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| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
|  |  |
| PLENARY MEETING | **Addendum 2 to Document 66(Add.6)-E** |
|  | **15 October 2015** |
|  | **Original: Spanish** |
|  | |
| Cuba | |
| Proposals for the work of the conference | |
|  | |
| Agenda item 1.6.2 | |

1.6 to consider possible additional primary allocations:

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

The FSS allocation in the unplanned frequency bands between 10 and 17 GHz displays considerable asymmetry between the amounts of spectrum available in the space-to-Earth and Earth-to-space directions. This asymmetry produces a spectrum deficit on the uplink, preventing the efficient and economic use of this important resource, which is needed to accommodate the operation of a service whose demands within the region are growing.

There is, moreover, an FSS allocation in the three regions of 300 MHz in the Earth-to-space direction in the frequency bands 14.5-14.8 GHz, limited to BSS feeder links for countries outside Europe.

The relevant studies have looked at different frequency band options, highlighting sharing difficulties with existing services. Use of the frequency band 14.5-14.8 GHz, already allocated in the Table of Frequency Allocations, has the advantage of assuming sharing conditions that will be no more demanding than those imposed by FSS feeder links, it being necessary of course to ensure due protection for the BSS feeder links which operate in this frequency band and are recorded or form part of the Appendix 30A Plan assignments and Regions 1 and 3 feeder-link List. This allocation is a potential solution to the need for spectrum for Regions 2 and 3 in the FSS (Earth-to-space).

In the light of the foregoing, Cuba submits the following proposal to WRC-15.

Proposals

ARTICLE 5

Frequency allocations

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

MOD CUB/66A6A2/1

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 | 14.5-14.8  FIXED  FIXED-SATELLITE (Earth-to-space) ADD 5.A162  MOBILE  Space research | |
|  | ADD 5.B162 | |

ADD CUB/66A6A2/2

5.A162 The use of the band 14.5-14.8 GHz by the fixed-satellite service (Earth-to-space) is limited to geostationary-satellite systems, and its use for feeder links for the broadcasting-satellite service is subject to the provisions of Appendix **30A**.

In Region 2, the use of the band 14.75-14.8 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of the satellite-broadcasting service.     (WRC‑15)

**Reasons:** Modifications necessary to broaden the use of the FSS in the band 14.5-14.8 GHz (Earth-to-space) in Regions 2 and 3, ending the limitation of its use to BSS feeder links.

NOTE – This proposal does not take account of Region 1, the analysis for which corresponds to item 1.6.1.

ADD CUB/66A6A2/3

5.B162 In the frequency band 14.5-14.8 GHz, stations in the space research service shall operate on an equal basis with stations of the fixed-satellite service that are not subject to the Regions 1 and 3 feeder-link Plan or List in accordance with the provisions of Appendix **30A**.     (WRC‑15)

**Reasons:** Introduction of suitable regulatory provisions to ensure protection of the space research service in line with the modifications made for the fixed-satellite service, taking into account the expected increase in the number of space stations therein.

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 CUB/66A6A2/4

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), 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 |
| 3) 14.5-14.75 GHz (Region 2) 14.5-14.8 GHz (Region 3) | i) Bandwidth overlap, and  ii) any network in the space research service (SRS) or FSS 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 not subject to a Plan |

**Reasons:** Introduction of relevant provisions in Table 5‑1 of Appendix 5 for sharing on an equal basis between stations of the space research service and stations of the fixed-satellite service not subject to the Regions 1 and 3 feeder-link Plan or List in accordance with Appendix 30A.

APPENDIX 30A (REV.WRC‑12)[[1]](#footnote-1)\*

Provisions and associated Plans and List[[2]](#footnote-2)1 for feeder links for the broadcasting-satellite service (11.7-12.5 GHz in Region 1, 12.2-12.7 GHz  
in Region 2 and 11.7-12.2 GHz in Region 3) in the frequency bands  
14.5-14.8 GHz[[3]](#footnote-3)2 and 17.3-18.1 GHz in Regions 1 and 3,  
and 17.3-17.8 GHz in Region 2     (WRC‑03)

ARTICLE 4     (Rev.WRC‑03)

Procedures for modifications to the Region 2 feeder-link Plan   
or for additional uses in Regions 1 and 3

MOD CUB/66A6A2/5

## 4.1 Provisions applicable to Regions 1 and 3

4.1.1 An administration proposing to include a new or modified assignment in the feeder-link List shall seek the agreement of those administrations whose services are considered to be affected, i.e. administrations[[4]](#footnote-4)4, [[5]](#footnote-5)5:

*a)* of Regions 1 and 3 having a feeder-link frequency assignment in the fixed-satellite service (Earth-to-space) to a space station in the broadcasting-satellite service which is included in the Regions 1 and 3 feeder-link Plan with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

*b)* of Regions 1 and 3 having a feeder-link frequency assignment included in the feeder-link List or for which complete Appendix **4** information has been received by the Radiocommunication Bureau in accordance with the provisions of § 4.1.3, and any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

*c)* of Region 2 having a feeder-link frequency assignment in the fixed-satellite service (Earth-to-space) to a space station in the broadcasting-satellite service which is in conformity with the Region 2 feeder-link Plan, or in respect of which proposed modifications to that Plan have already been received by the Bureau in accordance with the provisions of § 4.2.6 with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment; *or*

*d)* having a feeder-link frequency assignment in the band 17.8-18.1 GHz in Region 2 in the fixed-satellite service (Earth-to-space) to a space station in the broadcasting-satellite service or a frequency assignment in the band 14.5-14.8 GHz in the fixed-satellite service (Earth-to-space) not subject to this Appendix which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. 9.7, or under § 7.1 of Article 7, with a necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment.     (WRC‑15)

**Reasons:** Inclusion in the procedures for modifications to the Appendix 30A Plan of consideration of the fixed-satellite service operating in the band 14.5-14.8 GHz, separate from the feeder links for the broadcasting-satellite service.

MOD CUB/66A6A2/6

ARTICLE 7     (Rev.WRC‑15)

Coordination, notification and recording in the Master International   
Frequency Register of frequency assignments to stations in the fixed-satellite service (space-to-Earth) in Region 1 in the band 17.3-18.1 GHz and in   
Regions 2 and 3 in the band 17.7-18.1 GHz, to stations in the fixed-satellite service (Earth-to-space) in Region 2 in the band 17.8-18.1 GHz, to stations in the fixed-satellite service (Earth-to-space) in the band 14.5-14.75 GHz in Region 2 and 14.5-14.8 GHz in Region 3 where those stations are not subject to the Regions 1 and 3 feeder-link Plan or List and to stations  
in the broadcasting-satellite service in Region 2 in the band 17.3-17.8 GHz  
when frequency assignments to feeder links for broadcasting-satellite  
stations in the 14.5-14.8 GHz, 17.3-18.1 GHz band in Regions 1 and 3 or in the  
band 17.3-17.8 GHz in Region 2 are involved[[6]](#footnote-6)28

MOD CUB/66A6A2/7

Section I – Coordination of transmitting space or earth stations in the fixed-satellite   
service or transmitting space stations in the broadcasting-satellite service  
with assignments to broadcasting-satellite service feeder links

7.1 The provisions of No. 9.7[[7]](#footnote-7)29and the associated provisions under Articles 9 and 11 are applicable to transmitting space stations in the fixed-satellite service in Region 1 in the band 17.3-18.1 GHz, to transmitting space stations in the fixed-satellite service in Regions 2 and 3 in the band 17.7-18.1 GHz, to transmitting earth stations in the fixed-satellite service in Region 2 in the band 17.8‑18.1 GHz, to transmitting earth stations in the fixed-satellite service in the band 14.5-14.8 GHz where those stations are not subject to the Regions 1 and 3 feeder link Plan or List and to transmitting space stations in the broadcasting-satellite service in Region 2 in the band 17.3-17.8 GHz.    (WRC‑15)

7.2 In applying the procedures referred to in § 7.1, the provisions of Appendix 5 are replaced by the following:

7.2.1 The frequency assignments to be taken into account are:

*a)* the assignments in conformity with the appropriate Regional feeder-link Plan in Appendix 30A;

*b)* the assignments included in the Regions 1 and 3 feeder-link List;

*c)* the assignments for which the procedure of Article 4 has been initiated as from the date of receipt of the complete Appendix 4 information under § 4.1.3 or 4.2.6.     (WRC‑03)

7.2.2 The criteria to be applied are those given in Annex 4.

7.2*bis* In applying the procedures referred to in § 7.1 for frequency assignments to stations in the fixed-satellite service (Earth-to-space) in the frequency band 14.5-14.8 GHz not subject to the Regions 1 and 3 feeder link Plan or List, the provision of No. **11.41** is replaced by the following provision. No. **11.41.2** continues to apply.

7.2*bis.1* If, after a notice is returned under No. **11.38**, the notifying administration resubmits the notice and insists upon its reconsideration, and the assignment which was the basis of the unfavourable finding is neither an assignment in the Regions 1 and 3 Plan nor an assignment of definitive recording in the Regions 1 and 3 feeder-link List at the time when the notice is returned under No. **11.38**, the Bureau shall enter the assignment in the Master Register with an indication of those administrations whose assignments were the basis of the unfavourable finding (see also No. **11.42**).

**Reasons:** Introduction of suitable regulatory provisions to take account of new applications in the fixed-satellite service in the band 14.5-14.8 GHz.

MOD CUB/66A6A2/8

ANNEX 1

Limits for determining whether a service of an administration is considered  
to be affected by a proposed modification to the Region 2 feeder-link Plan  
or by a proposed new or modified assignment in the Regions 1 and 3  
feeder-link List or when it is necessary under this Appendix to seek  
the agreement of any other administration     (Rev.WRC‑15)

MOD CUB/66A6A2/9

# 4 Limits to the interference into frequency assignments in conformity with the Regions 1 and 3 feeder-link Plan or with the Regions 1 and 3 feeder-link List or proposed new or modified assignments in the Regions 1 and 3 feeder-link List     (WRC‑15)

Under assumed free-space propagation conditions, the power flux-density of a proposed new or modified assignment in the feeder-link List shall not exceed the value of −76 dB(W/(m2 · 27 MHz)) at any point in the geostationary-satellite orbit, and the relative off-axis e.i.r.p. of the associated feeder-link antenna shall be in compliance with Fig. A (WRC‑97 curves) of Annex 3.     (WRC‑03)

With respect to § 4.1.1 *a)* or *b)* of Article 4, an administration in Region 1 or 3 is considered by the Bureau as being affected if the minimum orbital spacing between the wanted and interfering space stations, under worst-case station-keeping conditions, is less than 9°.     (WRC‑03)

However, an administration is not considered as being affected if, under assumed free-space propagation conditions, the effect of the proposed new or modified assignments in the feeder-link List is that the feeder-link equivalent protection margin[[8]](#footnote-8)35 corresponding to a test point of its assignment in the feeder-link Plan or the feeder-link List or for which the procedure of Article 4 has been initiated, including the cumulative effect of any FSS frequency assignments not subject to this Appendix identified under § 4.1.1 *d)* in the band 14.5-14.8 GHz, whichhad been considered by the Bureau as having been brought into use under No. **11.44B**, and any previous modification to the feeder-link List or any previous agreement, does not fall more than 0.45 dB below 0 dB, or, if already negative, more than 0.45 dB below the value resulting from:

– the Regions 1 and 3 feeder-link Plan and List as established by WRC‑2000; *or*

– a proposed new or modified assignment to the feeder-link List in accordance with this Appendix; *or*

– a new entry in the Regions 1 and 3 feeder-link List as a result of the successful application of Article 4 procedures.     (WRC‑03)

For a proposed new or modified assignment to the feeder-link List, in the interference analysis, for each test point, the antenna characteristics described in § 3.5 of Annex 3 shall apply.     (WRC‑15)

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# 6 Limits applicable to protect a frequency assignment in the band 17.8-18.1 GHz (Region 2) to a receiving feeder-link space station in the fixed-satellite service (Earth-to-space), or to protect a frequency assignment in the band 14.5-14.8 GHz to a receiving space station in the fixed-satellite service (Earth-to-space) not subject to the Regions 1 and 3 feeder-link Plan or List)     (WRC‑15)

With respect to § 4.1.1 *d)* of Article 4, an administration is considered affected by a proposed new or modified assignment in the Regions 1 and 3 feeder-link List when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link in Region 2 or at the receiving space station of the fixed-satellite service uplinks not subject to the Regions 1 and 3 feeder-link Plan or List, in all regions, would cause an increase in the noise temperature of the receiving space station which exceeds the threshold value of Δ*T*/*T* corresponding to 6%, where Δ*T*/*T* is calculated in accordance with the method given in Appendix 8, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the necessary bandwidth of the uplink carriers.     (WRC‑15)

**Reasons:** Introduction of suitable regulatory provisions to ensure protection for the fixed-satellite service (Earth-to-space) in the frequency band 14.5-14.8 GHz.

MOD CUB/66A6A2/11

ANNEX 4     (Rev.WRC‑15)

Criteria for sharing between services

# Threshold values for determining when coordination is required between, on one hand, transmitting feeder-link earth stations in the fixed-satellite service in Region 2 in 17.8-18.1 GHz or transmitting earth stations in the fixed-satellite service in the band 14.5-14.8 GHz not subject to the Regions 1 and 3 feeder-link Plan or List and, on the other hand, a receiving space station in the Regions 1 and 3 feeder-link Plan or List or a proposed new or modified receiving space station in the List, in the frequency bands 14.5-14.8 GHz or 17.8‑18.1 GHz     (WRC‑15)

With respect to § 7.1, Article 7, coordination of a transmitting earth station in the fixed-satellite service with a receiving space station in a broadcasting-satellite feeder link in the Regions 1 and 3 feeder-link Plan or List, or a proposed new or modified receiving space station in the List, is required when the power flux density arriving at the receiving space station of a broadcasting-satellite service feeder link of another administration would cause an increase in the noise temperature of the feeder-link space station which exceeds a threshold value of Δ*T*/*T* corresponding to 6%, where Δ*T*/*T* is calculated in accordance with the method given in Appendix 8, except that the maximum power densities per hertz averaged over the worst 1 MHz are replaced by power densities per hertz averaged over the necessary bandwidth of the uplink carriers.     (WRC‑15)

**Reasons:** Introduction of the requisite coordination thresholds for the new fixed-satellite service application in the band 14.5-14.8 GHz with respect to the feeder links for the broadcasting-satellite service in this band.

SUP CUB/66A6A2/12

RESOLUTION 152 (WRC‑12)

Additional primary allocations to the fixed-satellite service in the   
Earth-to-space direction in frequency bands between 13-17 GHz   
in Region 2 and Region 3

**Reasons:** No longer necessary.

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

1. \* The expression “frequency assignment to a space station”, wherever it appears in this Appendix, shall be understood to refer to a frequency assignment associated with a given orbital position.     (WRC‑03) [↑](#footnote-ref-1)
2. 1 The Regions 1 and 3 feeder-link List of additional uses is annexed to the Master International Frequency Register (see Resolution **542 (WRC‑2000**)\*\*).     (WRC‑03) [↑](#footnote-ref-2)
3. 2 This use of the band 14.5-14.8 GHz is reserved for countries outside Europe.

   \*\* *Note by the Secretariat*: This Resolution was abrogated by WRC‑03.

   *Note by the Secretariat: Reference to an Article with the number in roman is referring to an Article in this Appendix.* [↑](#footnote-ref-3)
4. 4 Agreement with administrations having a frequency assignment in the bands 14.5-14.8 GHz or 17.7-18.1 GHz to a terrestrial station, or having a frequency assignment in the band 17.7-18.1 GHz to an earth station in the fixed-satellite service (space-to-Earth), or having a frequency assignment in the band 17.3-17.8 GHz in the broadcasting-satellite service shall be sought under No. **9.17**, No. **9.17A** or No. **9.19**, respectively. [↑](#footnote-ref-4)
5. 5 Coordination under Nos. **9.17** or **9.17A** is not required for an earth station of an administration on the territory of which this earth station is located and for which the procedures of former § 4.2.1.2 and 4.2.1.3 of Appendix **30A (WRC‑97)** have been successfully applied by that administration before 3 June 2000 in respect of terrestrial stations or earth stations operating in the opposite direction of transmission.     (WRC‑03) [↑](#footnote-ref-5)
6. 28 These provisions do not replace the procedures prescribed in Articles **9** and **11** when stations other than those for feeder links in the broadcasting-satellite service subject to a Plan are involved.     (WRC‑03) [↑](#footnote-ref-6)
7. 29 The provisions of Resolution **33 (Rev.WRC‑97)**\* are applicable to space stations in the broadcasting-satellite service for which the advance publication information or the request for coordination has been received by the Bureau prior to 1 January 1999.

   \* *Note by the Secretariat*: This Resolution was revised by WRC‑03. [↑](#footnote-ref-7)
8. 35 For the definition of the equivalent protection margin, see § 1.7 of Annex 3.

   \* *Note by the Secretariat*: This Resolution was revised by WRC‑12. [↑](#footnote-ref-8)