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| **World Radiocommunication Conference (WRC-19)Sharm el-Sheikh, Egypt, 28 October – 22 November 2019** |  |
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|  | CPG(19)143 ANNEX VIII-07 |
| PLENARY MEETING | **Addendum 7 toDocument 16-E** |
|  | **19 June 2019** |
|  | **Original: English** |
|  |
| European Common Proposals |
| Proposals for the work of the conference |
|  |
| Agenda item 1.7 |

1.7 to study the spectrum needs for telemetry, tracking and command in the space operation service for non-GSO satellites with short duration missions, to assess the suitability of existing allocations to the space operation service and, if necessary, to consider new allocations, in accordance with Resolution **659 (WRC-15)**;

Introduction

Resolution **659 (WRC-15)** invites ITU-R

1. to study the spectrum requirements for telemetry, tracking and command in the space operation service for the growing number of non-GSO satellites with short duration missions, taking into account No **1.23**;

2. to assess the suitability of existing allocations to the space operation service in the frequency range below 1 GHz, taking into account *recognizing a)* and current use;

3. if studies of the current allocations to the space operations service indicate that requirements cannot be met under *invites ITU-R 1* and *2*, to conduct sharing and compatibility studies, and study mitigation techniques to protect the incumbent services, both in-band as well as in adjacent bands, in order to consider possible new allocations or an upgrade of the existing allocations to the space operation service within the frequency ranges 150.05-174 MHz and 400.15-420 MHz.

During the study period, ITU-R has developed a number of Reports.

One contains the technical characteristics for telemetry, tracking and command in the space operation service (SOS) below 1 GHz for non-GSO satellites with short duration missions and another concludes that the spectrum requirements for short duration non-GSO systems range from 0.625 MHz to 2.5 MHz in the space-to-Earth direction and from 0.682 MHz to 0.938 MHz in the Earth-to-space direction, depending on the operational scenario.

CEPT supports relevant bands for telemetry, tracking and command in the space operation service below 1 GHz for non-GSO satellites with short duration missions.

In order to respond to this need, this proposal consists of using the existing SOS allocation in the frequency band 137-138 MHz for downlink (space-to-earth) and the 148-149.9 MHz band for uplink and to provide appropriate associated regulatory provisions in the Radio Regulations for telecommand links of non-GSO short duration satellites.

In the frequency band 148-149.9 MHz, in order to comply with the requirement of non-GSO short duration missions for an allocation which is not subject to coordination under Section II of Article **9** of the Radio Regulations, it is proposed to remove the reference to RR No **9.21** and to add a new SOS allocation in the Table of Frequency Allocations. Footnote RR No **5.218** is modified accordingly. It is also proposed to not apply RR No. **9.11A** to the Earth-to-space allocation.

In the frequency band 137-138 MHz, this proposal would apply to stations of the SOS (space-to-Earth) the same coordination threshold with terrestrial services as those for space stations of the MSS (space-to-Earth) (See sections 1.1.1 and 1.1.2 of Annex 1 of Appendix **5** of the RR). It is also proposed that RR No **9.11A** applies if the pfd threshold is exceeded.

For all other bands considered in ITU-R under this agenda item, CEPT supports the conclusions of the studies showing non-compatibility non-GSO short duration SOS systems with incumbent services and is hence proposing “No Change.

Proposals

ARTICLE 5

Frequency allocations

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

MOD EUR/16A7/1

75.2-137.175 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 137-137.025 SPACE OPERATION (space-to-Earth) ADD 5.A17 METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208 |
| 137.025-137.175 SPACE OPERATION (space-to-Earth) ADD 5.A17 METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 5.204 5.205 5.206 5.207 5.208 |

MOD EUR/16A7/2

137.175-148 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 137.175-137.825 SPACE OPERATION (space-to-Earth) ADD 5.A17 METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209  SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208 |
| 137.825-138 SPACE OPERATION (space-to-Earth) ADD 5.A17 METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 5.204 5.205 5.206 5.207 5.208 |
|  | 5.217 | 5.217 |

ADD EUR/16A7/3

5.A17 The use of the frequency bands 137-138 MHz and 148-149.9 MHz by the space operation service for telemetry, tracking and command links of non-GSO satellites with short duration missions is subject to Resolution **[EUR-A17] (WRC-19.)**   (WRC‑19)

**Reasons:** To use the existing SOS allocation in this frequency band.

MOD EUR/16A7/4

148-161.9375 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 148-149.9FIXEDMOBILE except aeronauticalmobile (R)MOBILE-SATELLITE(Earth-to-space) 5.209SPACE OPERATION (Earth-to-space) ADD 5.A17 MOD 5.218 | 148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.209 SPACE OPERATION (Earth-to-space) ADD 5.A17 MOD 5.218 |
| 5.219 5.221 |  5.219 5.221 |
| 149.9-150.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.220 |
| 150.05-153FIXEDMOBILE except aeronauticalmobileRADIO ASTRONOMY5.149 | 150.05-154 FIXED MOBILE |
| 153-154FIXEDMOBILE except aeronauticalmobile (R)Meteorological aids |  5.225 |
| 154-156.4875FIXEDMOBILE except aeronauticalmobile (R)5.225A 5.226  | 154-156.4875FIXEDMOBILE5.226 | 154-156.4875FIXEDMOBILE5.225A 5.226  |
| 156.4875-156.5625 MARITIME MOBILE (distress and calling via DSC) 5.111 5.226 5.227 |
| 156.5625-156.7625FIXEDMOBILE except aeronauticalmobile (R) | 156.5625-156.7625  FIXED MOBILE |
| 5.226 |  5.226 |
| 156.7625-156.7875MARITIME MOBILEMobile-satellite (Earth-to-space) | 156.7625-156.7875MARITIME MOBILEMOBILE-SATELLITE (Earth-to-space) | 156.7625-156.7875MARITIME MOBILEMobile-satellite (Earth-to-space) |
| 5.111 5.226 5.228 | 5.111 5.226 5.228 | 5.111 5.226 5.228 |
| 156.7875-156.8125 MARITIME MOBILE (distress and calling) 5.111 5.226 |
| 156.8125-156.8375MARITIME MOBILEMobile-satellite (Earth-to-space) | 156.8125-156.8375MARITIME MOBILEMOBILE-SATELLITE (Earth-to-space) | 156.8125-156.8375MARITIME MOBILEMobile-satellite (Earth-to-space) |
| 5.111 5.226 5.228 | 5.111 5.226 5.228 | 5.111 5.226 5.228 |
| 156.8375-161.9375FIXEDMOBILE except aeronauticalmobile | 156.8375-161.9375 FIXED MOBILE |
| 5.226 |  5.226 |

**Reasons:** The SOS allocation in the 148-149.9 MHz band is introduced in the Table of Frequency Allocations. Nevertheless, studies have shown compatibility problems in the 149.9-161.9375 MHz frequency band between non-GSO satellite with short duration missions operating under the space operation service and the incumbent services, therefore the band 149.9- 161.9375 MHz remain unchanged.

MOD EUR/16A7/5

5.218 The bandwidth of any individual transmission by the Space Operation Service in the band 148‑149.9 MHz shall not exceed  25 kHz.

**Reasons:** The SOS allocation is introduced in the Table of Frequency Allocations.

NOC EUR/16A7/6

161.9375-223 MHz

**Reasons:** Studies have shown compatibility problems between non-GSO satellite with short duration missions operating under the space operation service and the incumbent services.

NOC EUR/16A7/7

335.4-410 MHz

**Reasons:** Studies have shown that there is no compatibility:
- between short duration non-GSO systems operating in the Earth-to-space direction as well as the space-to-Earth direction and GSO Data Collection Systems the Meteorological-satellite service in the band 401-403 MHz;
- between MetAid receivers and emissions from the Space Operation Service (Earth-to-space) in the frequency band 403-406 MHz.
Resolution **659 (WRC-15)** recognizes the special requirements for the protection of GMDSS and COSPAS-SARSAT (Resolution **205 (WRC-15)**). Therefore, any consideration of bands for use under this agenda item must exclude the 406-406.1 MHz COSPAS-SARSAT band as well as its adjacent 405.9-406 MHz and 406.1-406.2 MHz bands. Studies have shown that there is no compatibility between non-GSO short duration systems operating in the Earth-to-space direction as well as the space-to-Earth direction and the radio astronomy service in the band 406.1-410 MHz.

APPENDIX 5 (REV.WRC‑15)

Identification of administrations with which coordination is to be effected or
agreement sought under the provisions of Article 9

MOD EUR/16A7/8

TABLE 5-1 (*continued*)     (Rev.WRC‑19)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ReferenceofArticle 9 | Case | Frequency bands (and Region) of the service for which coordination is sought | Threshold/condition | Calculation method | Remarks |
| No. **9.13**GSO/non‑GSO | A station in a GSO satellite network in the frequency bands for which a footnote refers to No. **9.11A** or No. **9.13**, in respect of any other non-GSO satellite network, with the exception of coordination between earth stations operating in the opposite direction of transmission | Frequency bands for which a footnote refers to No. **9.11A** or No. **9.13** | 1) Bandwidths overlap2) For the band 1 668-1 668.4 MHz with respect to MSS network coordination with **SRS** (passive) networks, in addition to bandwidth overlap, the e.i.r.p. spectral density of mobile earth stations in a GSO network of the mobile-satellite service operating in this band exceeds −2.5 dB(W/4 kHz) or the power spectral density delivered to the mobile earth station antenna exceeds−10 dB(W/4 kHz) | 1) Check by using the assigned frequencies and bandwidths2) Check by using MSS network Appendix **4** data |  |
| No. **9.14**Non-GSO/terrestrial, GSO/terrestrial | A space station in a satellite network in the frequency bands for which a footnote refers to No. **9.11A** or to No. **9.14**, in respect of stations of terrestrial services where threshold(s) is (are) exceeded | 1) Frequency bands for which a footnote refers to No. **9.11A**; or2) 11.7-12.2 GHz (Region 2 GSO FSS)3) 5 030-5 091 MHz4) 137-138 MHz (SOS) | 1) See § 1 of Annex 1 to this Appendix; In the bands specified in No. **5.414A**, the detailed conditions for the application of No. **9.14** are provided in No. **5.414A** for MSS networks or2) In the band 11.7-12.2 GHz (Region 2 GSO FSS):−124 dB(W/(m2 · MHz)) for 0° ≤ θ ≤ 5°−124 + 0.5 (θ – 5) dB(W/(m2 · MHz))for 5° < θ ≤ 25°−114 dB(W/(m2 · MHz)) for θ > 25°where θ is the angle of arrival of the incident wave above the horizontal plane (degrees)3) Bandwidth overlap4) In the frequency band 137-138 MHz (SOS): -140 dB(W/(m².4kHz)) | 1) See § 1 of Annex 1 to this Appendix |  |

ADD EUR/16A7/9

Draft New Resolution [EUR-A17] (WRC‑19)

Frequency bands identified for telemetry, tracking and command of non-GSO satellites with short duration missions

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

considering

*a)* that the term “short duration mission” used in this Resolution refers to a mission having a limited period of validity of not more than three years;

*b)* that telemetry, tracking and command links for non-GSO satellites with short duration missions falls under the space operation service;

*c)* that these satellites are constrained in terms of low on-board power and low antenna gain;

*d)* that No 5.A17 identifies the bands 137-138 MHz (space-to-Earth) and 148‑149.9 MHz (Earth-to-space) for such applications;

*e)* that ITU-R studies have indicated that other frequency bands than those mentioned in *considering d)* allocated to the space operation service below 1 GHz are not suitable for such applications,

resolves

1 that administrations wishing to implement telemetry, tracking and command of non-GSO satellites with short duration missions use the frequency bands referred to in *considering d)* above;

2 that in the frequency band 137-138 MHz (space-to-Earth), space stations of space operation service shall not exceed a pfd value of -140 dB(W/m2⋅ 4 kHz)), except in cases when another value was coordinated; if this level is exceeded, No **9.11A** applies for networks or systems within the space operation service in this band;

3 that in the frequency band 148-149.9 MHz (Earth-to-space), No **9.11A** does not apply to space operation service (SOS) (Earth-to-space) networks,

further resolves

that the use of the frequency bands in *considering d)* for non-GSO satellites with short duration missions in the space operation service does not establish priority in the Radio Regulations and does not preclude the use of the band for any application of the services to which they are allocated,

instructs the Director of the Radiocommunication Bureau

in applying *resolves 2* at the notification stage, to check conformity with the pfd value contained herein during its examination under No **11.31**: if the value is met, the finding shall be favourable; if the value is exceeded, the Bureau shall check whether a coordination request has previously been sent for this satellite or otherwise issue an unfavourable finding under No **11.32**.

invites administrations

to use the Radiocommunication Bureau  software in order to check the SOS pfd values mentioned in *resolves* *b.*

**Reasons:**
– to recognize the specificity of non-GSO satellites with short duration missions with an appropriate identification in the Radio Regulations;
– the definition of a pfd limit for coordination in the frequency band 137-138 MHz will ensure more protection to terrestrial services than the current situation pertaining to the existing SOS allocation;
– to simplify the coordination procedure.

SUP EUR/16A7/10

RESOLUTION 659 (WRC‑15)

Studies to accommodate requirements in the space operation service for
non-geostationary satellites with short duration missions

**Reasons:** This Resolution is not needed anymore.