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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 9 toDocument 16(Add.21)-E** |
|  | **8 October 2019** |
|  | **Original: English** |
|  |
| European Common Proposals |
| Proposals for the work of the conference |
|  |
| Agenda item 9.1(9.1.9) |

9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:

9.1 on the activities of the Radiocommunication Sector since WRC-15;

9.1 (9.1.9) Resolution **162 (WRC-15) -** Studies relating to spectrum needs and possible allocation of the frequency band 51.4-52.4 GHz to the fixed-satellite service (Earth-to-space)

Introduction

Resolution **162 (WRC-15)** calls for studies related to spectrum needs and possible allocation of the frequency band 51.4-52.4 GHz to the fixed-satellite service (FSS) (Earth-to-space).

In Report ITU-R S.2461, spectrum needs for development of FSS, in particular for justification of the 1 GHz FSS allocation (Earth-to-space) in the 51.4-52.4 GHz band are analysed. Those studies have been conducted taking into account several aspects including the need to contribute to providing connectivity to the world’s population that currently does not have access to the Internet; advances in satellite technology such as spot-beam antennas and high frequency reuse factors; technical simplifications of Q/V satellite payloads if the new allocation is granted to FSS; improvement of the availability levels that can be reached by FSS networks operating in these frequency bands. The consideration of all these aspects indicate that the additional allocation to FSS is beneficial to make reliable broadband connections more accessible to communities through satellite communication regardless of their geographical location, as achieved by High Throughput Satellite systems.

In line with the CPM Report, Europe proposes a new primary worldwide FSS allocation in the frequency band 51.4-52.4 GHz (Earth-to-space) under the following conditions:

– the allocation is limited to earth stations operating with geostationary FSS networks;

– FSS earth stations (ES) shall operate with a minimum antenna diameter of 2.4 m;

– the earth stations shall be notified at known locations on land.

FSS earth stations shall limit the unwanted emission power levels within the EESS (passive) frequency band 52.6-54.25 GHz to −37 dBW/100 MHz for a maximum elevation angle of the FSS ES of 75°. For FSS ES elevation angles equal or higher than 75°, the proposed unwanted emission levels are −52 dBW/100 MHz. In order to protect future GSO EESS (passive) sensors, FSS earth stations operating with FSS space stations within 3.2° from a limited number of orbital positions in the GSO arc shall not exceed additional limits ranging from −84 dBW/100 MHz to −34.2dBW/100 MHz, depending on the orbital separation between GSO FSS and EESS space stations in the GSO arc. Such limits should be specified in the revision of Resolution **750 (Rev.WRC-15)**.

In line with *resolves to invite ITU-R* of Resolution **162 (WRC-15)** involving “the possible associated regulatory actions”, relevant regulatory considerations, including modifications to RR Article **21** and RR Appendix **7** (Annex 7), are proposed as follows.

Proposals

ARTICLE 5

Frequency allocations

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

MOD EUR/16A21A9/1#50165

51.4-55.78 GHz

|  |
| --- |
| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 51.4-52.4 FIXED FIXED-SATELLITE (Earth-to-space) ADD 5.A919 MOBILE 5.547 5.556 MOD 5.338A |
| 52.4-52.6 FIXED MOD 5.338A MOBILE 5.547 5.556 |

**Reasons:** Proposed new allocation to the FSS (Earth-to-space).

MOD EUR/16A21A9/2#50166

5.338A In the frequency bands 1 350-1 400 MHz, 1 427-1 452 MHz, 22.55-23.55 GHz, 30-31.3 GHz, 49.7‑50.2 GHz, 50.4-50.9 GHz, 51.4-52.4 GHz, 52.4-52.6 GHz, 81-86 GHz and 92-94 GHz, Resolution **750 (Rev.WRC‑19)** applies.     (WRC‑19)

**Reasons:** Application of the limits for FSS ES unwanted emissions as contained in the proposed revision to Resolution **750 (Rev.WRC-15)**.

ADD EUR/16A21A9/3#50167

5.A919 The use of the frequency band 51.4-52.4 GHz by the fixed-satellite service (Earth-to-space) is limited to geostationary satellite networks and the fixed-satellite service earth stations shall have a minimum antenna size of 2.4 m. The earth stations shall be notified at known locations on land.     (WRC‑19)

**Reasons:** To limit the new allocation to gateways operating in FSS GSO satellites networks.

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section II − Power limits for terrestrial stations

MOD EUR/16A21A9/4#50168

TABLE **21-2**     (Rev.WRC‑19)

|  |  |  |
| --- | --- | --- |
| Frequency band | Service | Limit as specifiedin Nos. |
| … | … | … |
| 10.7-11.7 GHz 5 (Region 1)12.5-12.75 GHz 5 (Nos. 5.494 and 5.496)12.7-12.75 GHz 5 (Region 2)12.75-13.25 GHz13.75-14 GHz (Nos. 5.499 and 5.500)14.0-14.25 GHz (No. 5.505)14.25-14.3 GHz (Nos. 5.505 and 5.508)14.3-14.4 GHz 5 (Regions 1 and 3)14.4-14.5 GHz14.5-14.8 GHz51.4-52.4 GHz | Fixed-satellite | 21.2**,** 21.3and21.5 |
| … | … | … |

**Reasons:** Inclusion of the frequency band proposed for the new allocation to FSS (Earth-to-space) for applicability of the limits as specified in RR Nos. **21.2**, **21.3** and **21.5**.

Section III − Power limits for earth stations

MOD EUR/16A21A9/5#50169

TABLE **21-3**     (Rev.WRC‑19)

|  |  |
| --- | --- |
| Frequency band | Services |
| …  | … | … |
| 27.0-27.5 GHz 6  | (for Regions 2 and 3) | Mobile-satellite |
| 27.5-29.5 GHz |  | Space research |
| 31.0-31.3 GHz | (for the countries listed in No. 5.545) |  |
| 34.2-35.2 GHz | (for the countries listed in No. 5.550 with respect to the countries listed in No. 5.549) |  |
| 51.4-52.4 GHz |  | Fixed-satellite |

**Reasons:** Inclusion of the frequency band proposed for the new allocation to FSS (Earth-to-space) for applicability of the limits in RR No. **21.8**.

APPENDIX 4 (REV.WRC‑15)

Consolidated list and tables of characteristics for use in the
application of the procedures of Chapter III

ANNEX 2

Characteristics of satellite networks, earth stations
or radio astronomy stations[[1]](#footnote-1)2    (Rev.WRC‑12)

Footnotes to Tables A, B, C and D

MOD EUR/16A21A9/6#50170

**TABLE C**

CHARACTERISTICS TO BE PROVIDED FOR EACH GROUP OF FREQUENCY ASSIGNMENTS
FOR A SATELLITE ANTENNA BEAM OR AN EARTH STATION OR
RADIO ASTRONOMY ANTENNA      (Rev.WRC‑19)

| **Items in Appendix** | ***C \_ CHARACTERISTICS TO BE PROVIDED FOR EACH GROUP OF FREQUENCY ASSIGNMENTS FOR A SATELLITE ANTENNA BEAM OR AN EARTH STATION OR RADIO ASTRONOMY ANTENNA*** | **Advance publication of a geostationary-satellite network** | **Advance publication of a non-geostationary-satellite network subject to coordination under Section II of Article 9** | **Advance publication of a non-geostationary-satellite network not subject to coordination under Section II of Article 9** | **Notification or coordination of a geostationary-satellite network (including space operation functions under Article 2A of Appendices 30 or 30A)**  | **Notification or coordination of a non-geostationary-satellite network** | **Notification or coordination of an earth station (including notification under Appendices 30A or 30B)**  | **Notice for a satellite network in the broadcasting-satellite service under Appendix 30 (Articles 4 and 5)** | **Notice for a satellite network (feeder-link) under Appendix 30A (Articles 4 and 5)** | **Notice for a satellite network in the fixed-satellite service under Appendix 30B (Articles 6 and 8)** | **Items in Appendix** | **Radio astronomy** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ... | ... |  |  |  |  |  |  |  |  |  |  |  |
| C.10.d.7 | the antenna diameter, in metresIn cases other than Appendix **30A**, required for fixed-satellite service networks operating in the frequency bands 13.75-14 GHz, 14.5-14.75 GHz (in countries listed in Resolution **163 (WRC‑15)** not for feeder links for the broadcasting-satellite service), 14.5-14.8 GHz (in countries listed in Resolution **164 (WRC‑15)** not for feeder links for the broadcasting-satellite service), 24.65‑25.25 GHz (Region 1) 24.65-24.75 GHz (Region 3) and 51.4-52.4 GHz and for maritime mobile-satellite service networks operating in the frequency band 14‑14.5 GHz |  |  |  | **+** | **+** |  |  | **X** |  | C.10.d.7 |  |
| ... | ... |  |  |  |  |  |  |  |  |  |  |  |

**Reasons:** Limitations for antenna diameter for the frequency band 51.4-52.4 GHz is proposed in footnote RR No. **5.A919**.

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/16A21A9/7#50171

TABLE 7c    (Rev.WRC‑19)

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

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Transmitting spaceradiocommunication service designation | Fixed-satellite | Fixed-satellite 2 | Fixed-satellite 3 | Spaceresearch | Earth exploration-satellite,space research | Fixed-satellite,mobile-satellite,radionavigation-satellite | Fixed-satellite 2 | Fixed-satellite |
| Frequency bands (GHz) | 24.65-25.2527.0-29.5 | 28.6-29.1 | 29.1-29.5 | 34.2-34.7 | 40.0-40.5 | 42.5-4747.2-50.250.4-51.4 | 47.2-50.2 | 51.4-52.4 |
| Receiving terrestrial service designations | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile, radiolocation | Fixed, mobile | Fixed, mobile,radionavigation | Fixed,mobile | Fixed, mobile |
| Method to be used | § 2.1 | § 2.2 | § 2.2 |  | § 2.1, § 2.2 | § 2.1, § 2.2 | § 2.2 | § 2.1 |
| Modulation at terrestrial station 1 | N | N | N |  | N | N | N | N |
| Terrestrial station interference parameters and criteria | *p*0 (%) | 0.005 | 0.005 | 0.005 |  | 0.005 | 0.005 | 0.001 | 0.005 |
| *n* | 1 | 2 | 1 |  | 1 | 1 | 1 | 1 |
| *p* (%) | 0.005 | 0.0025 | 0.005 |  | 0.005 | 0.005 | 0.001 | 0.005 |
| *NL* (dB) | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 |
| *Ms* (dB) | 25 | 25 | 25 |  | 25 | 25 | 25 | 25 |
| *W* (dB) | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 |
| Terrestrial station parameters | *Gx* (dBi) 4 | 50 | 50 | 50 |  | 42 | 42 | 46 | 42 |
| *Te* (K) | 2 000 | 2 000 | 2 000 |  | 2 600 | 2 600 | 2 000 | 2 600 |
| Reference bandwidth | *B* (Hz) | 106 | 106 | 106 |  | 106 | 106 | 106 | 106 |
| Permissible interference power | *Pr*( *p*) (dBW)in *B* | −111 | −111 | −111 |  | −110 | −110 | −111 | −110 |
| 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. |

**Reasons:** Consequence of the new proposed allocation to FSS.

MOD EUR/16A21A9/8#50172

RESOLUTION 750 (Rev.WRC‑19)

Compatibility between the Earth exploration-satellite service (passive) and relevant active services

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

…

noting

*a)* that the compatibility studies between relevant active and passive services operating in adjacent and nearby frequency bands are documented in Report ITU-R SM. 2092 and in Report ITU‑R S.2463;

*b)* that the compatibility studies between IMT systems in the frequency bands 1 375-1 400 MHz and 1 427-1 452 MHz and EESS (passive) systems in the frequency band 1 400-1 427 MHz are documented in Report ITU‑R RS.2336;

*c)* that Report ITU‑R F.2239 provides the results of studies covering various scenarios between the fixed service, operating in the frequency band 81-86 GHz and/or 92-94 GHz, and the Earth exploration-satellite service (passive), operating in the frequency band 86-92 GHz;

*d)* that Recommendation ITU‑R RS.2017 provides the interference criteria for satellite passive remote sensing,

…

resolves

…

TABLE 1-1

|  |  |  |  |
| --- | --- | --- | --- |
| EESS (passive) band | Activeservice band | Active service | Limits of unwanted emission power fromactive service stations in a specified bandwidthwithin the EESS (passive) band1 |
| … | … | … | … |
| 50.2-50.4 GHz | 49.7-50.2 GHz | Fixed-satellite (E‑to‑s)4 | For stations brought into use after the date of entry into force of the Final Acts of WRC‑07:−10 dBW into the 200 MHz of the EESS (passive) band for earth stations having an antenna gain greater than or equal to 57 dBi−20 dBW into the 200 MHz of the EESS (passive) band for earth stations having an antenna gain less than 57 dBi |
| 52.6-54.25 GHz | 51.4-52.4 GHz | Fixed-satellite (E‑to‑s)4 | For stations brought into use after the date of entry into force of the Final Acts of WRC-19:−37 dBW in any 100 MHz of the EESS (passive) band for FSS earth stations with elevation angles lower than 75°−52 dBW in any 100 MHz of the EESS (passive) band for FSS earth stations with elevation angles equal or higher than 75°For earth stations operating with an GSO FSS space station whose orbital separation Δ is equal or smaller than 3.2° from the GSO EESS (passive) space stations at the time of the notification with nominal orbital positions: 0°, 3.5° E, 9.5° E, 41.5° E, 76° E, 79° E, 86.5° E, 99.5° E, 105° E, 112° E, 123.5° E, 133° E, 165.8° E, 3.2° W, 14.5° W, 75° W and 137° W:−84 + 200 Δ (dBW/100 MHz) for 0° ≤ Δ < 0.1°−67 + 22.8 Δ (dBW/100 MHz) for 0.1° ≤ Δ < 0.5°−61 + 11.3 Δ (dBW/100 MHz) for 0.5° ≤ Δ < 1.9°−47 + 4 Δ (dBW/100 MHz) for 1.9° ≤ Δ ≤ 3.2° |
| … | … | … | … |

**Reasons:** To limit the out of band emissions from the FSS earth stations falling in the band 52.6‑54.25 GHz to protect the EESS (passive), taking into account the elevation angles of FSS earth stations.

SUP EUR/16A21A9/9

RESOLUTION 162 (WRC‑15)

Studies relating to spectrum needs and possible allocation of the frequency band 51.4-52.4 GHz to the fixed-satellite service (Earth-to-space)

**Reasons:** Resolution **162 (WRC-15)** is not neededafter WRC-19, as studies under agenda item 9.1 issue 9.1.9 have been completed.

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

1. 2 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 (Space Services).    (WRC‑12) [↑](#footnote-ref-1)