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| **Radiocommunication Study Groups** |  |
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| Source: Document 4A/TEMP/198  Reference: Documents 4A/278 (Annex 15), 282, 292, 304, 310, 313, 316, 317, 339, 347, 350, 354, 355, 356, 357 and 360  Subject: WRC-12 Agenda item 1.13 | **Annex 16 to Document 4A/368-E** |
| **16 April 2010** |
| **English only** |
| Annex 16 to Working Party 4A Chairman’s Report | |
| WORKING DOCUMENT TOWARDs the development of draft Cpm text on wrc-12 agenda item 1.13 | |
|  | |

At the March/April 2010 meeting of Working Party 4A, text for prospective draft CPM text was reviewed and agreed for most sections. However, due to lack of time, the text for section 6 was not reviewed. The text for this section is shown with proposals and comments received during the meeting (shown with revision marks). Also, text for section 1, the Executive Summary, needs to be generated at the July 2010 meeting of Working Party 4A. For the time being, pieces of text that contain elements that may be used for this section are provided in the section.

Members of Working Party 4A are invited to review the working document towards the development of draft CPM text on WRC-12 Agenda item 1.13 for the next meeting, with particular focus on Section 6.

The working document towards the development of draft CPM text on WRC-12 Agenda item 1.13 is provided in the Attachment to this Annex.

**Attachment:** 1

Attachment  
  
Working document towards the development of draft   
CPM text on WRC-12 Agenda item 1.13

CHAPTER 5

Satellite issues

(Agenda items 1.7, 1.13, 1.18, 1.25, 7)

AGENDA ITEM 1.13

(**WP 4A** / **WP 5C**, **WP 6B**, (WP3M), (WP4B), (WP5A), (WP6A), (WP7D))

*1.13 to consider the results of ITU‑R studies in accordance with Resolution****551******(WRC‑07)*** *and decide on the spectrum usage of the 21.4-22 GHz band for the broadcasting-satellite service and the associated feeder-link bands in Regions 1 and 3;*

Resolution **551 (WRC-07)**: *Use of the band 21.4-22 GHz for broadcasting-satellite service and associated feeder-link bands in Regions 1 and 3.*

# 1 Executive summary

In this section a brief background of the present status of regulations in BSS on the spectrum usage of the 21.4-22 GHz band for the broadcasting satellite service and the associated feeder link bands in Regions 1 and 3 has been provided to clarify any problems and necessary changes needed for these regulations. Then, possible methods found during ITU-R studies have been summarized together with their respective advantages and disadvantages.

With respect to the advantages of disadvantages of each method contained in this document, it was noted that this issue is addressed in section 5/1.13/5 (see also the second paragraph of section 5/1.13/5).

# 2 Background

WARC-92 allocated the band 21.4-22.0 GHz in Regions 1 and 3 to the broadcasting-satellite service (BSS) to be implemented after 1 April 2007. The use of the band since 1992 was subject to an interim procedure in accordance with Resolution **525** (**WARC-92** and **Rev.WRC-03**).

Resolution **551** (**WRC-07**) *resolves* that ITU-R continue technical and regulatory studies on harmonization of spectrum usage, including planning methodologies, coordination procedures or other procedures, and BSS technologies, in preparation for WRC-12, in the 21.4-22 GHz band and the associated feeder-link bands in Regions 1 and 3, taking into account *considering h)[[1]](#footnote-1)* and *i)*[[2]](#footnote-2). Resolution **551** (**WRC-07**) also *resolves* that WRC-12 review the results of the studies and decide the usage of the 21.4‑22 GHz band and the associated feeder-link bands in Regions 1 and 3.

# 3 Summary of technical and operational studies and relevant ITU-R Recommendations and Reports

The regulatory provisions in the Radio Regulations including filing procedures applicable to the BSS network in the 21.4-22 GHz band are described as follows:

- Articles **5**, **9**[[3]](#footnote-3), **11** and **23;**

- Resolutions **33** (**Rev.WRC-03**), **507** (**Rev.WRC-03**), **525** (**Rev.WRC-03**),   
**525** (**Rev.WRC-07**), **526** (**WARC-92**), **551** (**WRC-07**) and **739** (**Rev.WRC-07**).

In preparation for WRC-12 Agenda item 1.13, the ITU-R Recommendations and Reports listed in the following table have been reviewed to take into account the most recent data and information.

| ITU-R Recommendations  and Reports | Subject |
| --- | --- |
| Report ITU-R BO.2071 | System parameters of BSS between 17.3 GHz and 42.5 GHz and associated feeder links |
| Recommendation ITU-R BO.1776 | Reference power flux-density for the broadcasting-satellite service in the band 21.4-22.0 GHz in Regions 1 and 3 |
| Recommendation ITU‑R BO.1659 | Mitigation techniques for rain attenuation for broadcasting-satellite service systems in frequency bands between 17.3 GHz and 42.5 GHz |
| Recommendation ITU-R BO.1785 | Intra-service sharing criteria for GSO BSS systems in the band 21.4-22.0 GHz in Regions 1 and 3 |

NOTE: These Recommendations and Report are currently being processed for updating by Working Party 4A.

In addition, the following ITU-R Recommendations were considered in the preparations under WRC-12 Agenda item 1.13:

- Recommendation ITU-R S.524-9;

- Recommendations ITU-R P.618-9, ITU-R P.837-5 and ITU-R P.1623-1;

- Recommendations ITU-R BO.652-1, ITU-R BO.790, ITU-R BO.791, ITU-R BO.792,   
ITU-R BO.1212, ITU-R BO.1213-1, ITU-R BO.1293-2, ITU-R BO.1295, ITU-R BO.1408-1 and ITU-R BO.1516;

- Recommendation ITU-R SM.1633.

The information in this section is provided for guidance to administrations in preparations for WRC‑12 Agenda item 1.13 only. This overview should in no way be interpreted to reflect all the provisions of the Radio Regulations relevant to BSS in the 21.4-22 GHz band, nor a complete list of all relevant ITU-R Recommendations and Reports.

# 4 Analysis of the results of studies

In analysing the results of the studies in preparation for WRC-12 Agenda item 1.13, the below issues were observed:

As of 5 March 2010, there were 20 networks on which the information on Resolution **49 (Rev.WRC-07)** was received, 11 networks are recorded in Master Register, 22 networks are at the stage of notification, 199 networks have sent coordination requests, 558 networks are at the stage of the API publication (see Annex 17 to this Chairman’s Report). Information was received that there are three satellites in operation and at least one manufacturing company is producing receiving equipment suitable for this frequency band.

*[Editor’s note: The information on submissions at various stages needs to be updated before 16 July 2010.]*

Review of the parameters/data elements relating to submissions received by the Bureau under RR Articles **9** and **11** for the frequency band of 21.4-22.0 GHz or described in relevant ITU-R Recommendations and Reports indicates that there are a wide range of differences between parameters submitted, e.g. space station e.i.r.p. density (22.1 to 81.1 dB(W/MHz)), receiving earth station antenna diameter (30 cm to 2.5 m) and C/N required (7 to 20 dB). The reader is referred to the corresponding Special Sections for submissions in the 21.4-22 GHz band for complete information.

## 4.1 Change of interim procedures of Resolution 525 (Rev.WRC-07) to a permanent situation

The Conference is expected to decide providing a stable situation for implementation of the BSS in Regions 1 and 3 in the band 21.4-22 GHz.

## 4.2 Approach to efficient and equitable use of the orbit spectrum resources

In addressing WRC-12 Agenda item 1.13, *A priori* planning is not necessary and should be avoided because it freezes access according to technological assumptions at the time of planning and then prevents flexible use taking account of real world demand and developments. This was clearly described in considering *h)* and *i)* and in the resolves part of the Resolution **551 (WRC-07)**. In other words, it is essential to ensure that existing and planned operations are not adversely affected and thus the flexible use of the spectrum/orbit resources in the band 21.4-22.0 GHz be ensured. On the other hand, the very principle of equitable access to the use of orbit/spectrum resources as stipulated in Article **44** of the ITU Constitution needs also to be fully observed.

## 4.3 Pfd value vs. availability

The relationship between the power flux-density (pfd) value and the availability depends mainly on the rain rates intensity. It seems very difficult to define a unique pfd value for the entire Regions 1 & 3 area. In some cities with low rain rates (e.g. in Europe), a reduced pfd value could be sufficient to ensure an adequate availability and no specific mitigation techniques would need to be developed. Inversely, in some cities with high rain rates (e.g., in equatorial areas), a higher pfd value would be necessary to achieve an adequate availability and some specific mitigation techniques could also be necessary.

## 4.4 Feeder links

### 4.4.1 Flexibility in choice of feeder link band

To facilitate flexible and efficient spectrum utilization, it is desirable not to have any limitations on the FSS Earth-to-space bands which may be used for the associated feeder links.

### 4.4.2 Balance between uplink and downlink capacity

Studies (see Documents 4A/[105](http://www.itu.int/md/R07-WP4A-C-0105/en) and [269](http://www.itu.int/md/R07-WP4A-C-0269/en)) have shown that at present, there is less uplink bandwidth than downlink bandwidth for FSS and BSS in Region 1 in the 15-40 GHz range. As a result, there is no capacity available in Region 1 that allows a 600 MHz band to be used for feeder links for the 21.4-22 GHz BSS without being capable of efficiently providing feeder links to other downlink bands. In Region 3, two blocks could potentially be used for feeder links for the 21.4-22 GHz band; these are 24.75-25.25 GHz and 27-27.5 GHz. However, both these bands are just 500 MHz wide, lacking 100 MHz to provide a 600 MHz feeder link bandwidth.

A mismatch between the uplink and downlink capacity as observed in this case, would need to be satisfactorily resolved. In this respect, two options were noted:

a) No particular action. Administrations will select uplink and downlink capacity for their satellite networks according to their wishes while observing the current situation regarding the availability of uplink and downlink capacity.

b) To enable efficient and rational spectrum usage of the 21.4-22 GHz band as well as other satellite downlink bands, WRC-12 may ensure that there exist at least 600 MHz uplink capacity which can be used to feed the 21.4-22 GHz band without being to the detriment of the capability to efficiently feed other downlink frequency bands, preferably in one continuous block. To this effect, WRC-12 may consider the allocation of 600 MHz of FSS (Earth-to-space) capacity for Region 1 in the 15-40 GHz range, preferably in one continuous block. Moreover, WRC-12 may consider ensuring a 600 MHz of FSS (Earth-to-space) capacity for Region 3 in the 15-40 GHz range, either through an allocation expanding one of the above identified bands or through other new allocations.

#### 4.4.2.1 Potential candidate bands

It was observed that feeder links for BSS are characterized by a very small number of large earth stations in known locations. Reception of terrestrial services can thus only be affected within a small number of geographical areas around these earth stations.

If considering possible new feeder link bands for BSS in Region 1 and 3, administrations may take note of the candidate bands provided in the table below. These bands are all associated with FSS allocations already made in Regions 1 and/or 3. It should be noted that frequency bands not included in this list could also be considered. Furthermore, observing Resolution **34 (Rev.WRC-03)**, allocations should, to the extent possible, be similar throughout Regions 1 and 3.

|  |  |  |
| --- | --- | --- |
| Candidate bands for new feeder links for BSS in Regions 1 and 3 (non-exhaustive list) | | |
|  | Region 1 | Region 3 |
| I | 24.65-25.25 GHz | 24.65-24.75 GHz  (complimentary to the existing  24.75-25.25 GHz band) |
| II | 24.75-25.35 GHz | 25.25-25.35 GHz  (complimentary to the existing  24.75-25-25 GHz band) |
| III | 26.5-27.1 GHz (and the 27.1-27.5 GHz considered for regular FSS (Earth-to-space) | 26.5-27 GHz (complimentary to the existing 27-27.1 GHz band and with the consideration of the  27.1-27.5 GHz band matching a new FSS allocation (space-to-Earth) in the  17.3-17.7 GHz band) |
| IV |  | 26.9-27 GHz (complimentary to the existing 27-27.5 GHz band) |

NOTE: Some administrations were of the view that the bands above 24 GHz were not appropriate since these bands have more rain attenuation than those in 18 GHz bands. Other administrations were of the view that there would be not much difference between the 18 GHz bands and the bands above 24 GHz.

Some administrations were of the view that the 18.1-18.4 GHz band could be considered for feeder links for a portion of the 21.4-22 GHz BSS. This band is allocated to FSS (Earth-to-space) in both Regions 1 and 3 and its use is limited to feeder links for BSS. However, other administrations were of the view that this band was not appropriate since this band is also allocated to FSS (space-to-Earth) in both Regions and cannot be implemented on the same satellite or in the same orbit location on co-located satellites due to intra system interference.

*[NOTE – Documents* [*4A/105*](http://www.itu.int/md/R07-WP4A-C-0105/en) *and* [*4A/269*](http://www.itu.int/md/R07-WP4A-C-0269/en)*, containing the studies, are [for the time being] hyperlinked to this section.]*

*[More text to be developed pending consideration of candidate uplink bands and outcome of sharing studies.]*

## 4.5 Sharing between Regions 1 and 3 BSS networks (intra-service protection)

The interim procedures of Resolution **525 (Rev.WRC-07)** specifies that in coordination between Regions 1 and 3 BSS networks, the procedures of Articles **9**, **11** and **23** of the Radio Regulations shall be applied.

The two complementary criteria to determine coordination requirements currently in use are:

– a **coordination arc** (RR Appendix **5**, Table **5-1**, section 8) associated with RR No. **9.7**) which requires that administrations coordinate with all networks inside the arc (currently, the value of the coordination arc is +/- 16˚);

– a **ΔT/T criterion** that allows administrations outside the arc, at their request, to be included in the coordination requirements ,or to be excluded from the coordination process even if their networks situated inside the arc ,as the case may be, if the ΔT/T into an assignment of their own networks is demonstrated to exceed a certain limit (RR Nos. **9.41** and **9.42**) (currently, the ΔT/T is calculated by the Bureau and published as a part of the coordination request) (the value of the ΔT/T limit currently in force in this case is 6%).

It has not been proposed to change this existing mechanism. However the appropriate value of the coordination arc has been the subject of several studies.

These technical studies have shown that the value of 16° is overly conservative and that the coordination arc for geostationary BSS networks in the 21.4-22 GHz band can be reduced to a value of 6° (see also Recommendation ITU‑R BO.1785).

## 4.6 Other issues

*i)* Section II of Article 23 of the Radio Regulations

It was recognized that section II of Article **23** of the RR equally applies to BSS in the band   
21.4-22 GHz. In this connection, it was brought to the attention of ITU-R, the difference in wording between provisions **23.13** and **23.13B**. Provision RR No. **23.13** includes the wording “all technical means available shall be used to reduce, to the maximum, ***radiation over the territory of other countries unless an agreement has been previously reached”*** whereas in RR No. **23.13B** which was approved/adopted at WRC-2000, such language is not used. Some administrations were of the view that this difference in wording between these provisions results in a discrepancy that needs to be corrected to align the text of RR No. **23.13B** with that of RR No. **23.13** in order that the consistency between various provisions of Article **23** is ensured. Other administrations were of the view that the difference in wording between the provisions adopted by WRC-2000 was intentional and, as such, there is no discrepancy that needs to be addressed.

Since this issue is of regulatory nature and also has implications for frequency bands and services other than Regions 1 and 3 BSS in the 21.4-22 GHz band, it should be dealt with under WRC‑12 Agenda item 7, by the relevant group to which this agenda item is assigned

ii) Improved due diligence information requirements for 21.4-22 GHz band BSS networks

It was recognized that submitted Resolution **49** information for networks that are not operational or have ceased operation, e.g. because the satellite has been moved to another orbit location, would place severe undue constraints on other administrations trying to coordinate networks. A method to improve this situation for BSS in the 21.4-22.0 GHz band was considered (see “Method B” in the following sections 5/1.13/5.2 and 5/1.13/6.2).

It was furthermore recognized that any consideration of application of such a method beyond BSS for Region 1 and 3 in the 21.4-22 GHz band would need to be addressed by the relevant groups under Resolution **86 (Rev.WRC-07)** (WRC-12 Agenda item 7).

# 5 Methods to satisfy the agenda item

Sections 5/1.13/5.1 to 5/1.13/5.7 are describing methods in response to issues between Regions 1 and 3 BSS networks (intra service issues). Section 5/1.13/5.8 and its subsections are addressing issues between Regions 1 and 3 BSS and other services (inter service issues).

This section provides different views of ITU-R in relation with various methods. It may therefore be counterproductive to repeat those views in the form of advantages and disadvantages for each of the methods. For these reasons, in the subsections, the methods are described, but without identifying advantages and disadvantages.

Intra service issues

**A.1** When discussing intra service methods to satisfy the Agenda item, the issue of equitable access was raised and it was mentioned that Article **44** of the ITU Constitution provides amongst other things, that the orbit and spectrum are limited natural resources and must be used rationally, efficiently and economically, in conformity with the provisions of these Regulations. It was agreed that *a priori* planning is not necessary and should be avoided as it freezes access according to technological assumptions at the time of planning and then prevents flexible use taking account of real world demand and technical developments. It was therefore agreed that coordination and notification procedures for Regions 1 and 3 BSS networks in the 21.4-22 GHz band should be based upon Articles **9**, **11** and **23** of the Radio Regulations. However, as discussed below, some administrations proposed supplementary procedures to Articles **9** and **11** as well as modifications to Article **23** procedures.

**A2** Some administrations were of the view that the number of BSS networks in the Bureau’s databases in this band (see section 5/1.13/4) would impose serious difficulties on successful and timely completion of coordination of subsequent submissions. The more networks submitted, the more limitations for successful and timely subsequent submissions. For these reasons,   
Methods D and E propose special procedures giving priority to submissions from administrations with no networks previously filed with the Bureau in this band. Some other administrations were of the view that since the number of satellite networks in other frequency bands was higher, the situation in this band did not require any special procedures in this respect. The former administrations did not agree with such an argument in comparing the situation in other band which are currently very extensively congested due to the extensive number over filing and the matter has been subject of serious concerns in various ITU fora including the recent Bureau’s workshop .These former administrations were thus of the view that it is inappropriate to expect the same misuse of other band in this frequency band. The latter administrations which are not in favour of such special measures also were of the view that only geographically large countries can implement economically viable networks under the proposed special procedures. The former administrations did not share such an argument as the special measures are applicable to all countries of different geographical size, including those countries which could form satellite networks covering their combined territories.

**A3** In respect of the application of the special procedures proposed in Methods D and E, some administrations were of the view that if an administration was party to one or more BSS submissions in the 21.4-22 GHz band by a named group of administrations (e.g. by a submission through an intergovernmental organization or through a multi-country agreement), this administration had already used its right to a submission in this frequency band and should not be entitled to further submissions under the special procedures. In the view of these administrations, it would not be reasonable to allow an administration that might already be party to a large number of multi-country submissions over its territory to have the privileges associated with these special procedures for subsequent submissions. Other administrations were of the view that this would discourage administrations from entering into multi-country co-operation and joining multi-country submissions or submissions by intergovernmental organizations. For these reasons, these administrations were of the view that administrations should be allowed to be party to up to [3] multi-country/intergovernmental submissions and still retain its rights to have its first national submission processed under these special procedures. The current texts for Methods D and E (see sections 5/1.13/5.4, 5.5, 6.4 and 6.5) are based upon the first view. However, should the Conference so decide, the solutions prescribed in these two methods could be amended according to the second view.

**A4** Some administrations believe that while supplementary measures proposed under Methods D and E would improve the situation and preserve to some extent, the equitable access to the orbital and spectrum resources as stipulated in Article **44** of the Constitution. Nevertheless, since many submitted networks did not reflect real satellite project and therefore proposed that ITU‑R urges administrations to review their submissions for Regions 1 and 3 BSS networks in the 21.4-22 GHz band and in order to facilitate equitable access of other countries which did not have any submissions in this frequency band suppress submissions which, in the view of the administration concerned, cannot realistically be brought into use within the period of validity of the submission. The Conference may adopt a Resolution to this effect. Method F proposes wording for such a Resolution.

**A5** Also, some administrations were of the view that many satellite networks in the Bureau’s databases did not represent real operational satellites. Under the current rules, as it is possible to inform the Bureau that a satellite network was brought into use several years ago without updating this information if the operating satellite changes or regular operation of the satellite network filing is suspended, it is very difficult to verify such information. Furthermore, the current rules allow the submission of due diligence information years in advance of the actual bringing into use, without the requirement to update this information if the administration’s plans have changed and a different satellite will ultimately operate under the satellite network filing in question. This could impose difficulties on successful coordination of subsequent submissions. For this reason, Method B proposes ways to resolve such difficulties by proposing new mechanisms to update due diligence information when required. The consequences of revising Resolution **49** needs to be reviewed.

**A6** Some administrations were of the view that the variation of the values for various data elements from one submission to another submission (see section 5/1.13/4) could also impose deficiencies in the proper allocation of spectrum orbit resources. To obtain more homogenous technical parameters, Method C proposes a limited range of the permitted values of technical parameters (e.g. e.i.r.p. density radiated by the satellite or the receiving earth station antenna diameter) should be established. Restrictions on the coverage area or the number of systems submitted by one Administration could also be considered. Other administrations were of the view that this would lead to limited flexibility for administrations to choose technical parameters according to their applications and needs and would hinder flexibility to adapt to new technical parameters as applications and technology changes. Moreover, introducing such limitations would disadvantage future submissions compared to those networks already submitted. These administrations are furthermore of the view that in some countries in Regions 1 and 3 the limitation of e.i.r.p. will reduce the service availability due to the heavy rain attenuation. The limitation of other technical parameters such as occupied bandwidth, modulation types will reduce the flexible use of the future applications such as UHDTV, 3D-TV.

Inter service issues

**B1** In addition to any method in respect of intra-service issues, WRC-12 should also address the sharing conditions between Region 1 and 3 BSS in the 21.4-22 GHz and terrestrial services in all three Regions. There is no agreement on the need or otherwise to provide specified protection between Region 1 and 3 BSS and terrestrial networks in Region 2 or Regions 1 and 3. Sections 5/1.13/5.81 and 5/1.13/5.8.2 discuss issues related to sharing between BSS in Region 1 and 3 and terrestrial services in Region 2 and Regions 1 and 3 respectively.

## 5.1 Method A

Article **9** and **11** of the Radio Regulations prescribe the procedures for use of spectrum resources of, amongst others, satellite networks (using the principle of “first-come-first served”). These provisions are, with the exception of the bands subject to *a priori* Plans (Appendix **30**, **30A** and **30B**), applied for coordination and notification of satellite networks in all frequency bands. Method A in addition provides a stable situation (from interim to permanent procedures) for the use of the band for implementation of BSS in the 21.4-22 GHz band in Regions 1 and 3. Submitted systems are protected against interference with the help of the coordination and notification procedures contained in Articles **9** and **11** and Article **23** of the Radio Regulations. Section 5/1.13/6.1 provides example regulatory text for Method A.

See paragraph A1 of section 5/1.13/5 for different views on Method A.

## 5.2 Method B

Method B is a variant of Method A. This method proposes measures to improve the due diligence requirements currently contained in Resolution **49** to obtain better coherence/consistency between networks recorded in the Master International Frequency Register (MIFR) and real satellites in operation. The main spirit of this, applicable only to Region 1 and 3 BSS in the 21.4-22 GHz band, is to require that Administrations inform the Bureau immediately after each key event for a specific satellite network filing. The events referred to would include each time a different satellite operates under the specific satellite network filing, or when regular operation under a satellite network filing is suspended.

The aim of this Method is to enable identification of each satellite and tracing the orbit location of a satellite at any given time. This will permit easy verification of the information submitted by any administration and would avoid one satellite being registered as being operational in multiple orbit locations simultaneously.

This Method may be implemented either having a separate Resolution or by having a new annex to the existing Resolution **49**. In both cases, it will be necessary to review the relevant provisions of Articles **9** to **14** and other relevant Articles of the Radio Regulations in order to make appropriate cross references with respect to the new Resolution or the new annex to the current Resolution **49** for the band 21.4-22 GHz. In the example text in section 5/1.13/6.2, this method is shown as a separate Conference Resolution.

See paragraph A5 of section 5/1.13/5 for different views on Method B.

## 5.3 Method C

Method C is based on Articles **9**, **11** and **23** of the Radio Regulations, but with additional restrictions on network parameters which might facilitate coordination of subsequent submissions. Consequently, when using Method C, a limited range of the permitted values of technical parameters (e.g. e.i.r.p. density radiated by the satellite or the receiving earth station antenna diameter) should be established. This will lead to more homogeneous submissions. Similar course of action has been taken when developing BSS and FSS Plans. Restrictions on the coverage area or the number of systems submitted by one Administration could also be considered.

The above mentioned course of actions described by Method C could be periodically reviewed depending on the actual usage of the orbit in the considered 21.4-22 GHz band (see section 5/1.13/6.3). Further studies are required to determine on what parameters to apply restrictions and what would be the appropriate range.

See paragraph A6 of section 5/1.13/5 for different views on Method C.

## 5.4 Method D

Method D is based on application (with the help of BR ITU) of the procedure of guarantee   
orbit-frequency resource allocation (similar to Article **7** of RR Appendix **30В**) for the *special* submission, satisfying the following conditions:

− administration (or a group of named administrations) requesting for special submission should not have any assignment for BSS systems in 21.4−22.0 GHz band;

− service and coverage areas (by −3 dB contour) of the special BSS system requests should correspond with national territory of notifying administration (or group of named administrations that joined the submission);

− all technical parameters including pfd, receiving earth station antennae size and availability correspond with the technical parameters described in Report ITU-R ВО.2071 or with a set of parameters, agreed by Conference;

− to prevent paper submissions, the term of bringing into use of the received special submission for national assignment may be limited, for example, by 5 years.

Upon receipt of such *special* submission the Bureau identifies appropriate orbital location for the submitted network and defines affected administrations.

At arising the coordination problems of such national submission with earlier submitted notices it is offered to call on affected administrations to agree with some restrictions, e.g.:

− restriction of service and coverage areas only by countries which have given their explicit agreement to include their territory into the service area of affected assignment;

− limiting the range of the technical parameters;

− application of the lowered interference criterion C/I.

In the event that the coordination of the network applying this special procedure during [1][ 2] months does not lead to a successful completion of the coordination, the affected administration(s) shall be deemed to have given its agreement to the network applying this special procedure. Following the successful notification under RR Article **11**, the Bureau shall record the assignments in the Master Register (MIFR).

Thus, in Method D version some of the specified restrictions will be applied only in case of need and only to those earlier submitted notices which will appear affected by the notice of the country which doesn’t have any assignments in the 21.4-22.0 GHz band and ready to bring into operation a BSS system within [5] years with national coverage and with the recommended parameters.

Method D is supplementary to Method A as the principle of “ *first come* *first served* “ is still applied to submissions not subject to this special procedures.

Draft new Resolution (see section 5/1.13/6.4) contains a possible procedure for the addition of an assignment for *special* BSS systems in the 21.4-22.0 GHz frequency band.

See paragraphs A2 and A3 of section 5/1.13/5 for different views on Method D.

## 5.5 Method E

The special procedures described below can only be applied by an administration which does not have any network neither in the MIFR nor notified under Article **11** nor coordinated or in the process of coordination under Article **9** of the Radio Regulations in this frequency band.

The general principle under Method E on how to process the network of that administration which has not submitted any national or intergovernmental/sub-regional requirement in this frequency band at the time that submitting their first national or intergovernmental/sub-regional requirements is as follows.

The networks submitted by these administrations in the order of their receipt will be given top priority, in analogy with the principles contained in RR Appendix **30B** in case of new Member of the Union (in that Appendix all Member States have already obtained an allotment/assignment in the Plan).

The orbital location for networks applying the special procedure could either be specified by the notifying administration, preferably co-located with the orbital location position(s) of the national assignments in Appendices **30**, **30A** and/or **30B**, at the time of the submission or should be selected within a specified period (not more than 6 months) by the Bureau pursuant to the request by the administration, within the arc specified at the time of submission of the responsible administration. In the shown regulatory example text in section 5/1.13/6.5, the option of specifying the orbit location at the time of submission is chosen.

The order of priority will be implemented so as these submissions will be moved to the beginning of the Bureau’s file waiting list behind all administrations which have already submitted RR complete information as per Appendix **4** data but with one single satellite network per administration which did not have any assignment/ satellite network in this frequency band that were either recorded in the MIFR or notified and not yet brought into use, or coordinated or under coordination. The remaining networks submitted by other administrations awaiting to be processed under section II of RR Article **9** by the Bureau will be moved to the end of the waiting list of the administrations which have submitted only one network respecting their corresponding date of receipt.

In case of intergovernmental /sub-regional[[4]](#footnote-4) systems, each administration member of those networks which have already been associated with that intergovernmental /sub-regional system and has had coverage by using assignments related to that intergovernmental /sub-regional systems would be considered as having the first/initial coverage per its territory, if the assignments relating to that first intergovernmental /sub-regional system is either recorded in the MIFR, or notified and not yet brought into use or coordinated or under coordination. This means that each one of the countries member of that intergovernmental/sub‑regional system would be considered to have already been granted one single network within that /those intergovernmental /sub-regional system(s).

The notifying administration applying these special procedures (Administration “B”) then needs to effect necessary coordination with other administrations that are identified as affected (Administrations “A1”, “A2” etc). In this connection, should any of these latter administrations already have satellite networks in the subject frequency band in the Bureau's coordination files and covering the same service area of Administration "B", they shall apply the following course of action in respect of Administration" B" which has had no submission before and having the first submission in the same frequency band and covering the same service area:

a) if the agreement of administrations "A1","A2 "and etc is required following the application of relevant procedure of Article **9** by Administration "B", in order to protect the satellite networks of administrations "A1", "A2"and etc. by the Administration" B "

from interference caused by the assignment proposed by the latter administration, the concerned administrations shall make every possible effort to resolve the difficulties by means of mutually acceptable adjustments to their networks;

b) in case of continuing disagreement, and if the administrations of "A1", "A2" and etc have not communicated to the Bureau the valid information specified in Annex 2 to Resolution **49 (Rev.WRC-2000)[[5]](#footnote-5)\***, these administrations shall be deemed to have given its agreement to Administration "B " for recording in the Master Register.

*[Editorial note: The concept of a) and b) above are stemming from RR Appendix* ***30*** *No.* ***4.1.24****]*

Once the assignments of Administration "B " is recorded in the MIFR, that Administration shall bring the assignments into use within the regulatory time limit specified in RR No. **11.44** and RR No. **11.48** together with submission of valid information specified in Annex 2 to Resolution **49 (Rev.WRC-2000)** andconfirmation of the date of bringing into use of the subject assignment**.** Otherwise assignments in question shall be cancelled from the MIFR together with the associated coordination file (s) from the Bureau's database.

Should Administration B submit at later stage a new submission intending to use the above mentioned procedures, such submission would not benefit from the priority arrangements enshrined in Method E.

Method E is supplementary to Method A as the principle of “first come first served” is still applied to submissions not subject to this special procedure.

In order to fully respect the applicable procedure of Article **9** of the Radio Regulations in terms of respecting the date of receipt of submissions, irrespective of their class of station (FSS, MSS, etc.), there is a need that the Bureau establish a separate processing queue (chain) for Regions 1 and 3 BSS submissions in the 21.4-22 GHz band and then apply the principles of Method E for this. This principle, together with the details of its application, needs to be included in a Conference Resolution, e.g. Resolution **525 (Rev WRC-12)** (see section 5/1.13/6.5).

See paragraphs A2 and A3 of section 5/1.13/5 for different views on Method E.

## 5.6 Method F

Method F is supplementary to Method A and proposes measures to improve the access by administrations to orbit spectrum resources. The key element is a Conference Resolution which amongst others would prescribe that administrations:

i) to reduce the number of submitted networks

- within a few months following the adoption of this Resolution, administrations review their submissions with a view to remove those that are no longer required;

ii) to use more homogenous parameters of submitted networks to facilitate coordination by

- revising; the technical parameters of submissions in the processing;

- queue of the Bureau at the time of WRC-12 without any change in date of receipt;

iii) to further facilitate coordination by

- urging administrations to make the utmost efforts to accommodate coordination of submissions by other administrations, especially submissions from administrations with a few submissions covering their own territory;

iv) to include a review of the effect of this Resolution in the Report of the Director of the Radiocommunication Bureau in his report to future World Radiocommunication Conferences.

See section 5/1.13/6.6 for example text for the prospective new Conference Resolution.

See paragraph A4 of section 5/1.13/5 for different views on Method F.

## 5.7 Feeder link allocation

As discussed in section 5/1.13/4.2.2; should WRC-12, to enable efficient usage of the 21.4-22 GHz BSS band not being to the detriment of efficient uplinking to other downlink bands, decide to allocate 600 MHz of FSS capacity for feeder links to the BSS in Region 1 and/or ensure a continuous block of 600 MHz for Region 3 through either expanding an existing block or through an allocation for a new block, candidate frequency bands that could be considered are provided in the table in section 5/1.13/4.4.2.1. To facilitate co-existence with other services sharing the band, the Conference might consider limiting the FSS usage to feeder links for BSS.

See section 5/1.13/4.4 and its subsections for different views on feeder links.

## 5.8 Sharing between terrestrial services and Region 1 and 3 BSS

### 5.8.1 Sharing between terrestrial services in Region 2 and Regions 1 and 3 BSS

The band 21.4-22 GHz is allocated to the fixed service in Region 2 on a primary basis and widely used in urban areas for many applications such as for backhauling wireless telephone traffic and for carrying business data and communications in corporate networks. Preliminary analysis based on one study made by a Region 2 administration indicated that there is a potential for interference if no mitigation techniques are employed by the BSS or terrestrial services or both.

#### 5.8.1.1 Interference from Regions 1 and 3 BSS transmitting space stations into Region 2 terrestrial receivers

Should WRC-12 conclude to protect Region 2 terrestrial services from Regions 1 and 3 BSS in the frequency band 21.4-22 GHz, irrespective of any intra service method, described above, decided by the Conference, there should be appropriate regulatory procedure/mechanism to address that issue.

Studies conducted by Working Parties 4A and 5C (Documents 4A/[252](http://www.itu.int/md/R07-WP4A-C-0252/en), [292](http://www.itu.int/md/R07-WP4A-C-0292/en) and Document 5C/[269](http://www.itu.int/md/R07-WP5C-C-0269/en)) on the potential for interference into terrestrial services, indicated the potential for unacceptable levels of interference into the FS in the absence of any mitigation techniques applied for the FS. One of these studies, furthermore indicated that if appropriate mitigation techniques could be applied by the FS (in the form of 1.5˚ GSO avoidance), only a very small percentage (less than 1%) of FS receivers would suffer from excess interference (less than 3 dB above a long term I/N criteria of -10 dB) with an emission level of -115/-105 dBW(W/m2· MHz) at 5˚/25˚ degrees employed by BSS in Regions 1 and 3. The optimal conditions for employing such orbital avoidance is in the case of new FS stations.

Another study ([Document 4A/317](http://www.itu.int/md/R07-WP4A-C-0317/en)) shows, that with pfd values of -115 dBW/m2/MHz, irrespective of Region, the probability of exceeding the long-term interference criterion without the mandatory FS TS antenna beam GSO avoidance will be no more than 2.48% to 0.21%. With the assumption that the FS TS antennae beam pointing avoids the GSO direction by not less than 1.5º, the probability of excess interference, i.e. portion of the stations that will get interference, varies from 0.92% to 0.004%.

Yet another study on the impact on Regions 1 and 3 BSS if subject to a pfd service mask ([Document 4A/254](http://www.itu.int/md/R07-WP4A-C-0254/en)), concluded that this in most cases will present no practical constraints for Regions 1 and 3 BSS networks.

*[NOTE – Documents 4A/252, 254, 292, 317 and 5C/269 containing the technical studies, are (for the time being) hyperlinked to this section. Further studies are invited.]*

Two options to provide such protection could be:

a) hard (pfd) limits

a1) to be contained in RR Article **21** and RR No. **9.11** does not applyor;

a2) to be contained in a Conference Resolution.e.g. a revised Resolution **525**;

b) as coordination thresholds

b1) RR No. **9.11** applies and pfd thresholds are specified in Appendix **5** of the Radio Regulations or;

b2) contained in a Conference Resolution (similar to former Resolution **77** **(WRC‑2000)**), e.g. a revised Resolution **525**.

If the Conference decide to select hard (pfd) limits, it should be noted that for coordination under RR **9.19** (terrestrial stations coordinating with typical BSS receiving earth stations), the frequency bands to be considered in RR Appendix **5** are those identified under RR No. **9.11**. Selecting a hard limit in RR Article **21** or in a new Conference Resolution to protect terrestrial stations in Region 2 would mean that RR No. **9.11** (prescribing a coordination process) would not be applicable for the 21.4-22 GHz band. As a result, the 21.4-22 GHz band would be deleted from the list of frequency bands in RR Appendix 5 for RR No. **9.11** coordination. This in turn would mean that this frequency band would also disappear from the list of frequency bands for RR No. **9.19** and Region 1 and 3 BSS receiving earth stations in the 21.4-22 GHz band would thus lose their protection from interference from Region 2 transmitting stations. Selection of hard pfd limits to be contained in RR Article **21** or in a new Conference Resolution would therefore require consequential changes to the Radio Regulations to maintain the applicability of RR No. **9.19**.

##### 5.8.1.1.1 Pfd limits (in RR Article 21)

A possible example of a regulatory procedure/mechanism could be as follows:

1) In the frequency band 21.4-22 GHz to apply a power flux-density (pfd) limit in RR Article **21** to BSS networks of Regions 1 and 3. The specified pfd limit would apply only on the territory of countries of Region 2.

2) Set these pfd limits to the following values on the territory of Region 2 countries, not to exceed:

- -115 dB(W/m2) in any 1 MHz band for angles of arrival between 0˚ and 5˚ above the horizontal plane; or

- -105 dB(W/m2) in any 1 MHz band for angles of arrival between 25˚ and 90˚ above the horizontal plane; or

- values to derived by linear interpolation between these limits for angles of arrival between 5˚ and 25˚ above the horizontal plane.

The specified pfd values are consistent with the values contained in Recommendation ITU‑R BO.1776. It is also worth noting that Recommendation ITU-R BO.1776 is referenced in Resolutions **525 (Rev.WRC-07)** and **551 (Rev.WRC-07)**.

##### 5.8.1.1.2 Coordination threshold (pfd in RR Appendix 5)

The pfd mask can be used as coordination threshold. The coordination procedure would be triggered only if the pfd value at the Earth’s surface on the territory of a Region 2 country is exceeded. A regulatory procedure/mechanism to provide protection of terrestrial networks of Region 2 through a coordination procedure would be based on:

1) application of RR Article **9** coordination procedures to Regions 1 and 3 BSS networks in the band 21.4-22 GHz vis-à-vis Region 2 terrestrial networks;

2) modification of the existing coordination threshold specified in the RR Appendix **5**.

#### 5.8.1.2 Interference from Region 2 terrestrial transmitting stations into Regions 1 and 3 BSS receiving earth stations

An adequate mechanism should be developed to address the protection of BSS earth stations in Regions 1 and 3 from Region 2 terrestrial services. RR No. **9.19** applies in this situation, together with criteria in RR Appendix **5**. However, the entry in RR Appendix **5** for RR No. **9.19** would need to be updated. Such protection should be ensured through an adequate pfd mask derived with the same mechanism and principles contained in Annex 3 of RR Appendix **30**.

### 5.8.2 Sharing between terrestrial services and BSS in Regions 1 and 3

#### 5.8.2.1 Interference from BSS transmitting space stations into terrestrial receivers

Some administrations are of the view that since there was no discussion and no observation in WRC-2000, WRC-03, and WRC-07 regarding the usage of terrestrial services in the band   
21.4-22.0 GHz, Resolution **525** was not changed regarding the status of the terrestrial services. Therefore the situation as of today should be retained, i.e. the use of the band 21.4-22 GHz by stations in services other than the broadcasting-satellite service shall not cause harmful interference to nor claim protection from stations in the broadcasting-satellite service operating in accordance with the Table of Frequency Allocations. As the design and construction of a BSS satellite system requires a long term planning, such a change of status of terrestrial service, in the absence of special measures yet to be decided by the Conference, could, in certain cases, have an impact on the usage and feasibility of BSS in the band 21.4-22GHz for satellites currently under design and construction. RR No. **9.11** does not apply.

Some other administrations are of the opinion that terrestrial services of Regions 1 and 3 also need to be protected from BSS in these Regions because of the rapid development of terrestrial services in the later years. These administrations are of the view that the band 21.4-22 GHz is allocated on a primary basis to the BSS, fixed and mobile services in Regions 1& 3, whereby the conditions stipulated in Section I of the Annex to Resolution **525 (WRC-07)** did not come into force until 1 April 2007. These terrestrial services are widely used in some urban areas for many applications such as for backhauling wireless telephone traffic and for carrying business data and communications in corporate networks. These administrations were therefore of the view that, WRC-12 needs to review the situation and status of the terrestrial services Regions 1& 3 in order to confirm or otherwise the decision made about 20 years ago at WARC-92, taking into account rapid development in technology of the use of terrestrial services and their application during the last 20 years and expected to be so in the future. At WARC-92, it was foreseen that there would be a Plan developed for BSS in the 21.4-22 GHz band. WRC-07 decided that planning should be avoided. Some administrations were of the view that the relationship between terrestrial services and BSS in Regions 1 and 3 having equal rights up to 1 April 2007, was decided by WARC‑92 which did not specifically exclude planning of this band. Now, that it is expected that there would be no planning at WRC-12, the relationship between terrestrial services and BSS in Regions 1 and 3 needs to be reviewed.

Should WRC-12 decide to protect of Regions 1 and 3 terrestrial networks from Regions 1 and 3 BSS networks with equal rights, the same considerations (pfd hard limit, pfd coordination threshold, Conference Resolution) as in section 5/1.13/5.8.1.1 (including subsections) above would apply.

#### 5.8.2.2 Interference from terrestrial transmitting stations into BSS receiving earth stations

##### 5.8.2.2.1 In the case the current status of terrestrial services remain unchanged[[6]](#footnote-6)

Should the Conference decide to maintain the status of terrestrial services in Regions 1 and 3 in respect of BSS in Regions 1 and 3 no additional mechanisms are required.

##### 5.8.2.2.2 In the case terrestrial services and BSS get the same status (equal primary rights)

Should the Conference decide to associate the same status to Regions 1 and 3 terrestrial services as Regions 1 and 3 BSS (equal primary rights), protection criteria are needed. One possible option would be to require the terrestrial transmitting station of Regions 1 and 3 not to exceed certain pfd values in the territory of the BSS administration (similar to principles as those contained in Annex 3 of Appendix **30** to RR could be used with a predetermined pfd value yet to be decided). Moreover, the entry in RR Appendix **5** for RR No. **9.19** would need to be updated. Such protection should be ensured through an adequate pfd mask derived with the same mechanism and principles contained in Annex 3 of RR Appendix **30**.

# 6 Regulatory and procedural considerations

## 6.1 Method A [with retention of the status of terrestrial services of Regions 1& 3 as currently mention in section I of Resolution 525 (Rev.WRC-07)]

Comments**:**  
Here we mix up several things which needs to be clarified .

Do we refer to method as far as the space servise or in relation with space service and terrestrial service .

Consequently we need to associate regulatory procedure with the appropriate section of the CPM Report as follows:

In the case the status of terrestrial services remain unchanged. e. The concept of section I of Resolution **525 (Rev.WRC-07)** is retained by WRC-12 ,then this Resolution should be modified.

MOD

**5.530** In Regions 1 and 3, the use of the band 21.4-22 GHz by stations in services other than the broadcasting-satellite service shall not cause harmful interference to nor claim protection from stations in the broadcasting-satellite service operating in accordance with the Table of Frequency Allocations. No. **9.11** does not apply.

Comment: This is in contradiction with the explanation provided in sub-section b2 under section 5.8.1.1 above

*Reason: Clarify directly in Article 5 the regulatory situation of the 21.4-22 GHz band which is set by Resolution* ***525 (Rev.WRC-07)****.*

MOD

18 **11.37.2** When a frequency assignment to a space station in the broadcasting-satellite service in a non-planned band other than the 21.4-22 GHz band is recorded in the Master Register, a note shall be entered in the remarks column indicating that such recording does not prejudge in any way the decisions to be included in the agreements and associated plans referred to in Resolution **507**.

*Reason: Following a decision by WRC-12, the status of BSS in the 21.4-22 GHz band should not be subject to modifications in the near future. Therefore, Resolution* ***507 (Rev.WRC-03)*** *should not be applicable to the 21.4-22 GHz band.*

*Editor’s Note: Specific action on Res. 507 and Res. 525 needs further discussion at the July meeting of WP 4A.*

MOD

RESOLUTION 507 (Rev.WRC-03)

Establishment of agreements and associated plans  
for the broadcasting-satellite service1

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

1 This Resolution does not apply to the 21.4-22 GHz band.

*Reason: Following a decision by WRC-12, the status of BSS in the 21.4-22 GHz band should not be subject to modifications in the near future. Therefore, Resolution* ***507 (Rev.WRC-03)*** *should not be applicable to the 21.4-22 GHz band.*

SUP

RESOLUTION 525 (Rev.WRC-07)

Introduction of high-definition television systems of the broadcasting-satellite service in the band 21.4-22.0 GHz in Regions 1 and 3

*Reason: The regulatory content of the Resolution is transferred to RR No.* ***5.530****.*

## 6.2 Method B

Method B consists of Method A plus the following:

**ADD**

RESOLUTION XYZ (WRC-12)

Long term access to and development in the band 21.4-22.0 GHz  
in Regions 1 and 3

The World Radiocommunication Conference (Geneva, 2012),

considering

*a)* that WARC-92 allocated the band 21.4-22.0 GHz in Regions 1 and 3 to the broadcasting-satellite service (BSS) to be implemented after 1 April 2007;

*b)* that the use of the band since 1992 was subject to an interim procedure in accordance with Resolution **525** (**WARC-92** and **Rev.WRC-03**);

*c)* that Resolution **551** (**WRC-07**) instructs ITU‑R to continue technical and regulatory studies on harmonization of spectrum usage, coordination procedures or other procedures, and BSS technologies, in preparation for WRC-12, in the 21.4-22 GHz band and the associated feeder-link bands in Regions 1 and 3;

*d)* that Article **44** of the Constitution sets out the basic principles for the use of the radio-frequency spectrum and the geostationary-satellite and other satellite orbits, taking into account the needs of developing countries,

resolves

1 that the procedures contained in the Annexes to this Resolution shall be applied as from 17 February 2012 for a satellite network of the broadcasting-satellite service in the 21.4-22.0 GHz band, for which information under Resolution **49** or the confirmation of the date of bringing into use were not received by the Bureau before 17 February 2012;

2 that for a satellite network of the broadcasting-satellite service in the 21.4-22.0 GHz band, for which information under Resolution **49** or the confirmation of the date of bringing into use were received by the Bureau before 17 February 2012, the responsible administration shall submit to the Bureau the complete due diligence information in accordance with Annex 2 to this Resolution not later than 17 April 2012;

3 that the information to be submitted in accordance with *resolves* 2 above shall be signed by an authorized official of the notifying administration or of an administration that is acting on behalf of a group of named administrations, an authorized official of the spacecraft manufacturer and an authorized official of the launch services provider;

4 that if the due diligence information specified in *resolves* 2 above, is found to be incomplete, the Bureau shall immediately request the administration to submit the missing information within 30 days;

5 that if the due diligence information specified in *resolves* 2 above, is not received by the Bureau before the expiry date specified in *resolves* 2 *or* 3 above, the satellite network of the broadcasting-satellite service in the 21.4-22.0 GHz band shall no longer be taken into account by the Bureau and other administrations and shall be cancelled by the Bureau;

6 that for satellite networks covered under *resolves 2* above, the provisions of Sections 8 to 10 of Annex 1 to this Resolution shall also apply after the original submission of information in accordance with Annex 2 to this Resolution on 17 April 2012,

further resolves

7 that the procedures in this Resolution are in addition to Article **9** or **11** of the Radio Regulations and associated provisions, as applicable,

instructs the Director of the Radiocommunication Bureau

to report to future competent world radiocommunication conferences on the results of the implementation of this Resolution.

Annex 1 to Resolution XYZ (WRC-12)

1 A maximum of 15 days after the actual date of bringing into use of a satellite network, the notifying administration shall send to the Bureau the confirmation of the date of bringing into use and the due diligence information specified in Annex 2 to this Resolution.

2 The information to be submitted in accordance with § 1 above shall be signed by an authorized official of the notifying administration or of an administration that is acting on behalf of a group of named administrations.

3 If the spacecraft data is used for the first time under this Resolution, the due diligence information to be submitted in accordance with § 1 above shall be additionally signed by an authorized official of the spacecraft manufacturer and an authorized official of the launch services provider.

4 On receipt of the confirmation of the date of bringing into use under § 1 above, the Bureau shall update its database and publish the relevant information on its website within 15 days.

5 On receipt of the due diligence information under § 1 above, the Bureau shall promptly examine that information for completeness. If the information is found to be complete, the Bureau shall publish the complete information in a special section of the BR IFIC within 30 days.

6 If the information is found to be incomplete, the Bureau shall immediately request the administration to submit the missing information within 30 days.

7 If the complete due diligence information is not received by the Bureau in the time limits specified in this Resolution under §§ 1 and 6, the due diligence information and the confirmation of the date of bringing into use shall be considered as invalid and the Bureau shall immediately inform the administration and take the appropriate measures under § 12, if required.

8 The due diligence information submitted in accordance with § 1 above shall be updated and resubmitted to the Bureau by the responsible notifying administration or administration that is acting on behalf of a group of named administrations not later than 30 days after the end of life or the relocation of the spacecraft associated with the notification under § 1 above.

9 On receipt of the due diligence information under § 8 above, the Bureau shall promptly examine that information for completeness. If the information is found to be complete, the Bureau shall publish the complete information in a special section of the BR IFIC within 30 days.

10 If the information is found to be incomplete, the Bureau shall immediately request the administration to submit the missing information within 30 days.

11 If the complete due diligence information is not received by the Bureau in the time limits specified in this Resolution under §§ 8 and 10, the due diligence information and the confirmation of the date of bringing into use shall be considered as invalid and the Bureau shall immediately inform the administration and take the appropriate measures under § 12, if required.

12 After the end of the seven-year period from the date of receipt the relevant information under No. **9.1**, if the confirmation of the date of bringing into use or the due diligence information for satellite network frequency assignments are not received by the Bureau, or if the due diligence information or the confirmation of the date of bringing into use of satellite network frequency assignments are considered as invalid under §§ 7 and 11, the frequency assignments shall no longer be taken into account by the Bureau and other administrations and shall be cancelled by the Bureau.

Annex 2 to Resolution XYZ (WRC-12)  
  
Due diligence information

1) Identity of the satellite network

a)Identity of the satellite network

b)Name of the administration

c)Country symbol

d)Orbital characteristics.

e)Reference to the advance publication information

f)Reference to the request for coordination

g)Frequency band(s) implemented on the satellite network

h)Initial date of bringing into use

2) Identity of the spacecraft[[7]](#footnote-7)

a)ITU id number

*or*

a) Spacecraft manufacturer

- Name of the spacecraft manufacturer

- Date of execution of the contract

**-** Delivery date

b) Launch services provider

- Name of the launch vehicle provider

- Date of execution of the contract

- Launch date

- Name of the launch vehicle

- Name and location of the launch facility

c)Frequency band(s) implemented on the spacecraft

or

a) Date of suspension

b) Planned date of bringing back into regular use.

[*Editorial Note: Resolution* ***49*** *shall not be relevant anymore for all satellite network of the broadcasting-satellite service in 21.4-22.0 GHz band in Regions 1 and 3. Therefore, RR shall be modified accordingly.*]

Comment:  
We need to develop the regulatory mechanism in case that the Conference provide the primary status to the terrestrial services of Regions1&3vis a vis BSS of those Regions.

## 6.3 Method C

[TBD]

## 6.4 Method D

Method D consists of Method A plus the following:

**ADD**

Draft new Resolution ON WRC-12 AGENDA ITEM 1.13

Procedure for submission, coordination and notification of an assignment for BSS system in the 21.4-22.0 GHz frequency band

The World Radiocommunication Conference (Geneva, 2012),

considering

*a)* that in accordance to Resolution 2 all countries have equal rights in the use of both the radio frequencies allocated to various space radiocommunication services and geostationary-satellite orbit and other satellite orbits for these services;

*b)* that the registration with the Radiocommunication Bureau of frequency assignments for space Radiocommunication services and their use do not provide any permanent priority for any individual country or groups of countries and do not create an obstacle to the establishment of space systems of other countries;

*c)* that accordingly, a country or a group of countries having registrated with the Radiocommunication Bureau frequencies for their space Radiocommunication services need to take all practical measures to facilitate the use of new space systems by other countries or groups of countries;

*d)* that accordingly to No. **23.13**, in devising the characteristics of a space station in the broadcasting-satellite service, all technical means available shall be used to reduce, to the maximum, the radiation over the territory of other countries unless an agreement has been previously reached with such countries,

taking into account

*a)* that WARC-92 allocated the 21.4-22.0 GHz band in Regions 1 and 3 to the broadcasting-satellite service to be implemented after April 2007;

*b)* that in accordance with active till WRC-12 interim procedure based on Articles **9** and **11** of RR Radiocommunication Bureau has received a great number of submissions from the limited number of countries that exceeds the GSO capacity;

*c)* that in that way it is obvious that application only Articles **9** and **11** procedures doesn’t guarantee equal rights and equitable access to spectrum-orbit resource in the 21.4-22.0 GHzfrequency band,

noting

that in the existing circumstances the development of the regional Plan of frequency and positions allocation for BSS systems in the 21.4-22.0 GHz frequency band is not practicable,

resolves

*a)* to adopt the special procedure of submitting and processing of notices by Radiocommunication Bureau (see the Attachment), granting advantages to submissions from the administrations not having assignments in the 21.4-22.0 GHz frequency band;

*b)* to apply the procedure of Articles **9** and **11** of Radio Regulations to all other requests for BSS systems in the 21.4-22.0 GHz frequency band.

Attachment  
  
Special procedure for the obtaining of an assignment for a BSS system   
in the 21.4‑22.0 GHz frequency band in Regions 1 and 3

1 The administration of the Member State which does not have any notified or recorded in MIFR assignment for BSS system in the 21.4-22.0 GHz band may obtain national assignment for single[[8]](#footnote-8) BSS system by the special procedure.

The submission under this special procedure is considered as a refusal of administration from including the territory of given administration in the service area of BSS systems recorded in MIFR by other administrations in the 21.4-22.0 GHz frequency band.

The submission under the special procedure can be also made by group of countries ITU Member States each of which meets the requirements of this item.

2 The administration shall submit its request for an assignment to the Bureau, with the following information:

*a)* the geographical coordinates of no more than 20 test points for determining the minimal beam (elliptical or shape) covering its national territory (or part of it);

*b)* the height above sea level of each of its test points;

*c)* any special requirement which is to be taken into account to the extent practicable;

*d)* technical parameters in accordance with specification, based on Report ITU-R BO.2071, given in the Annex 1 to this Resolution;

*e)* obligation to put system into operation not later than [7] years from the date of registration the assignment under special procedure.

3 Upon receipt of the submission in accordance with § 2, the Bureau shall expeditiously and ahead of submissions for which the examination under Articles **9**, **11** has not yet started, process the request with respect to its conformity with the Table of Frequency Allocations and the other provisions of the Radio Regulations and as well as with the provisions of §§ 1 and 2 of this Resolution.

4 If the submission meets the requirements of §§ 1, 2 and 3 of the given Resolution the Bureau shall expeditiously and ahead of submissions for which the examination under Articles **9**, **11** has not yet started, identify appropriate orbital locations and satellite antennae beam parameters for prospective national assignment at which compatibility with notified or recorded in MIFR assignments in given frequency band is provided, and shall also determine list of affected [under criterion C/I=26 dB] [ΔT/T=10%] administrations and systems which have been submitted earlier under Articles **9** and **11**. At compatibility examination the Bureau should take into account all published submissions for coordination and notification at the date of registration by BR the request under special procedure. The Bureau should send examination results to the requesting and affected administrations and publish them in the special section of BR IFIC.

5 Upon receipt of the Bureau’s response under § 4, the requesting administration shall, within thirty days, indicate which of the proposed orbital locations with the associated technical parameters as identified by the Bureau has been selected. During this period, the requesting administration may at any time seek the assistance of the Bureau.

6 If a selection of orbital location for an assignment under § 4 has not been received by the Bureau within the specified time-limit, the Bureau will resume examination of the subsequent submissions under this Resolution or the submissions under Articles **9** and **11**, as appropriate, and inform the requesting administration that its request will be processed under § 7 when the Bureau is informed about the selected orbit location.

7 Upon receipt of a reply of administration under § 5, the Bureau shall specify proposals on modifying system parameters necessary for achieving compatibility of the submitted under §§ 1 and 2 system with affected assignments.

These measures may include: the exception of national territory of the administration requesting assignment under special procedure from coverage areas of the affected networks, limiting of the range of the declared technical parameters of these networks (pfd, ES antennas size and so on) with their approach to those recommended in the Annex, application of the lowered interference criterion C/I.

The Bureau shall send these proposals to achieving compatibility to the affected administrations whose networks are at the stage of coordination or have not been examined yet under Articles **9** and **11**, and to the administration requesting assignment under special procedure. The above‑mentioned affected networks should obtain coordination with assignment under special procedure.

If necessary trilateral or multilateral consultations are carried out with the assistance of the Bureau, administration which has made an application under special procedure and administrations whose networks are affected.

8 When the examination under § 7 leads to agreement of mentioned above administrations, the Bureau shall enter the national assignment for BSS system in the MIFR provisionally, the entry shall be changed from provisional to definite after receiving by BR the complete due diligence information (Resolution **49**) and publish the characteristics of the assignment concerned and the result of its examination.

9 In the event that the Bureau’s consideration under § 7 during [1−2] month[s] doesn’t lead to a favourable finding, the Bureau shall return notices submitted for notification to affected administrations for coordination continuation and shall record assignment under special procedure in the Master Register.

10 Examination of the following request under special procedure is carried out by sequential principle: the Bureau starts examination of next request if any immediately after having complete examination and registration procedure of the previous request under special procedure.

11 If the system submitted under given procedure, is not brought into use in time, determined by item *2е)* above*,* an entry in the МIFR shall be cancelled by the Bureau.

Annex  
  
Mandatory technical parameters for BSS systems submitted under special procedure in the 21.4-22.0 GHz frequency band

 The coverage area is limited by national territory (test points − within national borders).

 Earth station receiving antenna diameter − 60 cm [45 cm].

 Earth station receive noise temperature − 170 K (*according to Report ITU-R ВО.2071 − 269 К; according to submissions: 145−180 К*).

 Signal to noise ratio at the input of the receiving earth station demodulator С/N = 10.7 dB   
[7.5 dB] in any bandwidth [27 MHz] 1 MHz of the 21.4-22.0 GHz frequency band.

 Pfd at the Earth’s surface and satellite transmitted power are determined by required С/N value at availability of 99.9 % [99.7 %] of the year in any point of a service area in view of signal attenuation in atmospheric precipitation.

 Pfd at the Earth’s surface produced by BSS system should not exceed   
−115 dBW/m2/MHzat elevation angles from 0° up to 5° and −105 dBW/m2/MHz at elevation angles more than 25° (the Rec. ITU-R F.760-1), taking in account minimum attenuation due to atmospheric gases.

 Reference receiving earth station antenna pattern should correspond to the Recommendation ITU-R ВО.1213.

 Criterion of a single permissible interference from other BSS systems − according to Recommendation ITU-R ВО.1785(*or less*).

## 6.5 Method E

[TBD]

## 6.6 Method F

Method F consists of Method A plus the following Resolution:

RESOLUTION XYZ (WRC-12)

Equitable access to BSS in the band 21.4-22.0 GHz in Regions 1 and 3

The World Radiocommunication Conference (Geneva, 2012),

considering

*a)* that WARC-92 allocated the band 21.4-22.0 GHz in Regions 1 and 3 to the broadcasting-satellite service (BSS) to be implemented after 1 April 2007;

*b)* that the use of the band since 1992 was subject to an interim procedure in accordance with Resolution **525** (**WARC-92** and **Rev.WRC-03**);

*c)* that Resolution **551** (**WRC-07**) instructs ITU‑R to continue technical and regulatory studies on harmonization of spectrum usage, coordination procedures or other procedures, and BSS technologies, in the 21.4-22 GHz band and the associated feeder-link bands in Regions 1 and 3;

*d)* that Article **44** of the Constitution sets out the basic principles for the use of the radio-frequency spectrum and the geostationary-satellite and other satellite orbits, taking into account the needs of developing countries,

further considering

*e)* that *a priori* planning is not necessary and should be avoided as it freezes access according to technological assumptions at the time of planning and then prevents flexible use taking account of real world demand and technical developments;

*f)* that interim arrangements for the use of the bands are on a first-come-first-served basis,

recognizing

*a)* that the number of filing made by some administrations in this band is extremely large, which may not be realistic;

*b)* that large number of filings [400 Coordination Requests] prevents the possibility of coordination of genuine systems by other administrations,

resolves

1 that administrations, in compliance with Article **44** of the ITU Constitution, review their submissions in the band 21.4-22.0 GHz received before 18 February 2012 but not yet processed, with a view to reducing their number of submissions, and to indicate to the Bureau the networks, before 30 June 2012, which are no longer required to be considered and processed under Article **9** and **11**.

2 that, for submissions received before 18 February 2012 but not yet processed, administrations may modify the characteristics confirming to the range of the technical parameters by values recommended in Report ITU-R ВО.2071 and supply new values before the Bureau’s examination under Article **9** or **11**;

3 to urge administrations to make utmost efforts to accommodate submissions received from other administrations with a few filing, especially covering their own territories,

instructs the Director of the Radiocommunication Bureau

to report to future competent world radiocommunication conferences on the results of the implementation of this Resolution.

## 6.7 Feeder link allocation

The following gives an example of possible regulatory text if WRC-12 should decide to provide additional capacity for feeder links for BSS in Regions 1 and/or 3. The example is given for 24.65‑25.25 GHz (Region 1) and 24.65-24.75 GHz (Region 3), but similar regulatory solutions could be implemented for other bands if so desired.

ARTICLE 5

Frequency allocations

…

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

MOD

22-24.75 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 24.65-24.75  FIXED  FIXED-SATELLITE (Earth-to-space) 5.535  INTER-SATELLITE | 24.65-24.75  INTER-SATELLITE  RADIOLOCATION- SATELLITE (Earth-to-space) | 24.65-24.75  FIXED  FIXED-SATELLITE (Earth-to-space) 5.535  INTER-SATELLITE  MOBILE |
|  |  | 5.533 |

**MOD**

24.75-29.9 GHz

|  |  |  |
| --- | --- | --- |
| Allocation to services | | |
| Region 1 | Region 2 | Region 3 |
| 24.75-25.25  FIXED  FIXED-SATELLITE (Earth-to-space) 5.535 | 24.75-25.25  FIXED-SATELLITE (Earth-to-space) 5.535 | 24.75-25.25  FIXED  FIXED-SATELLITE (Earth-to-space) 5.535  MOBILE |

**MOD**

5.535 In the band 24.65-25.25 GHz, feeder links to stations of the broadcasting-satellite service shall have priority over other uses in the fixed-satellite service (Earth-to-space). Such other uses shall protect and shall not claim protection from existing and future operating feeder-link networks to such broadcasting satellite stations.

## 6.8 Sharing between terrestrial services and Regions 1 and 3 BSS

### 6.8.1 Sharing between terrestrial services in Region 2 and Regions 1 and 3 BSS

#### 6.8.1.1 Interference from Regions 1 and 3 BSS transmitting space stations into Region 2 terrestrial receivers

##### 6.8.1.1.1 Pfd limits (in RR Article 21)

To implement the protection of Region 2 terrestrial services using the “pfd limit” approach the following amendments to RR Article **21** would be necessary:

**MOD**

ARTICLE 21

Terrestrial and space services sharing frequency bands above 1 GHz

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

TABLE **21-4**     (Rev.WRC-12)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Frequency band | Service\* | Limit in dB(W/m2) for angles of arrival (˚) above the horizontal plane | | | Reference bandwidth |
| 0˚-5˚ | 5˚-25˚ | 25˚-90˚ |  |
| In Regions 1 and 3: 21.4-22.0 GHz | Broadcasting -satellite | –1151 | –115 + 0.5(δ – 5)1 | –1051 | 1 MHz |

1 These limits apply only to Regions 1 and 3 BSS emissions on territories of Region 2 countries.

6.8.1.1.2 Coordination threshold (pfd in RR Appendix 5)

To implement the protection of Region 2 terrestrial services using the “Coordination Threshold” approach the following amendments to RR Article **5** andAppendix **5** would be necessary:

MOD

5.530 In Regions 1 and 3, the use of the band 21.4-22 GHz by stations in services other than the broadcasting-satellite serviceshall not cause harmful interference to nor claim protection from stations in the broadcasting-satellite service operating in accordance with the Table of Frequency Allocations. No. **9.11** does not apply. In Region 2, No. **9.11** shall apply.     (WRC‑12)

**MOD**

APPENDIX 5 (Rev.WRC‑12)

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

TABLE 5-1 (WRC-12)

**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. **9.11**  GSO, non-GSO/terrestrial | A space station in the BSS in any band shared on an equal primary basis with terrestrial services and where the BSS is not subject to a Plan, in respect of terrestrial services | 620-790 MHz  1 452-1 492 MHz  2 310-2 360 MHz  2 535-2 655 MHz  (Nos. **5.417A** and **5.418**)  12.5-12.75 GHz  (Region 3)  17.3-17.8 GHz  (Region 2)  74-76 GHz | Bandwidths overlap: The detailed conditions for the application of No. **9.11** in the bands 2 630-2 655 MHz and 2 605-2 630 MHz are provided in Resolution **539 (Rev.WRC-03)** for non-GSO BSS (sound) systems pursuant to Nos. **5.417A** and **5.418**, and in Nos. **5.417A** and **5.418** for GSO BSS (sound) networks pursuant to those provisions. Resolution **549 (WRC-07)** applies in the band 620-790 MHz. | Check by using the assigned frequencies and bandwidths |  |
| No.**9.11**  GSO,  non-GSO/  terrestrial | A space station in the BSS in the 21.4-22 GHz band in respect to terrestrial services of Region 2 only | 21.4-22 GHz  (Regions 1 and 3) | 1) Bandwidth overlap and;  2) The pfd produced on the territory of the country of  Region 2 exceeding:  -115 dB(W/(m2·MHz)) for 0˚ ≤ θ ≤ 5˚  -115 + 0.5(θ-5) dB(W/(m2·MHz)) for 5˚ ≤ θ ≤ 25˚  -105 dB(W/(m2·MHz)) for θ > 25˚  where θ is the angle of arrival of the incident wave above the horizontal plane (degrees) |  |  |

#### 6.8.1.2 Interference from Region 2 terrestrial transmitting stations into Regions 1 and 3 BSS receiving earth stations

[TBD]

### 6.8.2 Sharing between terrestrial services and BSS in Regions 1 and 3

#### 6.8.2.1 Interference from BSS transmitting space stations into terrestrial receivers

[TBD]

#### 6.8.2.2 Interference from terrestrial transmitting stations into BSS receiving earth stations

##### 6.8.2.2.1 In the case the status of terrestrial services remain unchanged

NOC

##### 6.8.2.2.2 In the case terrestrial services and BSS get the same status

To implement the protection of Regions 1 and 3 BSS earth station from terrestrial services, an adequate Resolution shall be developed and the following amendments to RR Appendix **5** would be necessary:

MOD

APPENDIX 5

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

TABLE 5-1 (WRC-12)

**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. **9.19**  Terrestrial,  GSO,  non-GSO  /GSO,  non-GSO | Any transmitting station of a terrestrial service or a transmitting earth stationin the FSS (Earth-to-space) in a frequency band shared on an equal primary basis with the BSS, with respect to typical earth stations included in the service area of a space station in the BSS | Bands listed in No **9.11**, the band  2 520-2 670 MHz, the band  11.7-12.7 GHz and the band  21.4-22 GHz | 1. Necessary bandwidths overlap; and 2. The power flux-density (pfd) of the interfering station at the edge of the BSS service area exceeds the permissible level | Check by using the assigned frequencies and bandwidths | See also Article **6** of Appendix **30B** and [TBD]  *[Editorial note: A regulatory procedure should be developed to address the protection of the earth station of BSS in Regions 1 and 3 from Region 2 terrestrial services]* |

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

1. *considering h)* that *a priori* planning is not necessary and should be avoided as it freezes access according to technological assumptions at the time of planning and then prevents flexible use taking account of real world demand and technical developments; [↑](#footnote-ref-1)
2. *considering i)* that interim arrangements for the use of the bands are on a *first-come-first-served* basis [↑](#footnote-ref-2)
3. In Regions 1 and 3, RR No. **9.11** shall not apply in accordance with the provisions of Resolution **525 (Rev.WRC-07)**. [↑](#footnote-ref-3)
4. Sub-regional system in this context is understood to mean networks submitted by an administration on behalf of a group of named administrations. [↑](#footnote-ref-4)
5. \* *Note by the Secretariat:* This Resolution was revised by WRC-07. [↑](#footnote-ref-5)
6. Terrestrial services in Regions 1 and 3 shall not claim protection from transmitting BSS space stations nor cause harmful interference to receiving BSS earth stations of Regions 1 and 3. [↑](#footnote-ref-6)
7. If the spacecraft is used for the first time under this Resolution, fields “Spacecraft manufacturer”, “Launch services provider” and “Frequency band(s) implemented on the spacecraft” shall be supply. Otherwise, if the spacecraft was already used under this Resolution associated to another satellite network, the id number given by the Bureau at that time shall be indicated. [↑](#footnote-ref-7)
8. In case the territory of requesting Administration cannot be covered with necessary elevation angle from single GSO position or by single beam, such system can consist of more than one position and/or beams. [↑](#footnote-ref-8)