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| **World Radiocommunication Conference (WRC-19)Sharm el-Sheikh, Egypt, 28 October – 22 November 2019** |  |
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|  | CPG(18)073 ANNEX V-07A |
| PLENARY MEETING | **Addendum 7A to****Document xxx-E** |
|  | **Date 2018** |
|  | **Original: English** |
|  |
| European Common Proposals |
| Proposals for the work of the conference |
|  |
| Agenda item 1.7 (Option A) |

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 which contains technical characteristics for telemetry, tracking and command in the space operation service below 1 GHz for non-GSO satellites with short duration missions and another one which concludes that the spectrum requirements for short duration NGSO 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 consist in 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 NGSO SD satellites.

In the frequency band 148-149.9 MHz, in order to comply with the requirement of NGSO SD 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. Footnote RR No. **5.218** is modified accordingly

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).

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

Proposal

ARTICLE 5

Frequency allocations

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

MOD EUR/XXXA7/1

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 5.2085 |
| 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/XXXA7/2

137.175-138 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 |

ADD EUR/XXXA7/3

5.XXX The frequency bands 137-138 MHz and 148-149.9 MHz are identified for use by administrations wishing to implement telemetry, tracking and command links for non-GSO satellites with short duration missions. Resolution **[A17-CEPT] (WRC‑19)** applies. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of the band 137-138 MHz is subject to application of provision No. **9.14**. Provisions Nos **9.12**, **9.12A** and **9.13** do not apply.   (WRC‑19)

**Reasons :**

- to use the existing allocation to the SOS in this band efficiently;
- to simplify the coordination with terrestrial services, **9.14** is introduced with the pfd threshold described in the Resolution;
- **9.12**, **9.12A** and **9.13** do not apply because there is no technical reason requiring coordination.
[Note: further study regarding the appropriate application of the relevant regulatory provisions is needed]

MOD EUR/XXXA7/4

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 | 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  |  MOD 5.218 5.219 5.221  |

**Reasons:**

MOD EUR/XXXA7/5

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 frequency table

[Note: further study regarding the impact of the removal of No. 9.21, in particular regarding the protection of the aeronautical-mobile (off-route) service is needed.]

NOC EUR/XXXA7/6

148-161.9375 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| … |
| 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:** 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/XXXA7/7

161.9375-223 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 161.9375-**161.9625**FIXEDMOBILE except aeronauticalmobileMaritime mobile-satellite (Earth-to-space) 5.228AA | 161.9375-**161.9625** FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA |
| 5.226 |  5.226 |
| 161.9625-161.9875FIXEDMOBILE except aeronauticalmobileMobile-satellite (Earth-to-space) 5.228F | 161.9625-161.9875AERONAUTICAL MOBILE (OR)MARITIME MOBILEMOBILE-SATELITE (Earth-to-space) | 161.9625-161.9875MARITIME MOBILEAeronautical mobile (OR) 5.228EMobile-satellite (Earth-to-space) 5.228F |
| 5.226 5.228A 5.228B | 5.228C 5.228D | 5.226 |
| **161.9875-162.0125**FIXEDMOBILE except aeronauticalmobileMaritime mobile-satellite (Earth-to-space) 5.228AA | **161.9875-162.0125** FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA  |
| 5.226 5.229 |  5.226 |
| 162.0125-162.0375FIXEDMOBILE except aeronauticalmobileMobile-satellite (Earth-to-space) 5.228F | 162.0125-162.0375AERONAUTICAL MOBILE (OR)MARITIME MOBILEMOBILE-SATELITE (Earth-to-space) | 162.0125-162.0375MARITIME MOBILEAeronautical mobile (OR) 5.228EMobile-satellite (Earth-to-space) 5.228F |
| 5.226 5.228A 5.228B 5.229 | 5.228C 5.228D | 5.226 |
| 162.0375-174FIXEDMOBILE except aeronauticalmobile | 162.0375-174 FIXED MOBILE |
| 5.226 5.229 |  5.226 5.230 5.231 |
| 174-223BROADCASTING | 174-216BROADCASTINGFixedMobile | 174-223FIXEDMOBILEBROADCASTING |
|  | 216-220FIXEDMARITIME MOBILERadiolocation 5.2415.242 |  |
| 5.235 5.237 5.243 |  | 5.233 5.238 5.240 5.245 |

**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/XXXA7/8

335.4-410 MHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 335.4-387 FIXED MOBILE 5.254 |
| 387-390 FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255 |
| 390-399.9 FIXED MOBILE 5.254 |
| 399.9-400.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.220 |
| 400.05-400.15 STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) 5.261 5.262 |
| 400.15-401 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth) 5.262 5.264 |
| 401-402 METEOROLOGICAL AIDS  SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile |
| 402-403 METEOROLOGICAL AIDS  EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile |
| 403-406 METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile5.265 |
| 406-406.1 MOBILE-SATELLITE (Earth-to-space) 5.265 5.266 5.267  |
| 406.1-410 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.265 |

**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 short duration NGSO 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.

ADD EUR/XXXA7/9

Draft New Resolution [A17-CEPT] (WRC-19)

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

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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.XXX 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

*a)* that administrations wishing to implement telemetry, tracking and command of non-GSO satellites with short duration missions use the bands 137-138 MHz and 148-149.9 MHz;

*b)* that in the band 137-138 MHZ (space-to-Earth) No’s 9.12, 9.12A, 9.13 and 9.14 does not apply to satellite networks or systems not exceeding a pfd value of -140 dB(W/(m². 4 kHz);

further resolves

 that the use of the bands in *considering d)* for non-GSO satellites in the space operation service with short duration missions 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 BR*

 in applying resolves b) 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 favorable; if the value is exceeded, the Bureau shall check whether a coordination request has previously been sent for this satellite or otherwise issue an unfavorable finding under No. **11.32**.

**Reasons :**

– to recognize the specificity of non-GSO SD with an appropriate identification in the Radio Regulations;

– the definition of a pfd limit for coordination in 137-138 MHz will ensure more protection to terrestrial services than the current situation pertaining to the existing SOS allocation;

– Simplify the coordination procedure.

[Note: further study regarding the appropriate application of the relevant regulatory provisions is needed]

MOD EUR/XXXA7/10

TABLE 5-1 (continued)     (Rev.WRC‑15)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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 band 137-138 MHz (SOS) : -140 dB(W/(m².4kHz)) | 1) See § 1 of Annex 1 to this Appendix |  |

SUP EUR/XXXA7/11

RESOLUTION 659 (WRC‑15)

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

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

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