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Space Services Department

THE FIXED-SATELLITE SERVICE PLAN (APPENDIX 30B)

1 Introduction

Appendix **30B** of the Radio Regulations contains the Plan for the fixed-satellite service (FSS) in the 6/4 GHz frequency bands and in the 13/10-11 GHz frequency bands. This Plan is also referred to as the “FSS Plan” and was established with a view to facilitating equitable access to the geostationary-satellite orbit (GSO) for all countries.

The FSS Plan covers the following frequency bands:

- 4 500-4 800 MHz (space-to-Earth);
- 6 725-7 025 MHz (Earth-to-space);
- 10.70-10.95 GHz (space-to-Earth);
- 11.20-11.45 GHz (space-to-Earth);
- 12.75-13.25 GHz (Earth-to-space),

resulting in a total bandwidth of 800 MHz in each direction.

FSS assignments in these bands have primary status.

2 The FSS Plan and the associated List of assignments

The FSS Plan was adopted by the World Administrative Radio Conference on the use of the geostationary-satellite orbit and the planning of the space services utilizing it (WARC ORB-88). This FSS Plan is contained in Appendix **30B** (hereafter referred to as **AP30B**) together with its associated regulatory procedures. Several annexes exist containing criteria, calculation methods, and technical data relating to the Plan.

The World Radiocommunication Conference 2007 (WRC-07) significantly modified the procedures contained in **AP30B** with a view to improving its efficiency. The characteristics of allotments and technical criteria used in the **AP30B** examinations were also updated in light of the technology then available.

The FSS Plan is an allotment plan. Each allotment in the Plan comprises:

- a nominal orbital position;

- a bandwidth of 800 MHz (uplink and downlink) as listed in paragraph 1 above;
- a service area for a national coverage.

Characteristics of the national allotments, such as nominal orbital position, ellipse parameters and power-density values, are contained in Article 10 of AP30B. More details, like the test points associated to each beam, are included in the AP30B database, which is distributed in the BR IFIC DVD (space service) and can be downloaded from the ITU website at:

<http://www.itu.int/en/ITU-R/space/plans/Pages/AP30B.aspx>

The parameters used in characterizing the Plan can be found in Annex 1 of AP30B. Each allotment in the Plan is based on C/N values of 21 dB and 15 dB for uplink and downlink respectively under rain-faded conditions and availability of 99.95% for the 6/4 GHz frequency bands and 99.9% for the 13/10-11 GHz frequency bands. In addition, the Plan has been prepared with a view to ensuring for each allotment an overall aggregate C/I value of 21 dB and a single-entry C/I value of 25 dB under free space path loss conditions.

Before the orbital position and frequency resources of an allotment can be utilized by a satellite system, the national allotment has to be converted into an assignment through the application of the procedures of Article 6 of AP30B. The assignments are then recorded in the List of AP30B (hereafter referred to as List), and they are entitled to protection against systems received by the Bureau at later date.

Additional systems can also be included in the List after successful application of the relevant procedures of Article 6 of AP30B. In the context of this Appendix, an additional system is a system for which the assignments are not the result of conversion of an allotment into assignments. When an administration submits an additional system, the allotment of that administration in the Plan is retained.

The whole process for an assignment entering into the List through the application of Article 6 of AP30B can be divided into two stages:

- Stage A: for coordination/agreement seeking, relating to a submission under § 6.1 of AP30B and a publication in Special Section AP30B/A6A/ under § 6.7 of AP30B;
- Stage B: for inclusion into the List, relating to a submission under § 6.17 of AP30B and a publication in Special Section AP30B/A6B/ under § 6.23 of AP30B.

The detailed characteristics of all the assignments in the List are included in the above-mentioned AP30B database.

After being entered into the List, an assignment can be notified in accordance with Article 8 of AP30B for recording in the Master Register.

3 Main procedures of Appendix 30B

3.1 Article 6 of Appendix 30B

3.1.1 Stage A submission

The procedure of Article 6 of AP30B is applied when an administration submits to the Bureau either: the conversion of an allotment into an assignment, the introduction of an additional system or the modification to an assignment in the List that has already been brought into use. The submission shall be sent not earlier than eight years and not later than two years before the planned date of bringing into use the assignments of the proposed network.

The Bureau examines the submission to assure that the information received is complete and the data elements are in conformity with the requirements of Appendix 4 and the Table of Frequency Allocations. The notifying administration has to provide missing information and clarification if requested by the Bureau.

3.1.2 Stage A examinations and publication

When a Stage A submission is considered as complete, its formal date of receipt is established. The Bureau treats the submissions in sequence of receipt. The Bureau first examines the submission against the limits in Annex 3 to AP30B as well as other limits contained in Articles 21 and 22 of the Radio Regulations.

Following a favourable finding, the Bureau further evaluates the impact of the proposed assignments on the reference situation of allotments in the Plan, the assignments in the List and the assignments that the Bureau has previously examined, using the method and criteria of Annex 4 to AP30B. This examination under § 6.5 of AP30B identifies administrations whose networks are considered to be affected.

The Bureau also identifies the administrations whose territories have been partially or wholly included in the service area of the assignments under examination in accordance with § 6.6 of AP30B.

The submitted information and the names of the identified administrations are published in a Special Section (AP30B/A6A/) annexed to the BR IFIC together with the relevant AP30B database.

3.1.3 Comments and agreement-seeking

The administration whose networks are identified as being potentially affected (under § 6.5 of AP30B) should send its comments to the Bureau and to the notifying administration (directly or through the Bureau) within four months following the publication of the AP30B/A6A/ Special Section. When no comment is received within the four-month period, it is considered that the administration has not agreed to the assignments of the proposed network unless an assistance under § 6.13 to § 6.15 of AP30B is requested by the notifying administration.

The notifying administration may request the above-mentioned assistance in respect of an administration that is considered to be affected but has not commented within the above-mentioned four-month period. If the identified administration fails to reply within 30 days after the Bureau's reminder, it shall be deemed to have agreed to the proposed assignments.

The comments from the administrations whose territories are included in the service areas of the published assignments can be sent at any time during or after the above-mentioned four-month period. The notifying administration must obtain explicit agreement from those administrations before the assignments are included in the List.

3.1.4 Stage B submission and examinations

For the purpose of entering into the List, the administration proposing the new or modified assignments has to either reach agreement with affected administrations or modify the characteristics of its assignments to ensure that the identified networks of other administrations are no longer affected.

The final characteristics of the proposed assignments should be submitted to the Bureau in accordance with § 6.17 of AP30B together with the names of administrations with which agreements have been reached.

The Bureau checks if required agreements from the identified administrations are obtained (examinations under § 6.19 and § 6.21 of AP30B). If not, an unfavourable finding is given to the assignments and the whole notice is returned to the administration.

In the examination under § 6.22 of AP30B the Bureau uses the method and criteria in Annex 4 to AP30B to identify the newly affected networks due to the changes of characteristics in Stage B submissions. The Bureau calculates and compares the interference caused by the Stage A characteristics and by the Stage B characteristics of the proposed network to the affected networks. If Stage B characteristics cause more interference at any test point or any grid point of a newly affected network, the assignment under examination will receive an unfavourable finding and the whole notice will be returned. As some of the affected networks may not have been published when a Stage B submission is prepared, notifying administration may not be able to foresee the Bureau's examination results. However, as long as the Stage B characteristics are within the envelope of Stage A characteristics, the result of this examination is always favourable.

If all the examinations lead to favourable findings, the submitted assignment is entered in the List and is published in a Special Section (AP30B/A6B/) of the BR IFIC. The reference situation of all allotments in the Plan, the assignments in the List and of those assignments of Article 6 submissions, which are still at the stage of application of that Article, is then updated. The AP30B database containing the technical characteristics and reference situation of the Plan and List is distributed in the BR IFIC DVD (space service) and can be downloaded from the ITU website at:

<http://www.itu.int/en/ITU-R/space/plans/Pages/AP30B.aspx>

3.1.5 Provisional entry into the List

If the examination of a Stage B submission leads to unfavourable findings, the submitted notice is returned. However, if a notice is returned due to unfavourable findings under Annex 4 to AP30B examination with respect to assignments, but the findings with respect to the allotments in the Plan are favourable, the submitted assignments can be provisionally entered into the List after resubmission of the notice by the notifying administration, together with a commitment indicating that its assignments shall not cause unacceptable interference to nor claim protection from the assignments for which agreement still needs to be obtained (see A.19a of Appendix 4).

If the assignments which are the basis of unfavourable finding are not brought into use within the eight years regulatory time-limit (and the extension time period mentioned in paragraph 7 below), the Bureau will review the status of the assignment provisionally entered into the List.

3.2 Article 7 of Appendix 30B

An administration that has joined the Union as a new Member State and does not have a national allotment in the Plan or an assignment stemming from the conversion of an allotment can obtain a national allotment in application of Article 7 of AP30B. That administration shall submit its request for an allotment to the Bureau, with the following information:

- the geographical coordinates of not more than 20 test points for determining a minimum ellipse to cover its national territory;
- the height above sea level of each of its test points;
- any special requirement which is to be taken into account to the extent practicable.

The request for a new allotment is processed ahead of submissions received under Article 6 of AP30B which have not yet been examined. The Bureau proposes appropriate technical characteristics and associated orbital positions for the new allotment and informs the requesting administration, who should respond to the Bureau's proposal within 30 days.

Upon receipt of a reply on the selection of an orbital position and technical parameters from the requesting administration, the Bureau verifies its compatibility with allotments, assignments in the List and the assignments which have been examined as well as the conformity with the Table of Frequency Allocations and other provisions of the Radio Regulations.

The new allotment is then included in the Plan and published in a Special Section (AP30B/A7/) of BR IFIC if the above-mentioned examinations lead to favourable findings. The reference situation of all allotments in the Plan, the assignments in the List and of those assignments of Article 6 submissions, which are still at the stage of application of that Article, is then updated.

If affected administrations are identified in this process, the corresponding agreements are required. If the calculated *C/I* values of the new allotment are below the required criteria, the requesting administration has to accept the excess degradation. Otherwise, the request for a new allotment in the Plan will be treated as a submission under Article 6 of AP30B and processed ahead of other Article 6 submissions which have not yet been examined by the Bureau.

3.3 Article 8 of Appendix 30B

Any assignment for which the relevant procedure of Article 6 of AP30B has been successfully applied shall be notified to the Bureau in accordance with Article 8 of AP30B not earlier than three years before the assignment is brought into use.

The Bureau first examines the notification to verify its compatibility with the Table of Frequency Allocations, the Plan, and other relevant provisions of the Radio Regulations including the Article 11.44B for confirmation of continuous bringing into use and then examines its conformity with the characteristics of the corresponding assignment in the List. A new assignment is recorded in the Master Register and published in Parts I-S and II-S of the BR IFIC if the examinations lead to favourable findings. If the examinations lead to unfavourable findings, the assignment is published in Part III-S, and returned.

If an assignment is not notified and brought into use within the eight-year regulatory time-limit (and the extension time period mentioned in paragraph 7 below), the assignment in the List will be cancelled. The Bureau informs the notifying administration three months in advance of the end of the above mentioned eight-year period of the actions it intends to take. If the cancelled assignment is the result of a conversion from an allotment, this allotment shall be reinstated with the same characteristics as the cancelled assignment, except for its service area which should be the national territory.

3.4 Confirmation of bringing into use or bringing back into use of assignments after a suspension of use

When a network is confirmed brought into use or brought back into use, the Bureau is verifying if the administration submitted information in conformity with the Articles **11.44B** or **11.49** of the Radio Regulations about the space station in the geostationary-satellite orbit with the capability of transmitting or receiving that frequency assignment deployed and maintained at the notified orbital position for a continuous period of at least 90 days. The list of satellite network frequency assignments brought into use is available on the following ITU web page:

<http://www.itu.int/net/ITU-R/space/snl/listinuse/index.asp>

Then the Bureau also control that the information in accordance with Resolution **40** (WRC-15) have been submitted to identify if one space station brings frequency assignments to geostationary satellite networks at different orbital locations into use within a short period of time. The list of space stations and those related information is available on the following ITU web page:

http://www.itu.int/net/ITU-R/space/snl/sat_relocation/index.asp

Once assignments are confirmed brought into use or brought back into use within regulatory time-limit, the record in the Master Register is becoming definitive.

4 Application of Resolution 49

WRC-07 extends the application of Resolution 49 to all the submissions under Article 6 of AP30B which are received after 17 November 2007 (except for submissions of new Member State for acquiring a national allotment in the Plan). The due diligence information of an assignment shall be sent to the Bureau within its eight-year regulatory time-limit and the Bureau informs the notifying administration six months in advance of the end of this eight-year period of the actions it intends to take. Otherwise, the relevant recordings in the Master Register and the entries into the List will be cancelled by the Bureau.

The World Radiocommunication Conference 2012 (WRC-12) decided that the due diligence information is also required when an administration requests for the extension of regulatory time-limit for its assignments to a space station in case of a launch failure (see paragraph 7 below).

The due diligence information submitted is examined by the Bureau in conformity with Resolution 49 and published in a Special Section (RES49/) annexed to BR IFIC.

5 Technical criteria and examinations

The core part of the technical examinations (in Articles 6 and 7) of AP30B is to check whether a new proposed assignment is compatible with allotments in the Plan, the assignments in the List and the assignments which have already been published in accordance with § 6.7 of AP30B. WRC-07 introduced the coordination arc concept into AP30B (10° in the 6/4 GHz frequency bands and 9° in the 13/10-11 GHz frequency bands), thus the compatibility examination is as follows:

- Outside the coordination arc, the pfd values produced by a proposed assignment are calculated and compared with the limits in Annex 3 of AP30B. The downlink pfd on any portion of the surface of the Earth and the uplink pfd towards any location in the geostationary-satellite orbit located beyond the coordination arc shall not exceed the corresponding limits.
- Within the coordination arc, the compatibility examination is based on the calculation of overall aggregate and single-entry *C/I* values of allotments and assignments. The aggregate and uplink single-entry *C/I* values are calculated at each test point (number of submitted test points extended up to 100 by WRC-15). The downlink single-entry *C/I* values are calculated at both test points and grid points (regularly generated within and along the border of the service area of interfered-with networks in order to protect them from incoming networks whose antenna gain contour diagrams contain very low antenna gain in a small area towards certain specific downlink test points of an interfered-with network). An allotment or assignment is considered as being affected if any of the calculated *C/I* values cannot meet the corresponding protection criteria in Annex 4 of AP30B.

As mentioned in the previous paragraphs, a new assignment under AP30B has also to be examined to check if it is in conformity with the Table of Frequency Allocations and the relevant provisions in Articles 21 and 22 of the Radio Regulations. In this regard, it should be noted that a downlink transmission must observe the pfd limits stipulated in 21.16 of Article 21 of the Radio Regulations. However, the Rules of Procedure concerning the application of pfd limits to steerable beams are not applicable to AP30B.

6 Software and databases

The Bureau's software packages GIBC (Graphical Interface for Batch Calculations) is used together with the AP30B database and GIMS (Graphical Interference Management System) with a graphical database, to carry out the calculations for the above-mentioned examinations as follows:

Provision	Software	Databases
AP30B#6.3a)/Article 5 of RR	---	A30B
AP30B#6.3a)/Article 21 of RR	GIBC/(PFD)	A30B, GIMS
AP30B#6.3a)/Article 22 of RR	GIBC/(PFD)	A30B
AP30B#6.3b)/Annex 3	GIBC/Appendix 30B	A30B, GIMS
AP30B#6.5/Annex 4	GIBC/Appendix 30B	A30B, GIMS
AP30B#6.6	GIBC/Appendix 30B	A30B, GIMS

7 Extension of the regulatory time-limit for bringing into use of an assignment in case of launch failure

The WRC-12 has approved new provisions to deal with the occurrence of launch failure. In accordance with § 6.31*bis* of Article 6 of AP30B, the eight-year regulatory time-limit can be extended by not more than three years due to launch failure, which includes the cases of destruction of satellite and failure to reach assigned orbital location.

The extension of time-limit for assignments to a space station can only be requested once and will be granted only when the launch failure has occurred five years after the date of receipt of the Stage A submission under § 6.1 of Article 6 of AP30B.

To request the extension, the notifying administration must inform the Bureau in writing within one month of the launch failure and provide due diligence information under Resolution 49 (Rev.WRC-15) relevant to the subject failure launch, if that information has not been provided before. Further the notifying administration shall submit to the Bureau updated Resolution 49 information for the new satellite under procurement within one year of the request for extension and the Bureau promptly sends a reminder to the notifying administration if 11 months after the request for extension such information has not been provided. Otherwise the related frequency assignments shall lapse.

8 Suspension time period (WRC-15)

Paragraph 8.17 of Article 8 of AP30B provides a mechanism to suspend an assignment recorded in the Master Register. The maximum suspension time period is three years. However, if the notifying administration informs the Bureau of the suspension more than six months after the date on which the use of the frequency assignment was suspended, the three-years' time period will be reduced to the equal amount of time that has elapsed between the end of six months period and the that the Bureau is informed of the suspension. For the date of bringing back into use of assignments, refer to paragraph 3.4.