 *EIRPmax clear sky* is the maximum EIRP towards the RAS station at which the HAPS platform station operates under clear sky condition in dB(W/500 MHz);

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

 *El* is the elevation angle at the HAPS platform towards the RAS station;

 *Att618p=2%* is the attenuation from recommendation 618 corresponding to p=2% of the time at the radio astronomy location;

 *d* is the separation distance in m between the HAPS platform and the RAS station;

 *pfd)* power flux density at the Earth surface per HAPS platform station in dB(W/m²/500MHz);

9 that *resolves* 7 and 8 apply for any radio astronomy station that was in operation prior to 22 November 2019 and has been notified to the Bureau in the band 31.3-31.8 GHz before 22 May 2020; and that radio astronomy stations notified after this date may seek an agreement with administrations that have authorized HAPS,

invites

TBD

instructs the Director of the Radiocommunication Bureau

to take all necessary measures to implement this Resolution.

**Reasons:** This new Resolution **[EUR-E114] (WRC-19)** includes regulatory mechanism to protect incumbent services in the bands 27.9-28.2 GHz and 31-31.3 GHz and facilitate the use of HAPS on a global level.

ANNEX 3

ARTICLE 5

Frequency allocations

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

MOD EUR/XXXA14/11

29.9-34.2 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 31-31.3 FIXED 5.338A ADD 5.F114A ADD 5.F114B MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 5.544 5.545 5.149 |

ADD EUR/XXXA14/12

5.F114AThe allocation to the fixed service in the band 31-31.3 GHz is identified for worldwide use by high-altitude platform stations (HAPS) in the HAPS-to-ground direction. Such use of the fixed-service allocation by HAPS is subject to the provisions of Resolution **[EUR-E114] (WRC‑19)**.     (WRC‑19)

**Reasons:** this footnote aims to facilitate the use of HAPS downlink on a global level by identifying the band for HAPS downlink and protect incumbent services with an associated new Resolution **[EUR-E114] (WRC-19)**.

ADD EUR/XXXA14/13

5.F114BThe allocation to the fixed service in the band 31-31.3 GHz is identified for worldwide use by high-altitude platform stations (HAPS) in the ground-to-HAPS direction. Such use of the fixed-service allocation by HAPS is subject to the provisions of Resolution **E114 (WRC‑19)**.     (WRC‑19)

**Reasons:** this footnote aims to facilitate the use of HAPS uplink on a global level by identifying the band for HAPS uplink and protect incumbent services with an associated new Resolution **[EUR-E114] (WRC-19)**.

SUP EUR/XXXA14/14

5.543A

**Reasons:** this footnote is replaced by new footnotes **5.F114A** and **5.F114B** and therefore is not necessary anymore

SUP EUR/XXXA14/15

RESOLUTION 145 (Rev.WRC‑12)

Use of the bands 27.9-28.2 GHz and 31-31.3 GHz by
high altitude platform stations in the fixed service

**Reasons:** This Resolution **145 (WRC-12)** is replaced by new Resolution **[EUR-E114] (WRC-19)** and therefore is not necessary anymore.

ANNEX 4

ARTICLE 5

Frequency allocations

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

MOD EUR/XXXA14/16

34.2-40 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 38-39.5 FIXED ADD 5.G114A ADD 5.G114B FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth) 5.547 |

ADD EUR/XXXA14/17

5.G114AThe allocation to the fixed service in the band 38-39.5 GHz is identified for worldwide use by high-altitude platform stations (HAPS) in the HAPS-to-ground direction. Such use of the fixed-service allocation by HAPS is subject to the provisions of Resolution **[EUR-G114] (WRC‑19)**.     (WRC‑19)

**Reasons:** This footnote aims to facilitate the use of HAPS downlink on a global level by identifying the band for HAPS downlink and protect incumbent services with an associated new Resolution **[EUR-G114] (WRC-19)**.

ADD EUR/XXXA14/18

5.G114BThe allocation to the fixed service in the band 38-39.5 GHz is identified for worldwide use by high-altitude platform stations (HAPS) in the ground-to-HAPS direction. Such use of the fixed-service allocation by HAPS is subject to the provisions of Resolution **[EUR-G114] (WRC‑19)**.     (WRC‑19)

**Reasons:** this footnote aims to facilitate the use of HAPS uplink on a global level by identifying the band for HAPS uplink and protect incumbent services with an associated new Resolution **[EUR-G114] (WRC-19)**.

ADD EUR/XXXA14/19

DRAFT NEW RESOLUTION [EUR-G114] (WRC‑19)

Use of the bands 38-39.5 GHz by high altitude platform
stations in the fixed service

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

considering

Note: No text has been developed, it may be proposed in contributions to CPM19-2

recognizing

Note: No text has been developed, it may be proposed in contributions to CPM19-2

resolves

1 that for the purpose of protecting the fixed service systems in neighbouring administrations in the band 38-39.5 GHz, the power flux density limit per HAPS platform station at the surface of the Earth in neighbouring administrations shall not exceed the following pfd mask in in dBW/m2/MHz, under clear sky condition, without the explicit agreement from the affected administration:

where El is the elevation angle in ° (angles of arrival above the horizontal plane)

In order to compensate for additional propagation impairments in the main beam of the HAPS due to rain, any exceedance of the pfd mask shall be limited by a value equivalent to the level of rain fading up to a maximum of 20 dB.

1. The wording above is subject to the conclusion of the correspondent activity on 1.14.

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

where:

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

 *EIRP* HAPS platform nominal EIRP spectral density in dBW/MHz at a specific elevation angle;

 *pfd(el)* power flux density at the Earth surface per HAPS platform station in dB(W/(m².MHz));

2 that for the purpose of protecting the mobile service systems in neighbouring administrations in the band 38-39.5 GHz, the power flux density limit per HAPS platform station at the surface of the Earth in neighbouring administrations shall not exceed the following pfd mask in in dBW/m2/MHz, under clear sky condition, without the explicit agreement from the affected administration:

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

In order to compensate for additional propagation impairments in the main beam of the HAPS due to rain, any exceedance of the pfd mask shall be limited by a value 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 meters between the HAPS and the ground (elevation angle dependent);

 *EIRP* HAPS platform nominal EIRP spectral density in dBW/MHz at a specific elevation angle;

 *pfd()* power flux density at the Earth surface per HAPS platform station in dB(W/(m².MHz));

3 that for the purpose of protecting FSS GSO systems in the fixed satellite service (space‑to-Earth) in neighbouring administrations, coordination of a transmitting HAPS station is required when the power-flux density in dB(W/(m²/MHz)) over any point of an administration’s border exceeds the following values:

-169.9 + 1954 α² dB(W/(m²/MHz)) for 0 ≤ α < 0.136°

 - 133.9 dB(W/(m²/MHz)) for 0.136° ≤ α < 1°

- 133.9 + 25 log α dB(W/(m²/MHz)) for 1° ≤ α < 47.9°

 - 91.9 dB(W/(m²/MHz)) for 47.9° ≤ α ≤ 180°

where α is the minimum angle at the border between the line to the HAPS platform and the lines to the GSO arc in degrees.

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

where:

 *d* : distance between the HAPS and the GSO FSS earth station (m);

 *Attgaz* : attenuation due to atmospheric gazes on the HAPS to GSO FSS earth station path in dB;

 *pfdI/N* : required pfd at the GSO FSS earth station location to meet the FSS protection criteria in dB(W/(m².MHz));

 *EIRP* : HAPS platform nominal EIRP spectral density in the direction of the GSO FSS earth station in dBW/MHz;

4 that for the purpose of protecting FSS NGSO systems in the fixed satellite service (space-to-Earth) in neighbouring administrations from co-channel interference, coordination of a transmitting HAPS station is required when the distance between the sub-HAPS point and any point of an administration’s border is less than 100 km;

5 that in making assignments to HAPS platforms in the fixed service 38-39.5 GHz, Administrations shall protect the space research service (space-to-Earth) in the band 37-38 GHz from harmful interference by unwanted emissions, taking into account the space research service (space-to-Earth) protection level of -217 dB(W/Hz) at the input of the SRS receiver with 0.001% exceedance due to atmospheric and precipitation effects as referred in the relevant ITU-R Recommendations,

instructs the Director of the Radiocommunication Bureau

to take all necessary measures to implement this Resolution.

**Reasons:** This new Resolution **[EUR-G114] (WRC-19)** includes regulatory mechanism to protect incumbent services in the bands 38-39.5 GHz and facilitate the use of HAPS on a global level.

ANNEX 5

ARTICLE 5

Frequency allocations

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

MOD EUR/XXXA14/20

40-47.5 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 47.2-47.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE MOD 5.552A |

MOD EUR/XXXA14/21

47.5-51.4 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 47.9-48.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE MOD 5.552A |

MOD EUR/XXXA14/22

5.552A The allocation to the fixed service in the bands 47.2-47.5 GHz and 47.9-48.2 GHz is identified for use by high altitude platform stations. The use of the bands 47.2-47.5 GHz and 47.9‑48.2 GHz is subject to the provisions of Resolution **122 (Rev.WRC-19)**.     (WRC‑19)

MOD EUR/XXXA14/23

RESOLUTION 122 (Rev.WRC-19)

Use of the bands 47.2-47.5 GHz and 47.9-48.2 GHz by high altitude platform stations in the fixed service and by other services

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

*..*

recognizing

*…*

*c)* that Recommendation ITU‑R SF.1843 provides information on the feasibility of HAPS systems in the fixed service sharing with the FSS;

*d)* that ITU‑R studies on HAPS operation in the bands 47.2-47.5 GHz and 47.9-48.2 GHz allocated to the fixed service have concluded that, in order to share with FSS (Earth-to-space), the maximum uplink transmit e.i.r.p. density of HAPS ground terminals in the bands should, in clear-sky conditions, be 6.4 dB(W/MHz) for Urban Area Coverage (UAC), 22.57 dB(W/MHz) for Suburban Area Coverage (SAC) and 28 dB(W/MHz) for Rural Area Coverage (RAC), and that these values can be increased by up to 20 dB during periods of rain;

1. The wording above is subject to the conclusion of the correspondent activity on 1.14.

…

resolves

…

2 that the maximum transmit e.i.r.p. density levels specified in *resolves*1 may be increased, using fading compensation techniques, by up to 20 dB during periods of rain;

1. The wording above is subject to the conclusion of the correspondent activity on 1.14.

…

**Reasons:** Amend the existing Resolution **122** (WRC-19) to take into account last technological improvement of HAPS technology

ANNEX 6 (only if needed)

ARTICLE 5

Additional considerations for the Region 2 band to protect global incumbent services.

**Note:**

The bands 24.25 – 27.5 GHz are core bands in Europe’s 5G strategy therefore the focus of the CEPT efforts regarding this band are on the facilitation of a worldwide IMT identification under Agenda Item 1.13. Nevertheless, any consideration of the frequency bands 21.4-22 GHz and 24.25-27.5 GHz in Region 2 under this Agenda item shall by accompanied by the appropriate protection of ISS in the band 24.45-24.75 GHz, ISS in the band 25.25-27.5 GHz, EESS (passive) in the bands 21.2-21.4 GHz, 22.21-22.5 GHz and 23.6-24 GHz, EESS and SRS(space-to-Earth) in the band 25.5-27 GHz and FSS in the bands 24.75-25.25 and 27.27.5 GHz.

This would lead to the following additional *resolves* in the appropriate Resolution X114 dealing with 21.4-22GHz and 24.25-27.5GHz frequency band in Region 2, if any:

1 that for the purpose of protecting the Inter Satellite service, the EIRP density per HAPS platform in the bands 25.25-27.5 GHz, shall not exceed -70.7 dBW/Hz for off-nadir angle higher than 85°;

2 that for the purpose of protecting the Inter Satellite service, the EIRP density per HAPS platform in the bands 24.45-24.75 GHz, shall not exceed TBD dBW/Hz for off-nadir angle higher than 85°;

3 that in order to ensure the protection of Inter Satellite service services from the HAPS ground station in the bands 24.45-24.75 and 25.25-27.5 GHz, [TBD];

Editor Note : in accordance with the decision on WRC 19 under agenda item 1.13, the relevant regulatory for the mobile services / the IMT identification should be added here.)

4 that for the purpose of protecting the Fixed Satellite service, the EIRP density per HAPS platform, in the bands 24.75-25.25 and 27-27.5 GHz, shall not exceed -10.8 dBW/MHz for off‑nadir angle higher than 95°;

5 that in order to ensure the protection of fixed satellite services from the HAPS ground station in the bands 24.75-25.25 and 27-27.5 GHz, [TBD];

6 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 EIRP per HAPS, in those two bands, shall not exceed:

where El is the elevation angle in° (angles of arrival above the horizontal plane);

7 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 EIRP per HAPS CPE, in those two bands, shall not exceed -33.4 dBW/100 MHz and the EIRP per HAPS gateway, in those two bands, shall not exceed -29.6 dBW/100 MHz;

8 that for the purpose of protecting the Earth Exploration Satellite (passive) service in the band 23.6-24 GHz, the EIRP per HAPS, in the band 23.6-24.2 GHz, shall not exceed:

where El is the elevation angle in° (angles of arrival above the horizontal plane);

9 that for the purpose of protecting the Earth Exploration Satellite (passive) service in the band 23.6-24 GHz, the EIRP per HAPS CPE, in the band 23.6-24 GHz, shall not exceed -46 dBW/200 MHz and the EIRP per HAPS gateway, in the band 23.6-24 GHz, shall not exceed -39.9 dBW/200 MHz;

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

11 that in order to ensure the protection of in-band SRS/EESS satellite services from the HAPS platform or from the HAPS ground station in the band 25.5-27.0 GHz, the PFD of a HAPS shall not exceed the sets of values below. The pfd limits applied to HAPS platforms are established to be met under clear sky conditions 100% of the time, at the location of the SRS/EESS earth station. For the case of the HAPS ground station towards an SRS/EESS Earth station path case there will be a need to consider HAPS and SRS/EESS antenna heights in order to apply attenuation using Recommendation ITU-R P.452, using the following percentages: 1) SRS: .001%; 2) EESS NGSO: .005%; 3) EESS GSO: 20%.

**SRS**

where is the angle of arrival () of the interfering signal above the local horizontal plane at the SRS antenna.

Note: Consequential modifications of Appendix **5** should be considered.

**EESS NGSO**

where is the angle of arrival () of the interfering signal above the local horizontal plane at the EESS antenna.

**EESS GSO**

where is the angle of arrival () of the interfering signal above the local horizontal plane at the EESS antenna.

For the case of HAPS platforms to earth stations, the PFD values above applied to HAPS shall be met under clear sky conditions 100% of the time. For the case of the HAPS ground station towards an SRS/EESS Earth station path case, attenuation using the relevant ITU-R propagation Recommendations shall be applied using the following percentages: 1) SRS: .001%; 2) EESS NGSO: .005%; 3) EESS GSO: 20%, and the HAPS and SRS/EESS antenna heights shall be used in this calculation.

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