

Draft CEPT Brief on agenda item 1.10

Agenda item 1.10 *to review the regulatory procedures and associated technical criteria of Appendix 30B without any action on the allotments, the existing systems or the assignments in the List of Appendix 30B*

The Appendix 30B (AP30B) Plan, when adopted at WARC-88, was deemed to meet the requirements of the Fixed-Satellite Service for a period of at least 20 years from its date of entry into force. However, 15 years later, this Plan is scarcely used, one possible reason being that some regulatory and technical aspects or regulatory procedures are complex and may not fully reflect up-to-date technology. This agenda item, proposed by CEPT at WRC-03, therefore provides for a way to improve and update the Appendix 30B provisions.

CEPT considers that linkage between agenda items 1.10 and 1.19 should be avoided.

This Brief contains the CEPT views on the different elements in AP30B of the Radio Regulations. These elements are:

1. Multinational service areas
2. Processing of submissions
3. Coordination between terrestrial stations and FSS earth stations in the AP30B frequency bands
4. PFD examination at the stage of application of Article 6
5. Independence of the 6/4 GHz and 13/10-11 GHz parts of the Plan
6. PDA
7. Existing systems
8. Different Categories of Submissions
9. Macrosegmentation
10. Sharing of capacity between two assignments through bandsegmentation (Further text to be developed)
11. Comments for inclusion in the coordination process
12. Provisional entry in the List

Other issues have been identified in the ITU-R study groups (see Annex 2 to Document SC-WP/57-E) and will be considered further at the next meeting of the PT-1. Of these the preliminary view of PT-1 regarding the following points are generally agreed:

- The use of coordination arc should be included in AP30B,
- Generalized parameters can be deleted from AP30B.

1. Multinational service areas

Issue

The allotments of the Plan are provided with a national service area protected by a number of up to ten test points. In the process of their conversion into assignments, § 6.4 prohibits the extension of the service area to a multinational service area. On the contrary, subregional systems and additional uses can have multinational service areas protected by up to twenty test points under the condition that the notifying administration has the explicit agreement of all administrations whose territories are partially or totally included in the service area.

Preliminary CEPT Position

CEPT considers that there should be no need to provide agreement of other administrations whose countries are included in the service area at the start of the procedure, but that there will be a need to obtain agreement prior to the assignments being entered in the “List”, and there will be a need to provide those agreements to the BR for the countries on which a test point is located prior to the compatibility analysis that would lead to the assignments being entered into the “List”.

Background

The limitation to national service area for assignment stemming from the conversion of an allotment (see § 6.4) penalizes greatly the administrations of countries having a “small” territory which have to rely on providing services to a number of countries in order to obtain an economically viable operation. On the contrary, allotments that are not converted could only be protected on the bases of national allotment as it is the case in the current regulations. Therefore, if the conversion of an allotment into a supra-national service area assignment is permitted, careful considerations should be taken for the procedure of suppression of an assignment stemming from an allotment (e.g. suppression of the test points situated outside the territory of the administration).

The need to give the explicit agreement of the countries that are included in the service area of an assignment is a great constraint since these agreements may be difficult to obtain. If such agreements are not given by the time the assignment is examined by the BR and entered in the List, no earth station can ever be implemented in the concerned territories even if the responsible administration wishes so.

This question raises the problem of the definition of service area of a network. For AP30B filing, it corresponds to a set of a maximum of 20 test points and a contour on the surface of the Earth (see C.11.a of Annex 2 to Appendix 4).

The contour on the surface of the Earth does give the limits on the geographical area on which earth stations may possibly be implemented in the future. The agreement of an

administration to be included in this contour does not mean that the administration agreed on the implementation of earth stations in his country but it leaves the issue open. On the other hand, in the current AP30B, if the administration did not give its agreement, no earth station for the considered network will ever be implemented in its country. The need for agreements of administrations to be included in the contour is therefore unnecessary at the start of the procedure.

The case of test points is different because test points represent the position on which the network's interference potentials and protection needs are evaluated and coordinated. If a test point is not situated in the country of the notifying administration, the administration responsible for the location of the test point will have to protect that test point and accept interferences from that test point even if it does not intend to implement earth station on its territory. That could be considered as an infringement to its national sovereignty and therefore, agreements should be provided before the assignment is entered in the List.

List of relevant documents

Actions to be taken in preparation for WRC-07

Proposals from outside CEPT

2. Processing of submissions

Issue

The treatment of submissions under Articles 6 and 7 of AP30B follows a strictly sequential process. This process limits the number of networks examined by the BR each year which resulted in a backlog of about 4 years and it also limits the period for which administration can effect the coordination of their proposed network to 30 days.

Preliminary CEPT Position

CEPT is of the view that non-sequential treatment without a PDA (Approach 2) would be preferable. There is a need to develop regulatory text associated with this Approach.

CEPT is of the opinion that Approach 1 should only be studied if it is not possible to develop acceptable regulatory text for Approach 2. (see 'Background for explanatory text')

Background

In the current procedures of AP30B, the Bureau examines the submissions under Articles 6 in the order of receipt and determines if the proposed assignment is compatible with the Plan and the List. Based upon the finding of this examination, it either enters the submission into the List or returns it to the notifying administration. Under the Rule of Procedure on § 6.12, the BR allows the administration 30 days from its first examination to obtain additional agreements or do adjustments to obtain compatibility before making the final decision. Also, for submissions of subregional systems, there is a 45 days period after publication of the network (§ 6.50) where other administrations may make comments on the network. The Bureau waits for the complete treatment of a submission including the 30 days and 45 days periods before processing the next submission.

As a consequence to the sequential treatment, the BR can only process a few number of submissions each year (22 networks in 2005, 14 networks in 2004 and 11 networks in 2003) and administrations are not informed by the BR of whom they need to coordinate with until 30 days before they are required to have all the coordination completed.

Procedures that would allow the Bureau to examine submissions in a non-sequential manner (examination of one submission can start before the previous submission has completed the whole process to be entered into the List), would avoid the problem of the processing rate of the Bureau. Such procedures would also allow administrations to have coordination requirements established before coordination needs to be conducted.

Still, a non-sequential treatment of submissions cannot be achieved if the PDA concept is kept in the AP30B. Indeed, once the coordination requirements of the network of an administration A have been determined by the BR, the use of the PDA concept by an

administration B could impose on administration A new coordination requirements that would not be determined by the BR.

Within ITU-R two approaches are being considered. These are:

Approach 1: strictly sequential treatment with a PDA concept as in the current AP30B,

and

Approach 2: non-sequential treatment without a PDA concept.

List of relevant documents

Actions to be taken in preparation for WRC-07

Under the approach 1 if that approach is to be retained, the rationale for the 45 days of commenting period for subregional systems is to be studied as well as the possibility for the BR to examine the next submission before this 45 days period is finished.

Proposals from outside CEPT

3. Coordination between terrestrial stations and FSS earth stations in the AP30B frequency bands

Issue

Coordination between assignments to terrestrial stations and assignments to earth stations related to an AP30B network follows the procedure of Article 9 (cf. § 8.18) and more specifically the provisions of Nos. 9.17 and 9.18.

[There is a risk that an administration may wish to implement its allotment and may only learn that the earth stations associated with their allotment cannot operate at the time when they attempt to notify them due to the fact that only at that time will an examination be made with regard to terrestrial operation in adjacent administrations. If assignments to typical Appendix 30B earth stations were allowed to be coordinated, the result would be that the FSS would preempt the spectrum resource against other co-primary services allocated in the bands.]

At present time Radio Regulations do not contain procedure of coordination between terrestrial services and typical earth stations in FSS that relate to Appendix 30B.

Preliminary CEPT Position

CEPT considers that any modification to Article 9 in order to address the issue of coordination between AP30B FSS earth stations and terrestrial stations should be avoided.

CEPT is of the view that no change related to the issue of coordination between AP30B FSS earth stations and terrestrial stations is required.

Background

The coordination of assignments to earth stations operating or planned to be operated in AP30B bands is subject to the provisions on No. 9.17 of the Radio Regulations. Coordination under No. 9.17 is a bilateral coordination process, and the status of the coordinated earth stations is dependent on the results of the bilateral coordination.

AP30B does not give any status to typical earth stations that could be associated with the allotments of the Plan. Since Nos. 9.17 and 9.18 is limited to specific earth stations, an administration can only protect AP30B earth stations in specific positions. But, if assignments to typical Appendix 30B earth stations were allowed to be coordinated, the result would be that the FSS would preempt the spectrum resource against other co-primary services allocated in the bands.

Some administrations are of the opinion that this regulatory issue requires further study and can be resolved by development of appropriate regulatory provisions in Article 9 and Appendix 30B.

List of relevant documents

Actions to be taken in preparation for WRC-07

Proposals from outside CEPT

4. PFD examination at the stage of application of Article 6

Issue

The current procedures of Appendix 30B introduce examination with respect to the hard pfd limits only at the stage of notification in Article 8. This means that a network can successfully complete the Article 6 coordination procedures and be entered into the List while not being in conformity with these hard pfd limits.

Preliminary CEPT Position

CEPT considers that the examination of hard PFD limits contained in Article 21 should also be made by the Bureau at the stage of Article 6 at the stage of compatibility examination.

Background

In the notification process of a network in AP30B (Article 8), the BR verify under § 8.8 whether the proposed assignment is in conformity with the Table of Frequency Allocations and the other provisions of the RR (except AP30B which is subject to § 8.9). This examination includes the conformity with the PFD limits of Article 21.

This verification is not done at the stage of Article 6 before the assignment to be notified is entered in the List. Therefore, in the current regulation, it is possible to enter in the List an assignment not in compliance with § 8.8 and that could therefore not be registered in the MIFR with the same parameters.

List of relevant documents

Actions to be taken in preparation for WRC-07

Proposals from outside CEPT

5. Independence of the 6/4 GHz and 13/10-11 GHz parts of the Plan

Issue

This would not be an issue with respect to Approach 2. A Rule of Procedure has been adopted that ensures that the orbital location for National Allotments in both the 6/4 GHz and the 13/10-11 GHz bands is common to both bands. Whenever the PDA concept is applied in one of these two band segments it is simultaneously applied to the other, keeping the orbital locations identical. Additionally, when an Administration applies Article 6 for only one of the two band segments, resulting in a change to the size of the PDA for that band segment, the size of the PDA for the other band segment is made to be the same.

Preliminary CEPT Position

CEPT agrees that the two times 800 MHz (uplink and downlink) of National Allotments should be maintained at the same orbital location.

Background

It has been considered within WP 4A that there may be advantages to split the allotment into two parts, one relating to the 6/4 GHz band and one to the 13/10-11 GHz band (e.g. flexibility in case of submissions involving only one of the two bands).

The current situation is that because of the definition of an allotment in AP30B, the two bands (C & Ku) are linked. When an administration wants to use only one of the bands, it follows the procedure to convert that band from an allotment into an assignment. In this process, if it results in changing the orbital position, the BR will also adjust the orbital position for the allotment in the band which is not converted to an assignment to the same position and process this in accordance with the procedures of AP30B. When such a conversion does not involve a change in the orbital position then this has the effect of changing the PDA for that band which is being converted to an assignment, resulting in different PDA values for the two bands. With regard to the application of the PDA concept, the Rule of Procedure states that in such cases, the smaller PDA would apply to both the 6/4 GHz and 13/10-11 GHz parts of the Plan.

List of relevant documents

Actions to be taken in preparation for WRC-07

Proposals from outside CEPT

6. PDA at the various stages of development

Issue

The PDA provides flexibility to modify orbital locations of Allotments and also leads to the current situation whereby it is necessary to process all notices in a strict sequential manner, and this in turn results in very limited possibility for adequate time for coordination activity to take place.

Preliminary CEPT Position

CEPT considers that the PDA concept should be retained if the sequential treatment of notice is retained and that it should be discarded if the sequential treatment of notice is not retained.

CEPT is of the opinion that if the PDA concept is retained, the PDA for national allotments should be equal to the service arc until such time as assignments have been entered into the List associated with any part of the national allotment, at which time the PDA of the remaining part of the allotment is equal to zero.

CEPT is of the view that there should be no PDA associated with assignments in the Appendix 30B List. See also "Processing of Submissions".

Background

Use of the PDA concept can mean that the administration responsible for a case awaiting treatment has difficulties in analysing the situation of its submission. It is difficult to see what coordinations may potentially be required because the reference situation may be moving many times as nominal orbital positions of entries in the Plan and List are being moved during the treatment of cases that have been received earlier.

The current situation is that, after having applied Article 6 provisions, a satellite network is considered as being at the "design stage", which implies a decrease of PDA value from $\pm 10^\circ$ to $\pm 5^\circ$. However, as administrations intend to bring into use a real system at a precise orbital position and as they do not want to lose their assignments at this orbital position, they have to apply Article 8 immediately afterwards, in order to make the PDA value equal to 0° .

List of relevant documents

Actions to be taken in preparation for WRC-07

Proposals from outside CEPT

7. Existing systems

Issue

In 1988 specific limitations on the period that ‘existing systems’ would be accommodated in the Plan were adopted. Many such systems have been implemented and there are concerns for how to handle the rights of these systems following a revision of Appendix 30B.

Preliminary CEPT Position

The CEPT is of the view that Section IB of Article 6 should be suppressed, as well as the notion of Part B.

The CEPT is also of the view that WRC-07 should address the definition of “existing systems” and other related aspects. A possible way for WRC-07 may be to adopt a Resolution.

Background

Part B of the AP30B Plan contains the networks of “existing systems”. Article 10 of AP30B provides the exhaustive collection of the “existing systems” at the time AP30B was adopted by WARC-Orb-88. This is a limited collection of networks that were “*a*) which are recorded in the Master International Frequency Register (MIFR); *or b*) for which the coordination procedure has been initiated; *or c*) for which the information relating to advance publication was received by the Radiocommunication Bureau before 8 August 1985, and which in all cases are listed in Part B of the Plan.”

All these “existing systems” have been either entered in the Appendix 30B List and brought into use (as well as notified or recorded in the Master Register) or have been cancelled (either pursuant to the application of § 6.29 of Article 6, as revised by WRC-03, or by the notifying administration). As all these existing systems are now contained in the AP30B List, they are afforded protection against subsequent assignments by the application of the relevant provisions of Article 6.

Section IB of Article 6 of AP30B contains the procedure for recording the “existing systems” contained in Part B of the Plan in the List. Since all “existing systems” have been either cancelled or recorded in the List, this procedure is no longer necessary. Moreover, since Part B has been emptied, the notion of Part B is also no longer necessary.

List of relevant documents

Actions to be taken in preparation for WRC-07

Proposals from outside CEPT

8. Different Categories of Submissions

Issue

The rights for a FSS GSO network to use AP30B frequency bands are acquired by entering the corresponding assignments in the AP30B List. Five different procedures (sections I, IA, IB, II and III of Article 6) can be followed in order to enter these assignment in the AP30B List. It is considered that simplification could lead to less complex regulation and more flexibility to allow use of the spectrum.

Preliminary CEPT Position

CEPT considers that Article 6 of AP30B should contain only 2 procedures for submissions of assignments to be entered in the List. One procedure should be dedicated to submissions relating to the conversion of an allotment into an assignment regardless of whether or not its parameters are in conformity with the parameters of this allotment. The other procedure should be dedicated to submissions relating to assignments not stemming from an allotment. CEPT considers that, if the sequential treatment is retained, the period of 45 days allocated to comments from administrations under § 6.50 should not be reproduced in the new procedures and should be suppressed if the current procedure of section II is retained.

CEPT considers that if the category of 'sub-regional systems' is to be maintained, then the relationship with 'neighbouring countries' should be removed.

Background

Currently the Appendix 30B provides separate procedures relating to

- a National Allotment that conforms to Part A of the Plan (Section I),
- a National Allotment not in conformity with Part A of the Plan (Section IA),
- an existing system from Part B of the Plan (Section IB),
- a sub-regional system (Section II), and
- an additional use (Section III).

However, the need for all these procedures can be discussed for the following reasons:

- a.) it is understood that the Bureau apply the procedure of section IA for national allotments that conform to Part A of the Plan,
- b.) all existing systems in part B of the Plan have entered the List or have been suppressed, and
- c.) the submissions for subregional systems have never included a request for the suspension of allotments in application of Section II. Moreover the notion of 'suspension of allotment' has no clear definition.

In view of these reasons, the procedures of Article 6 could be replaced by two procedures which would correspond to submissions relating to the conversion of an allotment (with

or without change to its parameters) and submissions relating to assignments not stemming from an allotment.

The current regulations allow a period of 45 days for comments following the publication of results established in Section II of Article 6. WRC-03 revised § 6.50 of Article 6 of Appendix 30B to change the time period for comments received by administrations after the publication in the BR IFIC. However, due to the large number of proposed subregional systems to be processed under Section II of Article 6 and considering that a comment under § 6.50 which required a re-examination of the proposed subregional system has never been received by the Bureau, the elimination of the period for receipt of comments mentioned in § 6.50 may significantly accelerate the treatment of all submitted networks under Articles 6 and 7 of Appendix 30B. On the contrary, the introduction of such a period for comments in any other procedures of Article 6 would considerably slow down the treatment of submitted networks if the sequential treatment of submissions is retained.

The category of subregional systems has also raised the following matter that needs consideration in case this category is kept in the AP30B. Under the provisions of Appendix 30B, a subregional system is the way for administrations to act jointly (through one designated notifying administration) in order to establish a satellite system with a service area larger than the national service area of the notifying administration, but limited at most to the aggregate of the national service areas of the administrations participating to the subregional system. The definition provided by § 2.5 of Article 2 of AP30B limits the group of administrations to “neighbouring countries” whereas, in some cases, it may be difficult to define whether or not two given countries are neighbouring countries. As stated in the Rule of Procedure on § 2.5, the Board has decided that the Bureau shall examine this question on a case by case basis. However, for the sake of consistency, the Bureau has decided to accept all submissions for subregional systems created by agreement among administrations.

At its 2005 meeting, ITU Council has decided that the conversion of an allotment under section IA is subject to cost recovery and that the conversion of an allotment under section I is not subject to cost recovery.

List of relevant documents

Actions to be taken in preparation for WRC-07

Transitional arrangements for consideration of satellite networks for which there is a pending notice will need to be considered.

Procedures for incorporation of Allotments for New ITU Member States into the Plan need to be considered.

Proposals from outside CEPT

9. Macrosegmentation

Issue

Macrosegmentation has been included in the Plan in 1988 to make provision for both analogue and digital transmissions and to allow for multiple carriers to share a single transponder with a back-off in operating level so as to avoid intermodulation products.

Preliminary CEPT Position

The CEPT proposes that the principle of macrosegmentation should be excluded from the Plan.

Background

The macrosegmentation concept as described in Annex 3B of Appendix 30B is understood as a rough way of traffic matching in which high density carriers (typically analogue modulation) are arranged in the upper 60% of the band and low density carriers (typically digital modulation) are arranged in the lower 40% of the band.

Correspondingly, Annex 4 of Appendix 30B gives special interference requirements to high density carriers if they are located in the low density band. It is noted that digital modulation now is the by far dominant modulation technique and provides inexpensive and efficient use of satellite capacity. The macrosegmentation concept moreover is a technique that is only applied when bringing into use new networks and will not have any impact on operational networks. It is also noted that earlier WRCs in revising the BSS bands have assumed only digital modulation.

List of relevant documents

Actions to be taken in preparation for WRC-07

Proposals from outside CEPT

10. Technical parameters of allotments

Issue

The Appendix 30B Plan was designed and adopted in 1988. Since that date, satellite transmissions have evolved and therefore the technical specifications and the associated sharing criteria have deeply changed. Therefore, it was proposed to investigate parameter values used for establishing the current reference situation (e.g. antenna diameters, antenna diagrams). Agenda Item 1.10 is “to review the regulatory procedures and associated technical criteria of Appendix 30B without any action on the allotments, the existing systems or the assignments in the List of Appendix 30B”. It is therefore understood that proposal for new parameters should not require any change with respect to the orbital position of the allotments in the Plan or the assignments in the List. Furthermore the proposal for new parameters should only concern the allotments in the Plan.

Preliminary CEPT Position

TBD

Background

Studies performed within ITU-R Working Party 4A have shown that a reduction of the earth station antenna diameters of allotments in the Plan would be feasible only if associated with variations of the following parameters: carrier-to-noise ratio (taking into account, *inter alia*, BER vs E_b/N_o and rain attenuation model); earth station antenna elevation angle; interference criteria; earth station characteristics (receiving system noise temperature, antenna efficiency, reference pattern), space station characteristics (receiving system noise temperature, antenna efficiency, reference pattern).

a.) Receiver noise temperature

Appendix 30B current antennas noise temperatures are 140 K and 200 K for earth stations in the 4 GHz and 10-11 GHz bands and 1000 K and 1500 K for space stations in the 6 GHz and 13 GHz bands (cf. Annex 1 of Appendix 30B).

Typical noise temperatures of antennas currently available are 100 K and 130 K for earth stations in the 4 GHz (7 m) and 10-11 GHz (3 m) bands and 500 K and 550 K for space stations in the 6 GHz and 13 GHz bands

b.) Antenna patterns

An allotment not converted into an assignment has currently two possible earth station antenna patterns. Those patterns are detailed in Table 1 and Table 2 in Annex 1 of Appendix 30B. Taking into consideration the current antenna manufacturing technology,

it seems feasible to adopt $29-25 \log \phi$ as the general reference antenna side-lobe pattern in Table 2 of Annex 1 of AP30B (Rev. WRC-03). The improved side-lobe pattern, $29-25 \log \phi$, would make the Plan more efficient and facilitate the efficient use of orbit and frequency resources.

The usual space station reference pattern used in Appendix 30B is the R123SS. A fast roll-off pattern may be used when specified by administrations, as indicated in Annex 1 of Appendix 30B. Systematical application of this fast roll-off pattern to allotments not converted into assignments would also make the Plan more efficient.

c.) Rain attenuation model

Annex 1 of Appendix 30B specifies that “the rain attenuation model used is that described in Report ITU-R 564-3 (1986)”. This text is completed by a footnote indicating that “This Report is no longer in force”. Moreover, for new allotments, the BR uses the rain attenuation model included in Recommendation ITU-R P.618-7 dealing with “Propagation data and prediction methods required for the design of Earth-space telecommunication systems”. (Note: the version currently in force of this Recommendation is ITU-R P.618-8. It differs from Recommendation ITU-R P.618-7 only by its reference to other ITU-R P Recommendations.)

If, at any time, any modifications to power parameters are to be considered for allotments, they should therefore be determined taking into account the rain attenuation model of the up-to-date version of Recommendation ITU-R P.618.

d.) Carrier-to-noise ratio

In 1988, a carrier-to-noise (C/N) ratio of 16 dB (23 dB uplink and 17 dB downlink) under rain fading condition was given to allotments. Nowadays, assuming digital modulation (for example QPSK with a bit-error rate (BER) of 10^{-8}), typical C/N ratios are of the range [3 to 9 dB] depending on the coding rate.

New set of technical parameters for allotments

The impact of different scenarios assuming various earth station antenna size and C/N ratio on the reference situation of the allotments in the Plan and the assignments in the List shows that there would be almost no effect on the List and only few allotments would not be guaranteed an aggregate C/I ratio above C/N+7dB with the following set of parameters:

Parameter	Units	Current AP30B value	Possible new values
Carrier to noise ratio			
(C/N) \uparrow	dB	23 dB	[15.5] dB
(C/N) \downarrow		17 dB	[10] dB
(C/N) _{total}		16 dB	[8.9] dB
Rain fading model		cf. Report ITU-R 564-3	Rec. ITU-R P.618-8
Interference criteria			
C/I _{se}	dB	27 dB (used to be 30 dB)	C/I _{se} = C/N) _{Total} + 12.2 dB = [21.1] dB
C/I _{agg}	dB	23 dB (used to be 26 dB)	C/I _{agg} = C/N) _{Total} + 7 dB = [15.9] dB
Earth station characteristics			
Diameter	Meter	-6/4 GHz: 7 m -13/10-11 GHz: 3 m	6/4 GHz: [4.6] m 13/10-11 GHz: [2.4] m
Receiving system noise temperature	Kelvin	-4 GHz: 140 K -10-11 GHz: 200 K	4 GHz: 100 K 10-11 GHz: 130 K
Antenna efficiency		70%	70%
Reference pattern		AP30B/Table 1 or AP30B/Table 2	AP30B Table 2
Space station characteristics			
Minimum half-power beamwidth	Degrees	-6/4 GHz: 1.6° -13/10-11 GHz: 0.8°	No change
Receiving system noise temperature	Kelvin	-6 GHz: 1 000 K -13 GHz: 1 500 K	6 GHz: 500 K 13 GHz: 550 K
Antenna efficiency		55%	No change
Reference pattern		AP30B/Figure 1 or AP30B/Figure 2	R123FR

List of relevant documents

Actions to be taken in preparation for WRC-07

Proposals from outside CEPT

11. Protection criteria

Issue

In Appendix 30B, the compatibility analyses determining whether a given allotment or assignment affects other allotments or assignments are based on both a single entry criterion and an aggregate C/I criterion. In 1988, the values of the single entry and aggregate criteria were 30 and 26 dB respectively. WRC-03 has reduced those values to 27 and 23 dB.

It is proposed to review the current protection criteria in order to link them to current ITU-R Recommendations OR to envisage possible new type of criteria and associated limits such as coordination arc or pfd examination.

Preliminary CEPT Position

TBD

Background

The single-entry and aggregate interference criteria mentioned in Annex 4 to Appendix 30B are consistent with the single-entry and aggregate interference criteria defined in several ITU-R Recommendations in force at the time the Appendix 30B was developed (e.g. Recommendation ITU-R S.523):

- The single-entry interference power level should not exceed 4% of the total noise power level at the input of the demodulator. In other words, the single-entry carrier-to-interference ratio should be 14 dB greater than the carrier-to-noise ration ($C/I_{Se} = C/N_{ref} + 14$ dB) ;
- The aggregate interference power level should not exceed 10% of the total noise power level at the input to the demodulator. In other words, the aggregate carrier-to-interference ratio should be 10 dB greater than the carrier-to-noise ration ($C/I_{Agg} = C/N_{ref} + 10$ dB).

In conjunction with the values of the technical data used in establishing the Allotment Plan, the total C/N was chosen equal to 16 dB ($C/N_{ref} = 16$ dB); it implies a single entry interference criteria of 30 dB and an aggregate interference criteria of 26 dB as contained in Annex 4 to Appendix 30B. During WRC-03 those values have been respectively reduced to 27 dB and 23 dB.

Recommendations ITU-R S.1432 and S.741-2

The above mentioned single-entry and aggregate interference criteria are no longer used because of the switch to digital communications and they have been replaced by the criteria described in Recommendations ITU-R S.1432 and S.741-2 which recommend a maximum single-entry interference power level of 6% of the total noise power at the

input of the demodulator and a maximum aggregate interference power level of 20% (25% in the case of non frequency re-use). It corresponds to the following carrier-to-interference ratio:

$$C/I_{se} = C/N_{ref} + 12.2 \text{ dB}$$

$$C/I_{agg} = C/N_{ref} + 7 \text{ dB (6 dB in the case of non frequency re-use)}$$

In elaborating new protection criteria for the AP30B allotments in the Plan and assignments in the List, use of the Recommendations ITU-R S.1432 and S.741-2 would be appropriate. The retroactive application of such updated criteria to assignments entered into the List prior to WRC-07, particularly regarding the choice of C/N_{ref} , has to be carefully considered, noting that such systems would have already been brought into use.

The reference C/N ratio to be used in determining the protection criteria could be either the reference C/N of 16 dB (23 dB uplink and 17 dB downlink) used in 1988 to elaborate the Plan or updated C/N values in view of the change in allotment's technical parameters, or for the case of assignments in the List, the minimum value between the reference C/N and the C/N calculated at each test point from the parameters of each beam entered in the List (see document PT1(06)083).

Coordination arc

With the current AP30B protection criteria, an administration may have to obtain the agreement of another administration even if the two networks are situated far away from each other. In order to solve this problem, a coordination arc of 10° in the C band and 9° in the Ku band may be considered. Studies within ITU-R (see documents 4A/256 and 4A/258) have shown that the aggregate interference from networks situated outside such coordination arc is in most cases below 6% of the total noise power.

If a coordination arc is introduced in AP30B, measures such as uplink and downlink pfd limits outside the arc should be envisaged to guarantee the protection of all networks (see document PT1(06)084).

Pfd examination

The current protection criteria are calculated on a set of up to 20 test points and therefore in most cases only the borders of the territories are protected. As in a pfd examination, the pfd values are calculated over the whole service area, one possible way of completely protecting the service area is to replace the overall single-entry C/I criterion by an uplink single-entry C/I criterion associated with a downlink pfd criterion. Besides, this criterion could be associated with a coordination arc and its corresponding uplink and downlink pfd limits. Studies (see document PT1(06)084) show that the downlink pfd masks that would protect the allotments in the Plan are likely to protect the assignments in the List on an average basis, and document PT1(06)084 provides some examples of such masks.

Studies described in document 4A/313 show that such criterion would give a number of networks considered as being affected equivalent to the one using the current single entry criterion.

List of relevant documents

Actions to be taken in preparation for WRC-07

Proposals from outside CEPT

12. Comments for inclusion in the coordination process

Issue

Under the non-sequential approach (see section on processing of submissions), the need to coordinate with an administration under Article 6 of Appendix 30B could be subject to the fact that that administration has made a comment within a given period of time.

Preliminary CEPT position

CEPT is of the opinion that the notifying administration of a proposed new assignment should be required to obtain the agreement of the administration responsible for an assignment if that administration has sent a comment within four months from the publication by the Bureau of the proposed assignment.

Background

Under Article 6 of Appendix 30B, the BR performs a technical examination in order to determine what are the coordination requirements before a proposed assignment is entered in the List. The result of this examination includes a list of allotments or assignments that may possibly be affected by the proposed assignment. As the criteria used to determine this list are based on a worst case approach, the list may still contain a lot of allotments or assignments which would not be considered affected if a more precise examination were performed.

In order to limit the requirement for unnecessary coordination, administrations that are responsible for an assignment could be asked to ascertain that coordination is required by sending a comment to the Bureau and to the notifying administration of the proposed assignment. In order not to delay the process, the comment should be sent within a given period which could be four months as it is already the case elsewhere in the Radio Regulations.

List of relevant documents

Actions to be taken in preparation for WRC-07

Proposals from outside CEPT

13. Provisional entry in the List

Issue

Under the non-sequential approach (see section on processing of submissions), an administration could be given the possibility to enter an assignment provisionally in the Appendix 30B List even if all the necessary coordination agreements have not been fully obtained.

Preliminary CEPT position

CEPT is of the opinion that, in case the non-sequential approach for Appendix 30B is retained, administrations should have the possibility to enter provisionally an assignment in the Appendix 30B List even if it has not obtained all the agreements pertaining to the compatibility with assignments.

Background

Under Appendix 30B, an administration has 8 years to apply successfully the procedure of Article 6, i.e. to obtain all the necessary agreements to enter a proposed assignment in the Appendix 30B List and then to notify this assignment under Article 8. An administration may therefore be in a situation where it loses all its rights associated to a proposed assignment because it was not able to obtain the agreement of another administration within those 8 years.

In order to alleviate this consequence of the lack of an agreement, Article 6 of Appendix 30B could include a procedure by which an administration can insist that the proposed assignment is included provisionally in the List even though all necessary agreements have not yet been obtained. This provisional entry could then become definitive when the proposed assignment and the assignments identified as affected have been in use simultaneously without any complaint of harmful interference being made or when the agreement is finally given. The assignment could then be notified in accordance with Article 8 before the 8 years deadline on the basis of the provisional entry in the List.

Proposals from outside CEPT

Regional telecommunication organisations

APT (January 2007)

APT Preliminary Views

The APT supports the following views;

- The work undertaken in the Special Committee and Working Party 4A on this Agenda item, recognizing that two 'Approaches' have been developed to review the regulatory procedures and technical criteria of Appendix 30B. There are several options in output of the SC Reports in various parameters. However, the regulatory texts have not been identified which option will be taken into account. Moreover, advantages and disadvantages of each approach have not been identified and described anywhere of SC Report. In addition, it is not clear that the regulatory procedures corresponding to each approach is based on what option. A decision on the most suitable approach, at the conclusion of the work presently ongoing in the ITU-R, will need to be made at WRC-07, bearing in mind that the objective of the Appendix 30B is to guarantee in practice, for all countries, equitable access to the geostationary-satellite orbit in the frequency bands of the fixed-satellite service covered by the Appendix.
- the technical parameters that are included in the draft CPM Report except that there is a need to consider smaller diameter earth station antennas in conjunction with C/I and C/N.
- To retain the current practice/arrangement not to separate the up-link part from the down- link part of an assignment.
- the introduction of the coordination arc principle.
- Shifting of orbital positions of Administration A having several allotments on one orbital position as result of the application of the PDA concept by Administration B, can only occur with the explicit consent of Administration A, should such a split be allowed.
- The principle of macro-segmentation should be excluded in connection with the use of digital transmission method.
- PFD examination should be done when processing submissions under Article 6 of Appendix 30B.
- That WRC-07 needs to properly reflect the actual geographical situation of those ITU Member States which were not considered when the Allotment Plan was established at WARC-Orb-88.

The APG also supports the following points on technical parameters;

- That in the case a definition of the rain climatic zones as today is retained, the elevation angle associated with rain climatic zone Q should be 40°.
- That it is desirable to reduce the antenna size for allotments in the Appendix 30B Plan. APT believes that it is feasible to reduce the antenna size with a corresponding reduction in C/I criteria, but that the exact size reduction without the need for relocation of allotments or assignments needs to be further studied.
- The adoption of the improved antenna diagram in Table 2 of Annex 1 of Appendix 30B should be used for allotments in the Plan.
- To base a revision of Appendix 30B on the rain fade model contained in Recommendation ITU-R P.618-8.
- That receiver noise temperatures for allotments should be updated to reflect the advances in receiver design. APT furthermore agrees that values in the order of 96 and 126 K for 4/6GHz and 10-11/13GHz band would seem representative

numbers for earth stations and that values in the order of 500 and 550 K would seem representative for 4/6GHz and 10-11/13GHz band spacecraft receivers.

- That C/I requirements should be considered as an integral part of the review of the technical parameters and should be based upon amongst others Recommendation ITU-R S.1432 and consideration of practical service quality requirements.
- Technical parameters and criteria at the TABLE 1.10-1 of draft CPM Report is a good starting point for identification of technical parameters and for defining a set of revised parameters which will not require relocation of allotments or assignments.