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| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
|  |  |
| PLENARY MEETING | **Addendum 6 to Document 25-E** |
|  | **10 September 2015** |
|  | **Original: Arabic** |
|  | |
| Arab States Common Proposals | |
| Proposals for the work of the conference | |
|  | |
| Agenda item 1.6 | |

1.6 to consider possible additional primary allocations:

1.6.1 to the fixed-satellite service (Earth-to-space and space-to-Earth) of 250 MHz in the range between 10 GHz and 17 GHz in Region 1;

1.6.2 to the fixed-satellite service (Earth-to-space) of 250 MHz in Region 2 and 300 MHz in Region 3 within the range 13-17 GHz;

and review the regulatory provisions on the current allocations to the fixed-satellite service within each range, taking into account the results of ITU‑R studies, in accordance with Resolutions **151 (WRC‑12)** and **152 (WRC‑12)**, respectively;

Introduction

In response to Resolution 151 (WRC-12), ITU-R has undertaken studies of possible bands for new primary allocations to the geostationary (GSO) fixed-satellite service (FSS) in the Earth-to-space and space-to-Earth directions within the frequency range 10-17 GHz in ITU Region 1. Studies were performed in 11 different sub-bands from 10 to 17 GHz.

Proposals

In relation to Resolution 152 (WRC-12), the Arab States administrations support ensuring that the proposed new FSS allocations do not cause undue constraints to current ITU Region 1 services.

In relation to Resolution 151 (WRC-12), and pursuant to the results of ITU-R studies, the Arab States administrations propose an allocation of 250 MHz to the FSS (space-to-Earth) in the band 13.4-13.75 GHz in accordance with the following provisions:

− Modification of RR Article 5.

– Dividing the Table of Frequency Allocations into two sub-bands: 13.4‑13.65 GHz and 13.65-13.75 GHz.

– Making an allocation of 250 MHz for FSS (space-to-Earth) in the band 13.4‑13.65 GHz in Region 1 limited to geostationary satellite networks.

− Inserting a footnote in RR Article 5 to protect Earth exploration-satellite systems from FSS (space-to-Earth).

– Protect existing SRS (DRS) systems with regard to FSS, by modifying RR No. 5.501A and adding a new footnote to apply RR No. 9.7 for the coordination of FSS with regard to SRS feeder downlink stations, and RR No. 9.21 for the coordination of FSS with regard to SRS forward inter-orbit links, for the grandfathered systems.

– Pfd limits in RR Article 21 (hard limits on FSS) to protect existing services in the band.

ARTICLE 5

Frequency allocations

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

MOD ARB/25A6/1

11.7-14 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 13.4-13.65  EARTH EXPLORATION-SATELLITE (active)  FIXED-SATELLITE (space-to-Earth) ADD 5.C161 ADD 5.X161 ADD 5.C161*bis*  RADIOLOCATION  SPACE RESEARCH ADD 5.L161  Standard frequency and time signal-satellite (Earth-to-space) | 13.4-13.65  EARTH EXPLORATION-SATELLITE (active)  RADIOLOCATION  SPACE RESEARCH ADD 5.L161  Standard frequency and time signal-satellite (Earth-to-space) | |
| 5.499 5.500 5.501 5.501B | 5.499 5.500 5.501 5.501B | |
| 13.65-13.75 EARTH EXPLORATION-SATELLITE (active)  RADIOLOCATION  SPACE RESEARCH MOD 5.501A  Standard frequency and time signal-satellite (Earth-to-space)  5.499 5.500 5.501 5.501B | | |

**Reasons:** To allocate the band 13.4-13.65 GHz to the FSS (space-to-Earth) in Region 1.

ADD ARB/25A6/2

5.C161 The use of the band 13.4-13.65 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary-satellite systems and is subject to agreement obtained under No. **9.21** with respect to satellite systems, operating in the space research service (space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated space stations in the non-geostationary-satellite orbit, for which information for advance publication has been received by the Bureau prior to 27 November 2015.     (WRC‑15)

**Reasons:** To limit use of the new FSS allocation (space-to-Earth) in Region 1 to GSO FSS, and to specify the terms and conditions for sharing between newly filed GSO FSS networks and SRS systems already notified to the Bureau, operating on space-to-space link to relay data from GSO space station to non-GSO user space station. There is understanding, that coordination of newly filed GSO FSS networks and already notified to the Bureau SRS (space-to-Earth) systems is subject to RR No. 9.7.

ADD ARB/25A6/3

5.L161 The allocation of the band 13.4-13.65 GHz to the space research service on a primary basis is limited to active spaceborne sensors, as well as satellite systems, operating in the space research service (space-to-Earth and space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated earth stations and space stations in the non-geostationary-satellite orbit, for which information for advance publication has been received by the Bureau prior to 27 November 2015. Satellite systems in the space research service (space-to-Earth and space-to-space) shall not cause harmful interference to nor claim protection from stations in the fixed, mobile, radiolocation and Earth exploration-satellite (active) services. Other uses of the band by the space research service are on a secondary basis.     (WRC‑15)

**Reasons:** Since only the frequency assignments having allocation of the considered frequency band on an equal basis are taken into account in the coordination under RR Article 9 it is proposed to modify footnote No. 5.501А and to add a new footnote under which the status of the ITU BR notified frequency assignments of DRS in SRS (s-E and s-s) will be increased up to the primary with regard to FSS. With respect to FSS stations in Region 1 in any case it is required to seek the agreement of other administrations (under RR No. 9.21) operating DRS in SRS (space-to-space) in Region 1, with NGSO user which can be potentially located over the territories of Regions 2 and 3. The direction of the DRS SRS links (space-to-Earth and space-to-space) is defined by the relevant Recommendations therefore it is not specified in RR Article 5 footnotes.

ADD ARB/25A6/4

5.X161 Administrations shall not preclude the deployment and operation of transmitting earth stations in the standard frequency and time signal-satellite (Earth-to-space) allocated on a secondary basis in the band 13.4-13.65 GHz, due to the primary allocation to FSS (space-to-Earth).     (WRC‑15)

**Reasons:** To ensure the deployment of transmitting Earth stations for the European ACES system in the band 13.4-13.75 GHz operating under the standard frequency and time signal-satellite.

ADD ARB/25A6/5

5.C161*bis* In the band 13.4-13.65 GHz, geostationary-satellite networks in the fixed-satellite service (space-to-Earth) shall not claim protection from space stations in the Earth exploration-satellite service (active) operating in accordance with these Regulations. No. **5.43A** and No. **22.2** do not apply.     (WRC‑15)

MOD ARB/25A6/6

5.501A The allocation of the band 13.65-13.75 GHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the band by the space research service are on a secondary basis.     (WRC‑15)

**Reasons:** To ensure operation of notified to the Bureau SRS systems on space-to-Earth and space-to-space links on an equal basis with newly filed stations in the fixed-satellite service (space-to-Earth).

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

Section I − Choice of sites and frequencies

MOD ARB/25A6/7

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1 21.2.1 For their own protection receiving stations in the fixed or mobile service operating in bands shared with space radiocommunication services (space-to-Earth) should also avoid directing their antennas towards the geostationary-satellite orbit if their sensitivity is sufficiently high that interference from space station transmissions may be significant. In particular, in the bands 13.4-13.65 GHz and 21.4-22 GHz, it is recommended to maintain a minimum separation angle of 1.5° with respect to the direction of the geostationary-satellite orbit.    (WRC‑15)

Section V − Limits of power flux-density from space stations

MOD ARB/25A6/8

TABLE **21-4**     (Rev.WRC‑15)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Frequency band | Service\* | Limit in dB(W/m2) for angles of arrival (δ) above the horizontal plane | | | | | | | Reference bandwidth |
| 0°-5° | | 5°-25° | | | 25°-90° | |
| 12.2-12.75 GHz 7 (Region 3)  12.5‑12.75 GHz 7 (Region 1 countries listed in Nos. 5.494 and 5.496) | Fixed-satellite (space-to-Earth) (geostationary-satellite orbit) | −148 | | −148 + 0.5(δ − 5) | | | −138 | | 4 kHz |
| 13.4-13.65 GHz (Region 1) | Fixed-satellite (space-to-Earth) (geostationary-satellite orbit) | **0°-0.6°** | **0.6°-1.25°** | | **1.25°-21.25°** | **21.25°-70°** | | **70°-90°** | 1 MHz |
| −137.5 | −136.5 | | −130.5 | −127.5 | | −122 |

**Reasons:** To insert pfd limits for GSO FSS (space-to-Earth) into RR Article **21** in order to protect allocations to terrestrial services (FS, MS) and RLS.

APPENDIX 5 (REV.WRC‑12)

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

MOD ARB/25A6/9

TABLE 5-1     (Rev.WRC‑15)

Technical conditions for coordination

(see Article 9)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reference of Article 9 | Case | Frequency bands (and Region) of the service for which coordination is sought | Threshold/condition | Calculation  method | Remarks |
| No. **9.7** GSO/GSO | A station in a satellite network using the geostationary-satellite orbit (GSO), in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a Plan, in respect of any other satellite network using that orbit, in any space radiocommunication service in a frequency band and in a Region where this service is not subject to a Plan, with the exception of the coordination between earth stations operating in the opposite direction of transmission | 1) 3 400-4 200 MHz 5 725-5 850 MHz (Region 1) and 5 850-6 725 MHz 7 025-7 075 MHz | i) Bandwidth overlap, and  ii) any network in the fixed-satellite service (FSS) and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±8° of the nominal orbital position of a proposed network in the FSS |  | With respect to the space services listed in the threshold/condition column in the bands in 1), 2), 2*bis*), 3), 4), 5), 6), 7) and 8), an administration may request, pursuant to No. **9.41**, to be included in requests for coordination, indicating the networks for which the value of Δ*T*/*T* calculated by the method in § 2.2.1.2 and 3.2 of Appendix **8** exceeds 6%. When the Bureau, on request by an affected administration, studies this information pursuant to No. **9.42**, the calculation method given in § 2.2.1.2 and 3.2 of Appendix **8** shall be used |
| 2) 10.95-11.2 GHz 11.45‑11.7 GHz  11.7-12.2 GHz  (Region 2) 12.2-12.5 GHz  (Region 3) 12.5‑12.75 GHz (Regions 1 and 3) 12.7‑12.75 GHz (Region 2) and  13.75‑14.5 GHz | i) Bandwidth overlap, and  ii) any network in the FSS or broadcasting-satellite service (BSS), not subject to a Plan, and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±7° of the nominal orbital position of a proposed network in the FSS or BSS, not subject to a Plan |
| 2*bis*) 13.4-13.65 GHz (Region 1) | i) Bandwidth overlap, and  ii) any network in the space research service (SRS) or any network in the FSS and any associated space operation functions (see No. **1.23**) with a space station within an orbital arc of ±7° of the nominal orbital position of a proposed network in the FSS |

**Reasons:** To specify the order and mechanism of coordination in accordance with provisions of RR No **9.7** between newly notifying networks of the FSS and SRS (space-to-Earth).

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TABLE 5-1 (*end*)     (Rev.WRC‑15)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reference of Article 9 | Case | Frequency bands  (and Region) of the service for which coordination is sought | Threshold/condition | Calculation  method | Remarks |
| No. **9.21** Terrestrial, GSO, non‑GSO/ terrestrial, GSO, non‑GSO | A station of a service for which the requirement to obtain the agreement of other administrations is included in a footnote to the Table of Frequency Allocations referring to No. **9.21** | Band(s) indicated in the relevant footnote except 13.4-13.65 GHz in Region 1  except 13.4-13.65 GHz in Region 1 | Incompatibility established by the use of Appendices **7**, **8**, technical Annexes of Appendices **30** or **30A**, pfd values specified in some of the footnotes, other technical provisions of the Radio Regulations or ITU‑R Recommendations, as appropriate  Any network in the space research service (SRS) and any FSS space station within an orbital arc of ±(24)° of the nominal orbital position of a proposed network in the SRS | Methods specified in, or adapted from, Appendices **7**, **8**, **30**, **30A**, other technical provisions of the Radio Regulations or ITU‑R Recommendations |  |

**Reasons:** To define the procedure for coordination under the provisions of RR No. 9.21 between the newly notified FSS networks and SRS networks.

APPENDIX 7 (REV.WRC‑12)

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 ARB/25A6/11

TABLE 8c    (Rev.WRC‑15)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Receiving space radiocommunication service designation | | | Fixed-satellite | | Fixed-satellite, radio- determination satellite | Fixed-satellite | Fixed- satellite | | Meteorological-satellite7, 8 | Meteorological-satellite9 | Earth exploration- satellite7 | Earth exploration- satellite9 | Space research10 | | Fixed-satellite | | Broadcasting-satellite | | Fixed- satellite9 | Broadcasting-satellite | Fixed-satellite7 |
|  | | |  | |  |  |  | |  |  |  |  | Deep space |  |  | |  | |  |  |  |
| Frequency bands (GHz) | | | 4.500-4.800 | | 5.150-5.216 | 6.700-7.075 | 7.250-7.750 | | 7.450-7.550 | 7.750-7.900 | 8.025-8.400 | 8.025-8.400 | 8.400-8.450 | 8.450-8.500 | 10.7-12.75 13.4-13.657 | | 12.5-12.7512 | | 15.4-15.7 | 17.7-17.8 | 17.7-18.8 19.3-19.7 |
| Transmitting terrestrial  service designations | | | Fixed, mobile | | Aeronautical radionavigation | Fixed, mobile | Fixed, mobile | | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | Fixed, mobile | | Fixed, mobile | | Fixed, mobile | | Aeronau-tical radio-navigation | Fixed | Fixed, mobile |
| Method to be used | | | § 2.1 | | § 2.1 | § 2.2 | § 2.1 | | § 2.1, § 2.2 | § 2.2 | § 2.1 | § 2.2 | § 2.2 | | § 2.1, § 2.2 | | § 1.4.5 | |  | § 1.4.5 | § 2.1 |
| Modulation at earth  station1 | | | A | N |  | N | A | N | N | N | N | N | N | N | A | N | A | N | – |  | N |
| Earth station interference parameters and criteria | *p*0 (%) | | 0.03 | 0.005 |  | 0.005 | 0.03 | 0.005 | 0.002 | 0.001 | 0.083 | 0.011 | 0.001 | 0.1 | 0.03 | 0.003 | 0.03 | 0.003 | 0.003 |  | 0.003 |
| *n* | | 3 | 3 |  | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 |  | 2 |
| *p* (%) | | 0.01 | 0.0017 |  | 0.0017 | 0.01 | 0.0017 | 0.001 | 0.0005 | 0.0415 | 0.0055 | 0.001 | 0.05 | 0.015 | 0.0015 | 0.03 | 0.003 | 0.0015 |  | 0.0015 |
| *NL* (dB) | | 1 | 1 |  | 1 | 1 | 1 | – | – | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |  | 1 |
| *Ms* (dB) | | 7 | 2 |  | 2 | 7 | 2 | – | – | 2 | 4.7 | 0.5 | 1 | 7 | 4 | 7 | 4 | 4 |  | 6 |
| *W* (dB) | | 4 | 0 |  | 0 | 4 | 0 | – | – | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 0 |  | 0 |
| Terrestrial station parameters | *E* (dBW) in *B*2 | A | 923 | 923 |  | 55 | 55 | 55 | 55 | 55 | 55 | 55 | 25 5 | 255 | 40 | 40 | 55 | 55 |  |  | 35 |
| N | 424 | 424 |  | 42 | 42 | 42 | 42 | 42 | 42 | 42 | −18 | −18 | 43 | 43 | 42 | 42 |  | 40 | 40 |
| *Pt* (dBW)  in *B* | A | 403 | 403 |  | 13 | 13 | 13 | 13 | 13 | 13 | 13 | −175 | −175 | −5 | −5 | 10 | 10 |  |  | −10 |
| N | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | −60 | −60 | −2 | −2 | −3 | −3 |  | −7 | −5 |
| *Gx* (dBi) | | 523, 4 | 523, 4 |  | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 45 | 45 | 45 | 45 |  | 47 | 45 |
| Reference band- width6 | *B* (Hz) | | 106 | 106 |  | 106 | 106 | 106 | 107 | 107 | 106 | 106 | 1 | 1 | 106 | 106 | 27 × 106 | 27 × 106 |  |  | 106 |
| Permissible interference power | *Pr*( *p*) (dBW) in *B* | |  |  |  | −151.2 |  |  | −125 | −125 | −15411 | −142 | −220 | −216 |  |  | −131 | −131 |  |  |  |

**Reasons:** To specify coordination distances for the FSS receiving earth station in order to protect it from interferences produced by terrestrial FS and MS stations, based on the allowable interference criterion *I*/*N* = 6%, see Recommendation ITU-R S.1432.

ARTICLE 5

Frequency allocations

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

NOC ARB/25A6/12

10-11.7 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 10-10.45  FIXED  MOBILE  RADIOLOCATION  Amateur | 10-10.45  RADIOLOCATION  Amateur | 10-10.45  FIXED  MOBILE  RADIOLOCATION  Amateur |
| 5.479 | 5.479 5.480 | 5.479 |
| 10.45-10.5 RADIOLOCATION  Amateur  Amateur-satellite  5.481 | | |

**Reasons:** No change concerning the frequency band 10-10.5 GHz.

NOC ARB/25A6/13

10-11.7 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 10.5-10.55  FIXED  MOBILE  Radiolocation | 10.5-10.55  FIXED  MOBILE  RADIOLOCATION | |
| 10.55-10.6 FIXED  MOBILE except aeronautical mobile  Radiolocation | | |

**Reasons:** No change concerning the frequency band 10.5-10.6 GHz.

NOC ARB/25A6/14

10-11.7 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 10.6-10.68 EARTH EXPLORATION-SATELLITE (passive)  FIXED  MOBILE except aeronautical mobile  RADIO ASTRONOMY  SPACE RESEARCH (passive)  Radiolocation  5.149 5.482 5.482A | | |

**Reasons:** No change concerning the frequency band 10.6-10.68 GHz.

NOC ARB/25A6/15

11.7-14 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 13.25-13.4 EARTH EXPLORATION-SATELLITE (active)  AERONAUTICAL RADIONAVIGATION 5.497  SPACE RESEARCH (active)  5.498A 5.499 | | |

**Reasons:** No change concerning the frequency band 13.25-13.4 GHz.

NOC ARB/25A6/16

14-15.4 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 14.5-14.8 FIXED  FIXED-SATELLITE (Earth-to-space) 5.510  MOBILE  Space research | | |

**Reasons:** No change concerning the frequency band 14.5-14.8 GHz.

NOC ARB/25A6/17

14-15.4 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 14.8-15.35 FIXED  MOBILE  Space research  5.339 | | |

**Reasons:** No change concerning the frequency band 14.8-15.35 GHz.

NOC ARB/25A6/18

15.4-18.4 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 15.4-15.43 RADIOLOCATION 5.511E 5.511F  AERONAUTICAL RADIONAVIGATION  5.511D | | |
| 15.43-15.63 FIXED-SATELLITE (Earth-to-space) 5.511A  RADIOLOCATION 5.511E 5.511F  AERONAUTICAL RADIONAVIGATION  5.511C | | |
| 15.63-15.7 RADIOLOCATION 5.511E 5.511F  AERONAUTICAL RADIONAVIGATION  5.511D | | |

**Reasons:** No change concerning the frequency band 15.4-15.7 GHz.

NOC ARB/25A6/19

15.4-18.4 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 15.7-16.6 RADIOLOCATION  5.512 5.513 | | |

**Reasons:** No change concerning the frequency band 15.7-16.6 GHz.

NOC ARB/25A6/20

15.4-18.4 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 16.6-17.1 RADIOLOCATION  Space research (deep space) (Earth-to-space)  5.512 5.513 | | |

**Reasons:** No change concerning the frequency band 16.6-17.1 GHz.

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