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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 3 to Document 16-E** |
|  | **9 October 2019** |
|  | **Original: English** |
|  | |
| European Common Proposals | |
| Proposals for the work of the conference | |
|  | |
| Agenda item 1.3 | |

1.3 to consider possible upgrading of the secondary allocation to the meteorological-satellite service (space-to-Earth) to primary status and a possible primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460-470 MHz, in accordance with Resolution **766 (WRC-15)**;

Introduction

This agenda item proposes to consider possible upgrading of the secondary allocation to the meteorological-satellite service (space-to-Earth) to primary status and a possible primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460-470 MHz.

Data Collection Systems (DCS) operate on geostationary and non-geostationary orbits in the meteorological‑satellite service (MetSat) and the Earth exploration-satellite service (EESS) (Earth‑to-space) systems in the frequency band 401-403 MHz (uplink) and 460-470 MHz (downlink). DCS systems are essential for monitoring and predicting climate change, monitoring ocean, and water resources, weather forecasting and assisting in protecting biodiversity, as well as improving maritime security.

Data collection systems in the MetSat service have been operating globally under a secondary allocation and on a primary basis in some countries under No. **5.290** of the Radio Regulations (RR), but this use is subject to agreement obtained under RR No. **9.21**. This has led to different limitations and has posed a barrier to implementation of essential DCS components on a global basis. According to RR No. **5.289**, Earth exploration-satellite service applications, other than the meteorological-satellite service, may also be used in the frequency bands 460‑470 MHz and 1 690-1 710 MHz for space-to-Earth transmissions subject to not causing harmful interference to stations operating in accordance with the RR Article **5**.

A primary allocation to the MetSat service and EESS in the frequency band 460-470 MHz would provide confidence to space and meteorological agencies deeply involved in Satellite Data Collection Programs and the public sectors funding the development and operation of such systems. Regulatory measures need to be developed to protect the mobile and fixed service, while ensuring operations of existing MetSat and EESS systems.

Sharing studies undertaken in accordance with Resolution **766 (WRC-15)** have shown that the protection of existing terrestrial services allocated in the 460-470 MHz and adjacent bands will be ensured provided that MetSat and EESS satellites are compliant with the following pfd masks:

For non-GSO satellites:



For GSO satellites:



where  is the angle of arrival above the horizontal plane, in degrees.

In addition, the following conditions are proposed:

– priority of MetSat over EESS as currently expressed in the RR is retained;

– MetSat and EESS earth stations will not claim protection from stations in the fixed and mobile services, consistently with *recognizing f)* of Resolution **766 (WRC-15)**;

– existing MetSat and EESS satellite networks and systems in the frequency band 460‑470 MHz for which complete notification information for non-geostationary satellite networks or coordination request or advance publication information for geostationary satellite networks was received by the Radiocommunication Bureau prior to the end of WRC-19 and whose space stations do not meet the pfd limits shall be used on a primary basis subject to not causing harmful interference to the fixed and mobile service stations.

CEPT recognises the need for ITU-R studies on a harmonized spectrum partitioning (GSO vs. non‑GSO DCS) of the global operating environment to allow full development of DCS.

Proposals

ARTICLE 5

Frequency allocations

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

MOD EUR/16A3/1#50192

460-890 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 460-470 EARTH EXPLORATION-SATELLITE (space-to-Earth)  FIXED  METEOROLOGICAL-SATELLITE (space-to-Earth)  MOBILE 5.286AA 5.287 5.288 ADD 5.A13 | | |

**Reasons:** According to studies under Resolution **766 (WRC-15)**, the secondary allocation to the meteorological satellite service (space-to-Earth) in the frequency band 460-470 MHz is upgraded to primary and a new primary Earth exploration-satellite service (space-to-Earth) allocation is added.

MOD EUR/16A3/2#50203

1 660-1 710 MHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 1 690-1 700  METEOROLOGICAL AIDS  METEOROLOGICAL-SATELLITE (space-to-Earth)  Fixed  Mobile except aeronautical mobile | 1 690-1 700  METEOROLOGICAL AIDS  METEOROLOGICAL-SATELLITE (space-to-Earth) | |
| MOD 5.289 5.341 5.382 | MOD 5.289 5.341 5.381 | |
| 1 700-1 710  FIXED  METEOROLOGICAL-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile | | 1 700-1 710  FIXED  METEOROLOGICAL-SATELLITE (space-to-Earth)  MOBILE except aeronautical mobile |
| MOD 5.289 5.341 | | MOD 5.289 5.341 5.384 |

MOD EUR/16A3/3#50193

5.289 Earth exploration-satellite service applications, other than the meteorological-satellite service, may also be used in the frequency band 1 690-1 710 MHz for space-to-Earth transmissions subject to not causing harmful interference to stations operating in accordance with the Table.     (WRC‑19)

**Reasons:** Due to the new primary status of EESS and MetSat service, the reference to the frequency band 460-470 MHz is no longer needed in this footnote.

SUP EUR/16A3/4

5.290 *Different category of service:* in Afghanistan, Azerbaijan, Belarus, China, the Russian Federation, Japan, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 460-470 MHz to the meteorological-satellite service (space-to-Earth) is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**.    (WRC‑12)

**Reasons:** To reflect the implications of the upgrade from secondary to primary: since the frequency band 460-470 MHz has been upgraded from secondary to primary for MetSat service (space-to-Earth) and EESS (space-to-Earth), there is no need to keep a reference to RR No. **9.21**, and footnote RR No. **5.290** is deleted.

ADD EUR/16A3/5#50196

5.A13 In the frequency band 460-470 MHz, Resolution **[EUR-A13] (WRC-19)** shall apply.     (WRC‑19)

**Reasons:** The Resolution includes the regulatory measures to protect the fixed and mobile services, the regulatory measure to assure priority of MetSat service over EESS and the grandfathering measures for existing data collection systems.

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 EUR/16A3/6#50199

TABLE 8a     (Rev.WRC‑19)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Receiving space radiocommunication service designation | | | Space operation, space research | Meteoro-logical- satellite, mobile-satellite | | Space research | Space research, space operation | Space operation | Mobile-satellite | Meteoro-logical-satellite | Mobile-satellite | Space research | Space operation |  | Broad-casting- satellite | Mobile-satellite | Broadcasting- satellite (DAB) | Mobile-satellite, land-mobile satellite, maritime mobile-satellite |
| Frequency bands (MHz) | | | 137-138 | 137-138 | | 143.6-143.65 | 174-184 | 163-167 272-273 5 | 335.4-399.9 | 400.15-401 | 400.15-401 | 400.15-401 | 401-402 |  | 620-790 | 856-890 | 1 452-1 492 | 1 518-1 530 1 555-1 559 2 160-2 200 1 |
| Transmitting terrestrial  service designations | | | Fixed, mobile | Fixed, mobile | | Fixed, mobile, radio-location | Fixed, mobile, broad-casting | Fixed, mobile | Fixed, mobile | Meteoro-logical  aids | Meteoro- logical  aids | Meteoro-logical  aids | Meteoro-logical aids, fixed, mobile |  | Fixed, mobile, broad-casting | Fixed, mobile, broad casting | Fixed, mobile, broadcasting | Fixed, mobile |
| Method to be used | | | § 2.1 | § 2.1 | | § 2.1 | § 2.1 | § 2.1 | § 1.4.6 | § 1.4.6 | § 1.4.6 | – | § 2.1 |  | § 1.4.5 | § 1.4.6 | § 1.4.5 | § 1.4.6 |
| Modulation at earth station 2 | | | N |  | | N |  | N |  |  |  | N | N |  |  |  | N | N |
| Earth station interference parameters and criteria | *p*0 (%) |  | 0.1 | |  | 0.1 |  | 1.0 |  | 0.012 |  | 0.1 | 0.1 |  |  |  |  | 10 |
| *n* |  | 2 | |  | 2 |  | 1 |  | 1 |  | 2 | 2 |  |  |  |  | 1 |
| *p* (%) |  | 0.05 | |  | 0.05 |  | 1.0 |  | 0.012 |  | 0.05 | 0.05 |  |  |  |  | 10 |
| *NL* (dB) |  | 0 | |  | 0 |  | 0 |  | 0 |  | 0 | 0 |  |  |  |  | 0 |
| *Ms* (dB) |  | 1 | |  | 1 |  | 1 |  | 4.3 |  | 1 | 1 |  |  |  |  | 1 |
| *W* (dB) |  | 0 | |  | 0 |  | 0 |  | 0 |  | 0 | 0 |  |  |  |  | 0 |
| Terrestrial station parameters | *E* (dBW) in *B* 3 | A | – | |  | – |  | 15 |  |  |  | – | – |  |  |  | 38 | 37 4 |
| N | – | |  | – |  | 15 |  |  |  | – | – |  |  |  | 38 | 37 |
| *Pt* (dBW)  in *B* | A | – | |  | – |  | –1 |  |  |  | – | – |  |  |  | 3 | 0 |
| N | – | |  | – |  | –1 |  |  |  | – | – |  |  |  | 3 | 0 |
| *Gx* (dBi) |  | – | |  | – |  | 16 |  |  |  | – | – |  |  |  | 35 | 37 |
| Reference bandwidth | *B* (Hz) |  | 1 | |  | 1 |  | 103 |  | 177.5 × 103 |  | 1 | 1 |  |  |  | 25 × 103 | 4 × 103 |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* |  | −199 | |  | −199 |  | −173 |  | −148 |  | −208 | −208 |  |  |  |  | −176 |
| 1 In the band 2 160-2 200 MHz, the terrestrial station parameters of line-of-sight radio-relay systems have been used. If an administration believes that, in this band transhorizon systems need to be considered, the parameters associated with the frequency band 2 500-2 690 MHz may be used to determine the coordination area.  2 A: analogue modulation; N: digital modulation.  3 *E* is defined as the equivalent isotropically radiated power of the interfering terrestrial station in the reference bandwidth.  4 This value is reduced from the nominal value of 50 dBW for the purposes of determination of coordination area, recognizing the low probability of high power emissions falling fully within the relatively narrow bandwidth of the earth station.  5 The fixed-service parameters provided in the column for 163-167 MHz and 272-273 MHz are only applicable to the band 163-167 MHz. | | | | | | | | | | | | | | | | | | | |

**Reasons:** No parameters for the MetSat and EESS systems to calculate coordination distances are needed.

ADD EUR/16A3/7#50201

Draft New Resolution [EUR-A13] (WRC-19)

Implementation of satellite networks and systems of the meteorological-satellite service (space-to-Earth) and the Earth exploration-satellite service (space-to-Earth) in the frequency band 460-470 MHz

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

considering

*a)* that data collection systems (DCS) operate on geostationary and non-geostationary orbits in the meteorological-satellite service (MetSat) and the Earth exploration-satellite service (EESS) (Earth-to-space) systems in the frequency band 401-403 MHz;

*b)* that DCS are essential for monitoring and predicting climate change, monitoring oceans, and water resources, weather forecasting and assisting in protecting biodiversity and improving maritime security;

*c)* that most of these DCS have implemented satellite downlinks (space-to-Earth) in the frequency band 460-470 MHz which bring significant improvements to the operation of satellite DCS, such as the transmission of information to optimize the usage of the terrestrial data collection platforms;

*d)* that the frequency band 460-470 MHz is also used for the downlink of mission and telemetry data for meteorological and Earth exploration purposes;

*e)* that the frequency band 460-470 MHz is allocated to the fixed and mobile services on a primary basis and is widely used by these services and is also identified for IMT on a global basis;

*f)* that for the upgrade of the MetSat (space-to-Earth) to primary status and an added primary allocation to the EESS (space-to-Earth) in the frequency band 460-470 MHz, it is necessary to establish power flux-density (pfd) limits, providing protection and not imposing any additional constraints on primary fixed and mobile services to which the frequency band is already allocated and consequently the existing broadcasting service in the adjacent frequency bands;

*g)* that the priority of MetSat systems over EESS systems in the frequency band 460‑470 MHz is provided to ensure protection of MetSat systems from interference from the increasing number of small satellite systems operating in the EESS;

*h)* that WRC-19 suppressed No. **5.290** and the relevant parameters in Table 8a of Appendix **7**, which identified some administrations that already had a primary allocation to the MetSat (space-to-Earth), subject to agreement obtained under No. **9.21,** in the light of the upgrade mentioned in *considering f)* above, and that it is necessary to provide some regulatory measures for satellite systems which operate in accordance with No. **5.290** to retain their regulatory status after the end of WRC-19,

noting

*a)* that frequency assignments for several EESS and MetSat satellite networks and systems in the frequency band 460-470 MHz were notified and brought into use before 22 November 2019;

*b)* that some of these EESS and MetSat satellite networks and systems above may not meet the pfd limits in *considering f),* but there is a need to continue to authorize them for operations in order to continue their operation,

resolves

1 that in the frequency band 460-470 MHz the power flux-density at the Earth´s surface produced by stations in the meteorological-satellite (space-to-Earth) and Earth exploration-satellite (space-to-Earth) services shall comply with the limits listed below under assumed free-space propagation conditions for all methods of modulation:

For non-GSO space stations:



And for GSO space stations:



where is the angle of arrival above the horizontal plane, in degrees.

These limits apply to all space stations in the meteorological-satellite service and Earth exploration‑satellite service in this frequency band for which complete notification information for non-geostationary satellite networks or coordination request or advanced publication information for geostationary satellite networks is received by the Radiocommunication Bureau after the end of WRC-19;

2 that the satellite networks and systems in the meteorological-satellite (space-to-Earth) and Earth exploration-satellite (space-to-Earth) services in the frequency band 460-470 MHz for which a complete coordination request or advanced publication information for geostationary satellite networks or notification information for non-geostationary satellite networks has been received by the Radiocommunication Bureau prior to the end of WRC-19, and those space stations which meet the pfd limits given in *resolves 1*, may continue to operate with the same parameters under Appendix **4** submitted for coordination or notification;

3 that the frequency assignment of MetSat (space-to-Earth) and EESS (space-to-Earth) satellite network and systems in the frequency band 460-470 MHz for which complete notification information for non-geostationary satellite networks or coordination request or advanced publication information for geostationary satellite networks was received by the Radiocommunication Bureau prior to the end of WRC‑19 and whose space stations do not meet the pfd limits given in *resolves* *1* shall be used on a primary basis subject to not causing harmful interference to the fixed and mobile service stations;

4 that the satellite systems in the meteorological-satellite service (space-to-Earth) referred to in *considering g)* for which complete coordination information related to No. **9.21** has been received by the Radiocommunication Bureau prior to the end of WRC-19 shall operate on a primary basis, and that, for those systems, the relevant provisions of Articles **9** and **11** continue to apply, and the relevant agreements obtained under No. **9.21** remain in force after the end of WRC-19;

5 that in the frequency band 460-470 MHz, earth stations in the meteorological satellite service (space-to-Earth) and Earth exploration-satellite service (space-to-Earth) shall not claim protection from stations of the fixed and mobile services in the frequency band 460-470 MHz, and shall not claim protection from stations of the broadcasting service operating in the adjacent band, unless other agreements were obtained under No. **9.21** prior to the end of WRC-19. No. **5.43A** does not apply;

6 that in the frequency band 460-470 MHz, stations in the Earth exploration-satellite service (space-to-Earth) shall not cause harmful interference to nor claim protection from stations in the meteorological-satellite service (space-to-Earth),

instructs the Director of the Radiocommunication Bureau

for the frequency assignment of MetSat (space-to-Earth) and EESS (space-to-Earth) satellite network for which complete notification information or coordination request was received by the Radiocommunication Bureau prior to the end of WRC 19, the Bureau shall review the finding under No. **11.50** without requiring the administration to submit a new assignment. The date of such assignment’s original recording in the Master International Frequency Register (MIFR) shall remain unchanged. For satellite systems of MetSat (space-to-Earth) and EESS (space-to-Earth), which space stations do not meet the pfd limits given in *resolves 1*, the Bureau shall propose the notifying administration to provide commitment that harmful interference would not be caused to the fixed and mobile service stations. In case of receiving such a commitment, relevant frequency assignments shall have primary status and be published by the Bureau in relevant parts of the BR IFIC with note that the relevant administration has provided commitment not to cause harmful interference to the fixed and mobile service stations. If the notifying administration does not provide this commitment and requests to retain the assignment and states that it will be operated under No. **4.4**, the assignment shall be kept in MIFR for information purposes under the conditions of No. **8.5**. If no reply is received within 30 days after the date of the Bureau communication, the Bureau shall send a reminder. If no reply is received from the relevant administration within 30 days after the date of reminder, the Bureau shall suppress the concerned recorded assignment from the MIFR,

invites ITU-R

to undertake studies with respect to the implementation of sharing of the 460-470 MHz frequency band between geostationary satellite networks and non-geostationary satellite networks for future DCS systems, including general partitioning of the band.

**Reasons:** The Resolution includes the regulatory measures to protect the fixed and mobile services, the regulatory measure to assure priority of MetSat service over EESS and the grandfathering measures for existing data collection systems.

SUP EUR/16A3/8#50200

RESOLUTION 766 (WRC-15)

Consideration of possible upgrading of the secondary allocation to the meteorological-satellite service (space-to-Earth) to primary   
status and a primary allocation to the Earth exploration-  
satellite service (space-to-Earth) in the   
frequency band 460-470 MHz

**Reasons:** The Resolution is no longer necessary.

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