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| **World Radiocommunication Conference (WRC-15) Geneva, 2-27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
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| **PLENARY MEETING** | **Addendum 1 to  Document 4(Add-2)(Rev.1)-E** |
| **1 October 2015** |
| **Original: English** |
| Director, Radiocommunication Bureau | |
| REPORT OF THE DIRECTOR ON THE ACTIVITIES OF THE RADIOCOMMUNICATION SECTOR | |
| PART 2  eXPERIENCE IN THE APPLICATION OF radio regulatoRY PROCEDURES AND OTHER RELATED MATTERS | |
| Additional information relevant to Part 2 of the Director’s Report | |

# 1 Application of RR No. 9.11A and its relationship with RR Appendix 5 and the corresponding data requirements (WRC12 Doc. 4(Add.2), § 3.3.2.1)

Paragraph. 3.2.1.1 of Document CMR15/4(Add.2) is presenting an example of drat texts for possible consideration by the Conference. In these examples, Option 1 is understood to include the substance of §2.3 of the Rule of procedure on No. **9.11A** in the Radio Regulations with a suggested MOD note 1 to Appendix **5** of the Radio Regulations and Option 2 to consider the coordination only between services with equal status with a proposed MOD §1 to Appendix 5 (including footnote 1).

# 2 Submission of a method to meet power-flux density (pfd) limits for steerable beams in accordance with the Rules of Procedure relating to RR No. 21.16 (WRC 12 Doc. 4 (Add.2), § 3.3.6)

Paragraph 3.2.1.2 of Document CMR15/4(Add.2) proposes the Conference to include the substance of paragraph 3 of the Rules of Procedure relating to RR No. **21.16** in Appendix **4** of the Radio Regulations.

Examples of drat texts for possible consideration by the Conference are presented below:

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| Appendix 4 ***B \_ CHARACTERISTICS TO BE PROVIDED FOR EACH SATELLITE ANTENNA BEAM  OR EACH EARTH STATION OR RADIO ASTRONOMY ANTENNA*** |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **B.1** | **IDENTIFICATION AND DIRECTION OF THE SATELLITE ANTENNA BEAM** |  |  |  |  |  | | | | | | | | | **B.1** |  | | B.1.a | the designation of the satellite antenna beam  For an earth station, the designation of the satellite antenna beam of the associated space station |  |  |  |  |  |  | **X** | **X** | **X** | **X** | **X** | **X** | **X** | B.1.a |  | | B.1.b | an indicator showing whether the antenna beam, under B.1.a, is fixed or whether it is steerable and / or reconfigurable |  |  |  |  |  |  | **X** | **X** | **X** |  | **X** | **X** | **X** | B.1.b |  | | **ADD** B.1.c | For a steerable and/or reconfigurable beam, a statement that the applicable pfd limits will be met by applying a method, the description of which should be submitted to the Bureau. |  |  |  |  |  |  | **X** | **X** | **X** |  | **X** | **X** | **X** | B.1.b |  | |
| Forms of notice to be applied similar to B.1.b |

Although paragraph 3 of the Rules of Procedure relating to RR No. **21.16** provides conditions for a favourable finding in cases where frequency assignments in steerable beams of a satellite network exceed the applicable pfd limits, the information for a steerable beam included in a coordination request or recorded in the MIFR only considers the maximum power density values over all the area the steerable beam of the satellite network could cover. The use of such information is triggering excessive coordination requirements with satellite networks with a later date of submission of coordination, which are not in conformity with the Radio Regulations, as the test point for the calculation may be located within an area where the pfd limits are exceeded with the notified maximum power density values.

In order to remedy this situation, an administration when submitting information on a steerable beams could also provide, in addition to the characteristics to be provided for each satellite antenna beam (Appendix **4**, item B), the necessary equivalent gain contours which would be determined based on the reduction of maximum antenna gain in order to meet the applicable PFD hard limits while maintaining the maximum power density.

Examples of drat text for possible consideration by the Conference is presented below:

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| Appendix 4 ***B \_ CHARACTERISTICS TO BE PROVIDED FOR EACH SATELLITE ANTENNA BEAM  OR EACH EARTH STATION OR RADIO ASTRONOMY ANTENNA*** |
| |  |  |  | | --- | --- | --- | | **B.3.b** | **Antenna gain contours:** |  | | **ADD** B.3.b.3 | Where a steerable beam is used, the necessary equivalent gain contours which are determined based on the reduction of maximum antenna gain in order to meet the applicable PFD limits while maintaining the maximum power density. |  | |
| Forms of notice to be applied similar to B.3.b.1 |

# 3 Rules of Procedure reflecting the practice of the Bureau under No. 9.62

The last paragraph and suggestions of additional notes Nos **9.47.1** and **9.62.1** under paragraph 3.2.2.3 of Document CMR15/4(Add.2) should be read in conjunction with paragraph  3.2.1.1 of the same document, as a decision on the issue in this later paragraph would resolve the issue exposed in par. 3.2.2.3 without any need for additional notes Nos **9.47.1** and **9.62.1**.

# 4 Submission of coordination requests for non-GSO satellite systems

The limitation to the extent of acceptable flexibility for a request for coordination of a non-GSO satellite system as suggested in par. 3.2.2.4.1 of Document CMR15/4(Add.2) could be considered in an addition to the Rule of Procedure concerning the Receivability of forms of notice to be developed in accordance with Section II of Article **13** of the Radio Regulations.

The suggestions contained in §3.2.2.4.3 of Document CMR15/4(Add.2), are conforming to the current regulations applying to the use of frequencies and orbits by GSO and non-GSO satellite networks operating non-planned services, based on the “first come, first served” principle. Such principle has been proving to be efficient for the sustainable development of spaces services in an interference-free environment and therefore should be maintained, without casting any doubt in particular on the date from which a satellite network is included in the coordination procedure, or undermining its objectives and goal.

The coordination discussions involving GSO networks have been so far based on bilateral meetings between involved parties on the assumption that the addition of constraints (in term of bilateral agreed individual network performance degradation) resulting from bilateral agreements would be sufficient to guarantee a global acceptable interference environment for all involved networks. Such successful bilateral approach has been supported by agreed coordination criteria between GSO networks developed over the last 40 years.

Regarding the specificity of the numerous requests for coordination for non-GSO systems operating in the FSS bands, recently received by the Bureau and the lack of agreed coordination criteria between non-GSO networks, the chances exist that the addition of bilateral agreement constraints for a system in terms of interference environment may not adequately represent the real interference environment for that systems and therefore does not provide the necessary free-interference environment for the operation of that system. In addition to continuing study with the ITU-R study groups, consideration of non-mandatory multilateral meetings between non-GSO FSS systems, similar to those already introduced in the Radio Regulations for non-GSO networks for specific bands and services, may be explored as it might help and provide more flexibility, sharing possibility and efficiency in the management of the scarce orbit/spectrum resources for satellite networks.

# 5 Notification of typical earth stations in the fixed-satellite service (FSS)

Paragraph  3.2.3.8 of Document CMR15/4(Add.2) proposes the Conference further investigate the possibility to notify typical earth stations in the fixed-satellite service. In that regards some indication on the information that could be required were listed (Appendix **4** information for the typical earth station including the service area (see Appendix **4**, items C.10.d) and the number of stations operating or to be operated, as well as the associated space station).

Annex 1 displays an example of Appendix **4** information that could be required for the notification of FSS typical earth stations, as draft modifications to Appendix **4** to the Radio Regulations.

The Conference may wish to take account of Annex 1 information when considering Par. 3.2.3.8 of Document CMR15/4(Add.2)

# 6 No. 13.6 of the Radio Regulations

Within the regulatory framework of No. **13.6** of the Radio Regulations, the Bureau requests administrations to provide clarification to demonstrate the use of frequency assignments on-board the satellite in accordance with the notified characteristics recorded in the MIFR. Generally, the administration provides a spectrogram representing the carriers across the requested frequency band as evidence to the Bureau. However, in some instances, the spectrogram provided is only a sample covering a portion of the relevant band.  In these cases, the Bureau understands that partial evidence provided by the administration to support the use of frequency assignments may be considered as proper enough to justify continuous operation of the frequency band to the extent that the Bureau is able to associate the evidence with the relevant bands.

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| The Conference may wish to address this issue and confirm this understanding. |

# 7 Space debris

During the ITU Symposium and Workshop on small satellite regulation and communication systems held in Prague, Czech Republic, on 2-4 March 2015, participants stressed the urgent need for the small satellite community adherence to international laws, regulations and procedures, in particular related to the space debris mitigation guidelines ([Prague Declaration on Small Satellite Regulation and Communication Systems](http://www.itu.int/en/ITU-R/space/workshops/2015-prague-small-sat/Documents/Prague%20Declaration.pdf)).

Space debris is an important issue for the sustainable development of space services and activities, but has so far received a low echo within ITU although ITU-R has approved one recommendation, Rec. ITU-R S.1003.2 on the “Environmental protection of the geostationary-satellite orbit” which in its recommends 1 states “that as little debris as possible should be released into the GSO region during the placement of a satellite in orbit”.

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| In that context, the Conference may wish to consider further this issue, in particular in relation with non-GSO satellites |

**Annex 1**

Example of Appendix 4 information for the notification of a FSS typical earth station

| **Items in Appendix** | ***A \_ GENERAL CHARACTERISTICS OF THE SATELLITE NETWORK,  EARTH STATION OR RADIO ASTRONOMY STATION*** | **Notification of a typical earth station in FSS** |
| --- | --- | --- |
| **A.1** | **IDENTITY OF THE SATELLITE NETWORK, EARTH STATION OR RADIOASTRONOMY STATION** |  |
| A.1.e | **Identity of the earth station or radio astronomy station:** |  |
| A.1.e.1 | the type of earth station (specific or typical) | **X** |
| A.1.e.2 | the name of the station | **X** |
| A.1.e.3 | **For a specific or typical earth station or radio astronomy station:** |  |
| A.1.e.3.a | the country or geographical area in which the station is located, using the symbols from the Preface | **X** |
| A.1.e.3.b*bis* | the number of stations operated or to be operated | **X** |
| A.1.f | **Administration and intergovernmental organization symbol:** |  |
| A.1.f.1 | the symbol of the notifying administration (see the Preface) | **X** |
| **A.2** | **DATE OF BRINGING INTO USE** |  |
| A.2.a | the date (actual or foreseen, as appropriate) of bringing the frequency assignment (new or modified) into use  For a frequency assignment to a GSO space station, including frequency assignments in Appendices **30, 30A** and **30B**, the date of bringing into use is as defined in Nos. **11.44B** and **11.44.2**  Whenever the assignment is changed in any of its basic characteristics (except in the case of a change under A.1.a, the date to be given shall be that of the latest change (actual or foreseen, as appropriate)  Required only for notification. | **X** |
| **A.4** | **ORBITAL INFORMATION** |  |
| A.4.c | **For an earth station:** |  |
| A.4.c.1 | the identity of the associated space station(s) with which communication is to be established | **X** |
| A.4.c.2 | if communication is to be established with a geostationary space station, its(their) orbital position(s) | **X** |
| **B.2** | **TRANSMISSION / RECEPTION INDICATOR FOR THE BEAM OF THE SPACE STATION OR THE ASSOCIATED SPACE STATION or for an earth station** | **X** |
| **B.5** | **EARTH STATION ANTENNA CHARACTERISTICS** |  |
| B.5.a | the isotropic gain, in dBi, of the antenna in the direction of maximum radiation (see No. **1.160**) | **X** |
| **C.1** | **FREQUENCY RANGE** |  |
| C.1.a | the lower limit of the frequency range within which the carriers and the bandwidth of the emission will be located for each Earth-to-space or space-to-Earth service area, or for each space-to-space relay | **X** |
| C.1.b | the upper limit of the frequency range within which the carriers and the bandwidth of the emission will be located for each Earth-to-space or space-to-Earth service area, or for each space-to-space relay | **X** |
| **C.4** | **CLASS OF STATION AND NATURE OF SERVICE** |  |
| C.4.a | the class of station, using the symbols from the Preface | **X** |
| C.4.b | the nature of service performed, using the symbols from the Preface | **X** |
| **C.8** | **Power characteristics of the transmission**  *Not required for passive sensors* |  |
| C.8.b.2 | the maximum power density, in dB(W/Hz), supplied to the input of the antenna2  For coordination or notification of an Appendix **30A** earth station the values shall include the maximum range of power control  Required if neither C.8.a.2 nor C.8.b.3.b is provided | **X** |
| **C.10** | **TYPE AND IDENTITY OF THE ASSOCIATED STATION(S)**  (the associated station may be another space station, a typical earth station of the network or a specific earth station)  For all space applications except active or passive sensors |  |
| C.10.d.7 | the antenna diameter, in metres  In cases other than Appendix 30A, required for fixed-satellite service networks operating in the frequency bands 13.75-14 GHz, 24.65-25.25 GHz (Region 1) and 24.65-24.75 GHz (Region 3), for maritime mobile-satellite service networks operating in the frequency band 14-14.5 GHz and typical earth stations in FSS | **X** |

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