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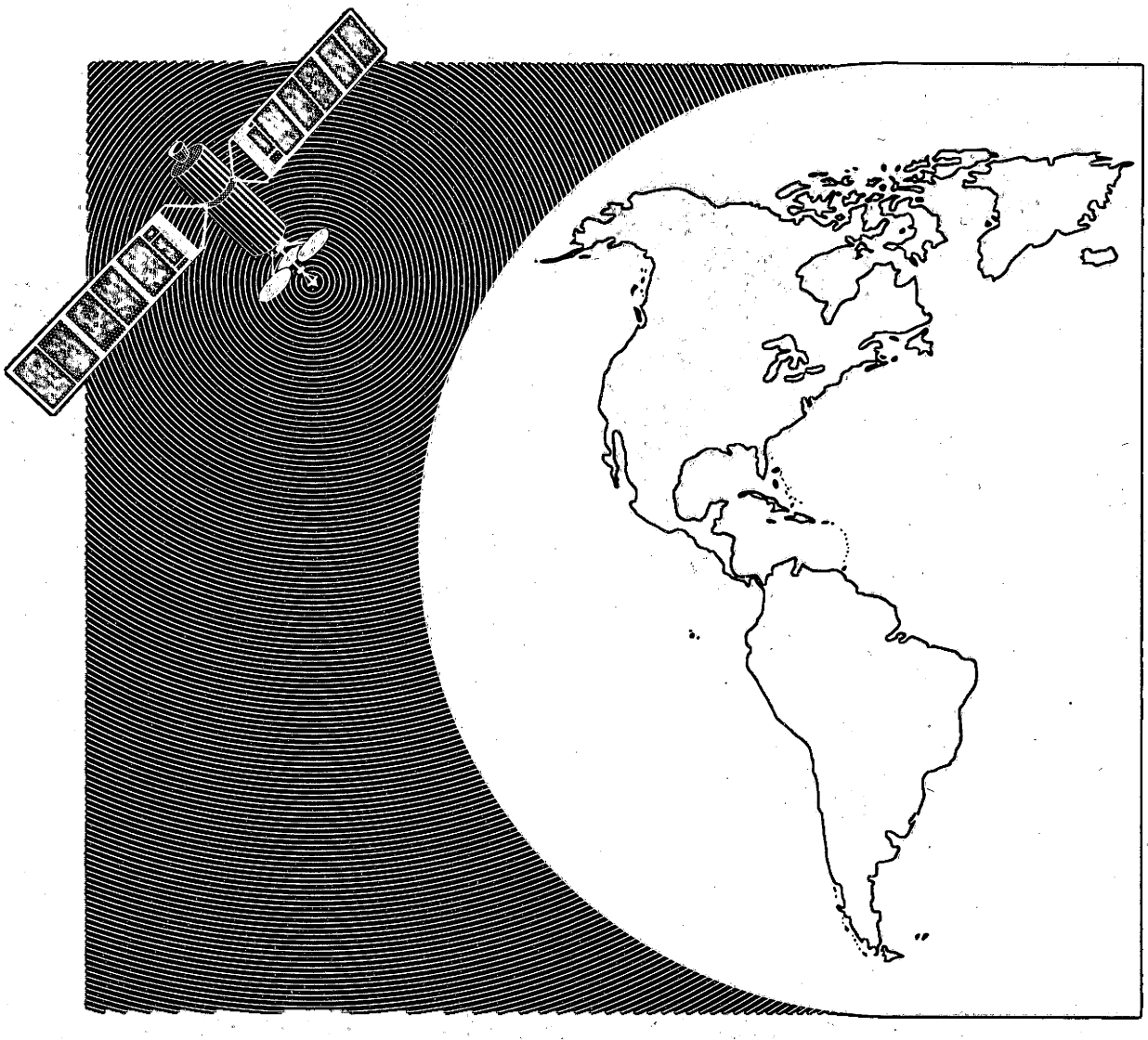

FINAL ACTS

of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2 (SAT-83) Geneva 1983

INTERNATIONAL TELECOMMUNICATION UNION

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FINAL ACTS

of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2

(Geneva, 1983)

PREAMBLE

The delegates of the following Members of the International Telecommunication Union, having participated in the present Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2,

Argentine Republic, Belize, Republic of Bolivia, Federative Republic of Brazil, Canada, Chile, Republic of Colombia, Costa Rica, Cuba, Denmark, Ecuador, United States of America, France, Grenada, Guyana, Republic of Honduras, Jamaica, Mexico, Nicaragua, Republic of Panama, Kingdom of the Netherlands, Peru, United Kingdom of Great Britain and Northern Ireland, Republic of Suriname, Eastern Republic of Uruguay, Republic of Venezuela,

a) have adopted

i) provisions and an associated Plan for the broadcasting-satellite service in the frequency band 12.2 - 12.7 GHz in Region 2 (Part I);

ii) provisions and an associated Plan for the feeder links for the broadcasting-satellite service (12.2 - 12.7 GHz) in the frequency band 17.3 - 17.8 GHz (Part II);

iii) recommendations for consequential modifications to certain Articles of the Radio Regulations and to Appendices **3** and **30** thereto (Part III);

iv) resolutions which may be applicable to all countries of Region 2, subject to adoption by a competent world administrative radio conference;

b) have decided

to transmit their decisions listed in paragraph *a)* above to the First Session (1985) of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It (WARC-ORB (1)) for the latter's consideration with the objective of incorporating them in the Radio Regulations (Recommendation No. **1**(Sat-R2)), and of adopting resolutions in order to make them applicable to all countries of Region 2 and when appropriate to all the Members of the Union;

c) have noted further

that, notwithstanding the interim procedure to be applied in the period between 1 January 1984 and the date of entry into force of the Final Acts of the WARC-ORB (1) and notwithstanding the related instructions given by the present Conference to the IFRB contained in Resolution No. **1**(Sat-R2) of the present Final Acts, decisions of the present Conference shall enter into force only after their incorporation in the Radio Regulations by WARC-ORB (1), which is empowered to adopt appropriate Final Acts to achieve this objective;

d) have also adopted

the interim procedure and instructions contained in Resolution No. **1**(Sat-R2) of the present Final Acts to be applied between 1 January 1984 and the entry into force of the Final Acts of WARC-ORB (1) together with Resolutions Nos. **2**(Sat-R2) and **6**(Sat-R2) and Recommendation No. **3**(Sat-R2), containing instructions concerning the protection of other services in Regions 1 and 3 and in Region 2.

IN WITNESS WHEREOF, the delegates of the Members of the Union mentioned below have, on behalf of their respective competent authorities, signed the present Final Acts in a single copy in the English, French and Spanish languages, of which, in case of dispute, the French text shall prevail. This copy shall remain deposited in the archives of the Union. The Secretary-General shall forward one certified true copy to each Member of the International Telecommunication Union.

Done at Geneva, 17 July 1983

For the Argentine Republic:

FERNANDO JIMÉNEZ DÁVILA
JORGE A. TABOADA
GRACIELA BRIGIDA MEALLA
HORACIO G. SAAVEDRA

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For the Federative Republic of Brazil:

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For the Republic of Colombia:

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For Cuba:

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For Denmark:

PALLE JUUL

For Ecuador:

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ABBOTT WASHBURN
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For France:

DANIEL SAUVET-GOICHON

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P. D. CROSS
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LUIS VALENCIA PEREZ
GUILLERMO QUIÑONES JIMENEZ

For Nicaragua:

IVAN GARAY

For the Kingdom of the Netherlands:

JOSÉ M. CIJNTJE
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For Peru:

RAFAEL AVALOS MANCO
VICTOR VARGAS DÍAZ

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For the Republic of Suriname:

JOHN R. NEEDE
OTTO W. MORROY

For the Eastern Republic of Uruguay:

ROSENDO HERNANDEZ
JUAN ZAVATTIERO

For the Republic of Venezuela:

SANTIAGO E. AGUERREVERE R.
RAMON J. MALDONADO CH.

GENERAL DEFINITIONS

For the purposes of these Final Acts the following terms shall have the meanings defined below:

Union:	The International Telecommunication Union;
Secretary-General:	The Secretary-General of the Union;
IFRB (Board):	The International Frequency Registration Board;
CCIR:	The International Radio Consultative Committee;
Convention:	The International Telecommunication Convention in force;
Radio Regulations:	The Radio Regulations annexed to the Convention;
Regions 1, 2 and 3:	The geographical areas defined in Nos. **393** to **399** of the Radio Regulations;
Master Register:	The Master International Frequency Register;
IFRB weekly circular:	The publication referred to in No. **1235** of the Radio Regulations;
Administration:	Any governmental department or service responsible for discharging the obligations undertaken in the Convention and the Radio Regulations;
WARC:	World Administrative Radio Conference;
Conference:	Regional Administrative Radio Conference for the Planning in Region 2 of the Broadcasting-Satellite Service in the Frequency Band 12.2 - 12.7 GHz and Associated Feeder Links in the Frequency Band 17.3 - 17.8 GHz, called in short Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983.

PART I

Provisions and Associated Plan for the Broadcasting-Satellite Service in the Frequency Band 12.2 - 12.7 GHz in Region 2

ARTICLE 1

Definitions

1.1 *Region 2 Plan:* The Plan for the Broadcasting-Satellite Service in the Frequency Band 12.2 - 12.7 GHz in Region 2 contained in this Part of the Final Acts, together with any modifications resulting from the successful application of the procedures of Article 4 of this Part.

1.2 *Frequency assignment in conformity with the Region 2 Plan:* Any frequency assignment which appears in the Region 2 Plan or for which the procedure of Article 4 of this Part has been successfully applied.

1.3 *Regions 1 and 3 Plan:* The Plan for the Broadcasting-Satellite Service in the Frequency Bands 11.7 - 12.2 GHz in Region 3 and 11.7 - 12.5 GHz in Region 1 contained in Appendix **30** to the Radio Regulations, together with any modifications resulting from the successful application of the procedures contained in the said Appendix.

ARTICLE 2

Frequency Band

2.1 The provisions of this Part apply to the broadcasting-satellite service in the frequency band 12.2 - 12.7 GHz in Region 2 and to the other services to which this band is allocated in Regions 1, 2 and 3, insofar as their relationship to the broadcasting-satellite service in this band in Region 2 is concerned.

ARTICLE 3

Execution of the Provisions and Associated Plan

3.1 The Members of the Union in Region 2 shall adopt for their broadcasting-satellite space stations [1] operating in the frequency band referred to in this Part, the characteristics specified in the Plan for that Region.

3.2 Administrations shall not bring into use assignments to broadcasting-satellite stations which are not in conformity with the Region 2 Plan, except in those cases referred to in Resolution No. **2**(Sat-R2) and those cases covered by paragraph 5.2.3.

[1] Such stations may also be used for transmissions in the fixed-satellite service (space-to-Earth) in accordance with No. **846** of the Radio Regulations.

3.3 The Plan is based on the grouping of the space stations in nominal orbital positions of $+0.2°$ and $-0.2°$ on both sides of the cluster of satellites. Administrations may locate satellites within a cluster at any orbital position within the cluster, provided they obtain the agreement of administrations having assignments to space stations in the same cluster (see 3.13.1 of Annex 3 to Part II of the Final Acts).

3.4 An administration is considered to be affected if the limits specified in Annex 1 to this Part are exceeded.

ARTICLE 4

Procedure for Modifications to the Plan

4.1 When an administration intends to make a modification to the Plan, i.e. either:

a) to modify the characteristics of any of its frequency assignments to a space station [1] in the broadcasting-satellite service which are shown in the Plan, or for which the procedure in this Article has been successfully applied, whether or not the station has been brought into use; *or*

b) to include in the Plan a new frequency assignment to a space station in the broadcasting-satellite service; *or*

c) to cancel a frequency assignment to a space station in the broadcasting-satellite service;

the following procedure shall be applied before any notification of the frequency assignment is made to the International Frequency Registration Board (see Article 5 of this Part of the Final Acts and Resolution No. **2**(Sat-R2)).

4.1.1 Before an administration proposes to include in the Region 2 Plan under the provisions of 4.1 *b)*, a new frequency assignment to a space station or to include in the Plan new frequency assignments to a space station whose orbital position is not designated in the Plan for this administration, all of the assignments to the service area involved should normally have been brought into service or have been notified to the Board in accordance with Article 5 of this Part. Should this not be the case, the administration concerned shall inform the Board of the reasons therefore.

4.2 *Proposed modifications to a frequency assignment in conformity with the Plan or the inclusion in the Plan of a new frequency assignment*

4.2.1 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Plan or the inclusion of a new frequency assignment in the Plan shall seek the agreement of those administrations:

4.2.1.1 in countries of Region 2 having a frequency assignment in the Region 2 Plan to a space station in the broadcasting-satellite service in the same channel or an adjacent channel, which is in conformity with the Plan or in respect of which modifications to the Plan have been published by the Board in accordance with the provisions of this Article; *or*

4.2.1.2 in countries of Regions 1 and 3 having a frequency assignment to a space station in the broadcasting-satellite service with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment, which is in accordance with the Plan contained in Appendix **30** to the Radio Regulations or in respect of which modifications have been published by the Board in accordance with the provisions of that Appendix; *or*

4.2.1.3 in countries having no frequency assignment in the broadcasting-satellite service in the channel concerned but in whose territory the power flux-density value exceeds the prescribed limit as a result of the proposed modification; *or*

4.2.1.4 in countries of Regions 1 and 3 having a frequency assignment in the band 12.2 - 12.7 GHz to a space station in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **1060** of the Radio Regulations or those of paragraph 7.2.1 of this Part; *or*

[1] The expression "frequency assignment to a space station", wherever it appears in this Article, shall be understood to refer to a frequency assignment associated with a given orbital position.

4.2.1.5 in countries having a frequency assignment to a space station in the broadcasting-satellite service in the band 12.5 - 12.7 GHz in Region 3 with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment and which

a) is recorded in the Master Register, *or*

b) has been coordinated or is being coordinated under the provisions of Resolution No. **33** of the WARC-79, *or*

c) appears in a Region 3 Plan to be adopted at a future regional administrative radio conference, taking account of modifications which may be introduced subsequently in accordance with the Final Acts of that conference;

4.2.1.6 which are considered to be affected.

4.2.1.7 A frequency assignment is considered to be affected when the limits shown in Annex 1 to this Part are exceeded.

4.2.2 An administration intending to modify characteristics in the Plan shall send to the Board, not earlier than five years but preferably not later than eighteen months before the date on which the assignment is to be brought into use, the relevant information listed in Annex 2 to this Part.

4.2.2.1 Where as a result of the intended modification the limits defined in Annex 1 to this Part are not exceeded, this fact shall be indicated when submitting to the Board the information required by 4.2.2. The Board shall then publish this information in a special section of its weekly circular.

4.2.2.2 In all other cases the administration shall notify the Board of the names of the administrations whose agreement it considers should be sought in order to arrive at the agreement referred to in 4.2.1 as well as of those with which agreement has already been reached.

4.2.3 The Board shall determine on the basis of Annex 1 to this Part the administrations whose frequency assignments are considered to be affected within the meaning of 4.2.1. The Board shall include the names of those administrations with the information received under 4.2.2.2 and shall publish the complete information in a special section of its weekly circular. The Board shall immediately send the results of its calculations to the administration proposing the modification to the Plan.

4.2.4 The Board shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

4.2.5 An administration which feels that it should have been included in the list of administrations whose services are considered to be affected may, giving the technical reasons for so doing, request the Board to include its name. The Board shall study this request on the basis of Annex 1 to this Part and shall send a copy of the request with an appropriate recommendation to the administration proposing the modification to the Plan.

4.2.6 Any modification to a frequency assignment which is in conformity with the Plan or any inclusion in the Plan of a new frequency assignment which would have the effect of exceeding the limits specified in Annex 1 to this Part shall be subject to the agreement of all affected administrations.

4.2.7 The administration seeking agreement or the administration with which agreement is sought may request any additional technical information it considers necessary. The administrations shall inform the Board of such requests.

4.2.8 Comments from administrations on the information published pursuant to 4.2.3 should be sent either directly to the administration proposing the modification or through the Board. In any event the Board shall be informed that comments have been made.

4.2.9 An administration that has not notified its comments either to the administration seeking agreement or to the Board, within a period of four months following the date of the weekly circular referred to in 4.2.2.1 or 4.2.3 shall be understood to have agreed to the proposed assignment. This time limit may be extended by up to three months for an administration that has requested additional information under 4.2.7 or for an administration that has requested the assistance of the Board under 4.2.17. In the latter case the Board shall inform the administrations concerned of this request.

4.2.10 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of 4.2.2 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

4.2.11 If no comments have been received on the expiry of the periods specified in 4.2.9, or if agreement has been reached with the administrations which have made comments and with which agreement is necessary, the administration proposing the modification may continue with the appropriate procedure in Article 5 of this Part and shall inform the Board, indicating the final characteristics of the frequency assignment together with the names of the administrations with which agreement has been reached.

4.2.12 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

4.2.13 When the proposed modification to the Plan involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

4.2.14 The Board shall publish in a special section of its weekly circular the information received under 4.2.11 together with the names of any administrations with which the provisions of this Article have been successfully applied. The frequency assignment concerned shall enjoy the same status as those appearing in the Plan and will be considered as a frequency assignment in conformity with the Plan.

4.2.15 When an administration proposing to modify the characteristics of a frequency assignment or to make a new frequency assignment receives notice of disagreement from an administration whose agreement it has sought, it should first endeavour to solve the problem by exploring all possible means of meeting its requirement. If the problem still cannot be solved by such means, the administration whose agreement has been sought should endeavour to overcome the difficulties as far as possible, and shall state the technical reasons for any disagreement if the administration seeking the agreement requests it to do so.

4.2.16 If no agreement is reached between the administrations concerned, the Board shall carry out any study that may be requested by these administrations; the Board shall inform them of the result of the study and shall make such recommendations as it may be able to offer for the solution of the problem.

4.2.17 An administration may at any stage in the procedure described, or before applying it, request the assistance of the Board, particularly in seeking the agreement of another administration.

4.2.18 The relevant provisions of Article 5 of this Part shall be applied when frequency assignments are notified to the Board.

4.3 *Cancellation of frequency assignments*

When a frequency assignment in conformity with the Plan is released, whether or not as a result of a modification, the administration concerned shall immediately so inform the Board. The Board shall publish this information in a special section of its weekly circular.

4.4 *Master copy of the Plan*

4.4.1 The Board shall maintain an up-to-date master copy of the Plan, including the overall equivalent protection margins of each assignment, taking account of the application of the procedure specified in this Article. This master copy shall contain the overall equivalent protection margins derived from the Plan as established by the Conference and those derived from all modifications to the Plan as a result of the successful completion of the modification procedure described in this Article. The Board shall prepare a document listing the amendments to be made to the Plan as a result of modifications made in accordance with the procedure described in this Article.

4.4.2 The Secretary-General shall be informed by the Board of modifications made to the Plan and shall publish an up-to-date version of the Plan in an appropriate form when justified by the circumstances.

ARTICLE 5

Notification, Examination and Recording in the Master Register of Frequency Assignments to Space Stations in the Broadcasting-Satellite Service in Region 2

5.1 *Notification*

5.1.1 Whenever an administration intends to bring into use a frequency assignment to a space station in the broadcasting satellite service, it shall notify this frequency assignment to the Board. For this purpose, the notifying administration shall apply the following provisions.

5.1.2 For any notification under 5.1.1, an individual notice for each frequency assignment shall be drawn up as prescribed in Annex 2 to this Part, the various sections of which specify the basic characteristics to be provided as appropriate. It is recommended that the notifying administration should also apply any other data it may consider useful.

5.1.3 Each notice must reach the Board not earlier than three years before the date on which the frequency assignment is to be brought into use. In any case, the notice must reach the Board not later than three months before that date [1].

5.1.4 Any frequency assignment the notice of which reaches the Board after the applicable period specified in 5.1.3 shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with 5.1.3.

5.1.5 Any notice made under 5.1.1 which does not contain the characteristics specified in Annex 2 to this Part shall be returned by the Board immediately by airmail to the notifying administration with the relevant reasons.

5.1.6 Upon receipt of a complete notice, the Board shall include its particulars, with the date of receipt, in its weekly circular which shall contain the particulars of all such notices received since the publication of the previous circular.

5.1.7 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

5.1.8 Complete notices shall be considered by the Board in order of receipt. The Board shall not postpone its finding unless it lacks sufficient data to reach a decision; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board until it has reached a finding with respect to such earlier notice.

5.2 *Examination and recording*

5.2.1 The Board shall examine each notice:

a) with respect to its conformity with the Convention and the relevant provisions of the Radio Regulations and Annex 1 to this Part (with the exception of those relating to conformity with the Region 2 Plan and the provisions of Resolution No. **2**(Sat-R2));

b) with respect to its conformity with the Region 2 Plan;

c) with respect to its conformity with the provisions of Resolution No. **2**(Sat-R2).

5.2.2 Where the Board reaches a favourable finding with respect to 5.2.1 *a)* and 5.2.1 *b)*, the frequency assignment of an administration shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations, all frequency assignments brought into use in conformity with the Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

[1] Where appropriate, the notifying administration shall initiate the procedure for modifying the Plan in sufficient time to ensure that this limit is observed.

5.2.3 Where the Board reaches a favourable finding with respect to 5.2.1 *a)* and finds that the difference between the notified characteristics and those appearing in the Plan is:

a) a reduced e.i.r.p.; *or*

b) a reduced coverage area entirely situated within the coverage area appearing in the Plan; *or*

c) different modulation characteristics [1]; *or*

d) a use of the assignment for transmission in the fixed-satellite service in accordance with No. **846** of the Radio Regulations; *or*

e) use of an orbital position under the conditions specified in paragraph 3.3;

the frequency assignment shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations, all frequency assignments brought into use in conformity with the Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments. When recording these assignments, the Board shall indicate by an appropriate symbol the characteristics having a value different from that appearing in the Plan.

5.2.4 Where the Board reaches a favourable finding with respect to 5.2.1 *a)*, but an unfavourable finding with respect to 5.2.1 *b)*, it shall examine the notice with respect to its conformity with the provisions of Resolution No. **2**(Sat-R2). A frequency assignment which is in conformity with the provisions of Resolution No. **2**(Sat-R2) shall be recorded in the Master Register with an appropriate symbol to indicate its interim status. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations all frequency assignments brought into use in conformity with the provisions of Resolution No. **2**(Sat-R2) and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

5.2.5 Whenever a frequency assignment is recorded in the Master Register, the finding reached by the Board shall be indicated by a symbol in Column 13a.

5.2.6 Where the Board reaches an unfavourable finding with respect to 5.2.1 *a)* or 5.2.1 *b)* and *c)*, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to a satisfactory solution of the problem.

5.2.7 Where the notifying administration resubmits the notice and the finding of the Board becomes favourable with respect to the appropriate parts of 5.2.1, the notice shall be treated as in 5.2.2, 5.2.3 or 5.2.4, as appropriate.

5.2.8 If the notifying administration resubmits the notice without modification and insists on its reconsideration, and if the Board's finding with respect to 5.2.1 remains unfavourable, the notice is returned to the notifying administration in accordance with 5.2.6. In this case, the notifying administration undertakes not to bring into use the frequency assignment until the condition specified in 5.2.7 is fulfilled.

5.2.9 If a frequency assignment notified in advance of bringing into use in conformity with 5.1.3 has received a favourable finding by the Board with respect to the provisions of paragraph 5.2.1, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

5.2.10 When the Board has received confirmation that the frequency assignment has been brought into use, the Board shall remove the symbol in the Master Register.

5.2.11 The date in Column 2c shall be the date of bringing into use notified by the administration concerned. It is given for information only.

[1] The use of other modulating signals having different characteristics (e.g. modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics), is authorized only on condition that the use of such characteristics does not cause greater interference than that caused by the system considered in the Plan.

5.3 *Cancellation of entries in the Master Register*

5.3.1 If an administration has not confirmed the bringing into use of a frequency assignment under 5.2.10, the Board will make inquiries of the administration not earlier than six months after the expiry of the period specified in 5.1.3. On receipt of the relevant information, the Board will either modify the date of coming into use or cancel the entry.

5.3.2 If the use of any recorded frequency assignment is permanently discontinued, the notifying administration shall so inform the Board within three months, whereupon the entry shall be removed from the Master Register.

ARTICLE 6

Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Terrestrial Stations Affecting Broadcasting-Satellite Frequency Assignments in the Band 12.2 - 12.7 GHz (in Region 2) [1]

Section I. Coordination Procedure to be Applied

6.1.1 Before an administration notifies to the Board a frequency assignment to a terrestrial transmitting station, it shall initiate coordination with any other administration if the power flux-density which would be produced by the proposed terrestrial transmitting station at any point on the border of its territory exceeds the value derived in accordance with Annex 3 to this Part of the Final Acts.

6.1.2 For the purpose of effecting coordination, the administration responsible for the terrestrial station shall send to the administrations concerned, by the fastest possible means, a copy of a diagram drawn to an appropriate scale indicating the location of the terrestrial station and all other data of the proposed frequency assignment and the approximate date on which it is planned to bring the station into use.

6.1.3 An administration with which coordination is sought shall acknowledge receipt of the coordination data immediately by telegram. If no acknowledgement is received within fifteen days of dispatch, the administration seeking coordination may dispatch a telegram requesting acknowledgement of receipt of the coordination data, to which the receiving administration shall reply. Upon receipt of the coordination data an administration with which coordination is sought shall promptly examine the matter with regard to interference [2] which would be caused to its frequency assignments in conformity with the Plan and shall, within an overall period of two months from dispatch of the coordination data, either notify the administration requesting coordination of its agreement to the proposed assignment or, if this is not possible, indicate the reasons therefor and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem.

6.1.4 No coordination is required when an administration proposes to change the characteristics of an existing assignment in such a way as not to increase the interference to the service to be rendered by the broadcasting-satellite stations of other administrations.

[1] These procedures do not replace the procedures prescribed for terrestrial stations in Articles **11** and **12** of the Radio Regulations and Appendix **30** thereto.

[2] The criteria to be employed in evaluating interference levels shall be based on the relevant CCIR Recommendations or, in the absence of such Recommendations, shall be agreed between the administrations concerned.

6.1.5 An administration seeking coordination may request the Board to endeavour to effect coordination where:

a) an administration with which coordination is sought fails to acknowledge receipt under paragraph 6.1.3 within one month of dispatch of the coordination data;

b) an administration which has acknowledged receipt under paragraph 6.1.3 fails to give a decision within three months of dispatch of the coordination data;

c) the administration seeking coordination and an administration with which coordination is sought disagree on the acceptable level of interference; *or*

d) coordination between administrations is not possible for any other reason.

In so doing, it shall furnish the Board with the necessary information to enable it to endeavour to effect such coordination.

6.1.6 Either the administration seeking coordination or an administration with which coordination is sought, or the Board, may request any additional information which they may require to assess the level of interference to the services concerned.

6.1.7 Where the Board receives a request under paragraph 6.1.5 *a)*, it shall forthwith send a telegram to the administration concerned requesting immediate acknowledgement.

6.1.8 Where the Board receives an acknowledgement following its action under paragraph 6.1.7 or where the Board receives a request under paragraph 6.1.5 *b)*, it shall forthwith send a telegram to the administration concerned requesting an early decision in the matter.

6.1.9 Where the Board receives a request under paragraph 6.1.5 *d)*, it shall endeavour to effect coordination in accordance with the provisions of paragraph 6.1.2. Where the Board receives no acknowledgement of its request for coordination within the period specified in paragraph 6.1.3, it shall act in accordance with paragraph 6.1.7.

6.1.10 Where an administration fails to reply within one month of dispatch of the Board's telegram sent under paragraph 6.1.7 requesting an acknowledgement or fails to give a decision on the matter within two months of dispatch of the Board's telegram of request sent under paragraph 6.1.8, the administration with which coordination was sought shall be considered to have undertaken that no complaint will be made in respect of any harmful interference which may be caused by the terrestrial station being coordinated to the service rendered or to be rendered by its satellite-broadcasting station.

6.1.11 Where necessary, as part of the procedure under paragraph 6.1.5, the Board shall assess the level of interference. In any case, the Board shall inform the administrations concerned of the results obtained.

6.1.12 In the event of continuing disagreement between one administration seeking to effect coordination and one with which coordination has been sought, the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

Section II. Notification Procedure for Frequency Assignments

6.2.1 Any frequency assignment to a fixed, land or broadcasting station shall be notified to the International Frequency Registration Board if the use of the frequency concerned is capable of causing harmful interference to the service rendered or to be rendered by a broadcasting-satellite station of any other administration, or if it is desired to obtain international recognition of the use of the frequency [1].

[1] The attention of administrations is specifically drawn to the provisions of Section I of this Article.

6.2.2 For this notification, an individual notice for each frequency assignment shall be drawn up as prescribed in Section A of Appendix **1** to the Radio Regulations, which specifies the basic characteristics to be furnished as required. It is recommended that the notifying administration should also supply the additional data called for in that Section, together with such further data as it may consider appropriate.

6.2.3 Whenever practicable, each notice should reach the Board before the date on which the assignment is brought into use. The notice made in accordance with paragraph 6.2.2 must reach the Board not earlier than three years and not later than three months before the date on which the assignment is to be brought into use.

6.2.4 Any frequency assignment, the notice of which reaches the Board less than three months before it is brought into use, shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with paragraph 6.2.3.

Section III. Procedure for the Examination of Notices and the Recording of Frequency Assignments in the Master Register

6.3.1 Whatever the means of communication, including telegraph, by which a notice is transmitted to the Board, it shall be considered complete if it contains at least the appropriate basic characteristics specified in Section A of Appendix **1** to the Radio Regulations.

6.3.2 Complete notices shall be considered by the Board in the order of their receipt.

6.3.3 Any notice which is incomplete shall be returned by the Board immediately, by airmail, to the notifying administration with the reasons therefor.

6.3.4 Upon receipt of a complete notice, the Board shall include the particulars thereof, with the date of receipt, in its weekly circular; this circular shall contain the particulars of all such notices received since publication of the previous circular.

6.3.5 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

6.3.6 Complete notices shall be considered by the Board in the order specified in paragraph 6.3.2. The Board cannot postpone the formulation of a finding unless it lacks sufficient data to reach a decision; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board until it has reached a finding with respect to such earlier notice.

6.3.7 The Board shall examine each notice:

6.3.8 *a)* with respect to its conformity with the Convention, the relevant provisions of the Radio Regulations and the provisions of this Part of the Final Acts (with the exception of those relating to the coordination procedure and the probability of harmful interference);

6.3.9 *b)* with respect to its conformity with the provisions of paragraph 6.1.1 relating to coordination of the use of the frequency assignment with the other administrations concerned;

6.3.10 *c)* where appropriate, with respect to the probability of harmful interference to a broadcasting-satellite station whose frequency assignment is in accordance with the Plan.

6.3.11 Depending upon the findings of the Board subsequent to the examination prescribed in paragraphs 6.3.8, 6.3.9 and 6.3.10, further action shall be as follows:

6.3.12 *Finding unfavourable with respect to paragraph 6.3.8*

6.3.13 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. **342** of the Radio Regulations, it shall be examined immediately with respect to paragraphs 6.3.9 and 6.3.10.

6.3.14 If the finding is favourable with respect to paragraph 6.3.9 or 6.3.10, as appropriate, the assignment shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d.

6.3.15 If the finding is unfavourable with respect to paragraph 6.3.9 or 6.3.10, as appropriate, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding. In those circumstances the notifying administration shall undertake not to bring into use the frequency assignment until the condition specified in paragraph 6.3.14 can be fulfilled. But the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

6.3.16 Where the notice does not include a specific reference to the fact that the station will be operated in accordance with the provisions of No. **342** of the Radio Regulations, it shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

6.3.17 If the notifying administration resubmits the notice unchanged, it shall be treated in accordance with the provisions of paragraph 6.3.16.

6.3.18 If the notifying administration resubmits the notice with a specific reference to the fact that the station will be operated in accordance with the provisions of No. **342** of the Radio Regulations, it shall be treated in accordance with the provisions of paragraphs 6.3.13 and 6.3.14 or 6.3.15, as appropriate.

6.3.19 If the notifying administration resubmits the notice with modifications which, after re-examination, result in a favourable finding by the Board with respect to paragraph 6.3.8, the notice shall be treated under the provisions of paragraphs 6.3.20 to 6.3.32. However, in any subsequent recording of the assignment, the date of receipt of the resubmitted notice by the Board shall be entered in Column 2d.

6.3.20 *Finding favourable with respect to paragraph 6.3.8*

6.3.21 Where the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has been successfully completed with all administrations whose broadcasting-satellite services may be affected, the assignment shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d.

6.3.22 Where the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has not been applied, and the notifying administration requests the Board to effect the required coordination, the Board shall take the appropriate action necessary and shall inform the administrations concerned of the results obtained. If the Board's efforts are successful, the notice shall be treated in accordance with paragraph 6.3.21. If the Board's efforts are unsuccessful, the notice shall be examined by the Board with respect to the provisions of paragraph 6.3.10.

6.3.23 Where the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has not been applied and the notifying administration does not request the Board to effect the required coordination, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this action and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

6.3.24 Where the notifying administration resubmits the notice and the Board finds that the coordination procedure mentioned in paragraph 6.3.9 has been successfully completed with all administrations whose broadcasting-satellite services may be affected, the assignment shall be recorded in the Master Register. The date of receipt of the original notice by the Board shall be entered in Column 2d. The date of the receipt of the resubmitted notice by the Board shall be entered in the Remarks Column.

6.3.25 Where the notifying administration resubmits the notice with a request that the Board effect the required coordination, it shall be treated in accordance with the provisions of paragraph 6.3.22. However, in any subsequent recording of the assignment, the date of receipt of the resubmitted notice by the Board shall be entered in the Remarks Column.

6.3.26 Where the notifying administration resubmits the notice and states it has been unsuccessful in effecting the coordination, it shall be examined by the Board with respect to the provisions of paragraph 6.3.10. However, in any subsequent recording of the assignment, the date of receipt of the resubmitted notice by the Board shall be entered in the Remarks Column.

6.3.27 *Finding favourable with respect to paragraphs 6.3.8 and 6.3.10*

6.3.28 The assignment shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d.

6.3.29 *Finding favourable with respect to paragraph 6.3.8 but unfavourable with respect to paragraph 6.3.10*

6.3.30 The notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

6.3.31 Should the notifying administration resubmit the notice with modifications which result, after re-examination, in a favourable finding by the Board with respect to paragraph 6.3.10, the assignment shall be recorded in the Master Register. The date of receipt of the original notice by the Board shall be entered in Column 2d. The date of receipt of the resubmitted notice by the Board shall be indicated in the Remarks Column.

6.3.32 Should the notifying administration resubmit the notice, either unchanged or with modifications which decrease the probability of harmful interference but not sufficiently to permit the provisions of paragraph 6.3.31 to be applied and should that administration insist upon reconsideration of the notice but the Board's finding remain unchanged, the notification shall again be returned to the notifying administration in accordance with paragraph 6.3.30. In those circumstances, the notifying administration shall undertake not to bring into use the proposed frequency assignment until the condition specified in paragraph 6.3.31 can be fulfilled. But the administrations concerned may explore the possibility of reaching an agreement on the use of the frequency assignment for a specified period. In that event the Board shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note indicating that the assignment is valid only for the specified period. The notifying administration using the frequency assignment during a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration or the administrations concerned.

6.3.33 *Change in the basic characteristics of assignments already recorded in the Master Register*

6.3.34 A notice of a change in the basic characteristics of an assignment already recorded, as specified in Appendix **1** to the Radio Regulations (except those entered in Columns 2c, 3 and 4a of the Master Register), shall be examined by the Board in accordance with paragraphs 6.3.8 and 6.3.9 and, where appropriate, paragraph 6.3.10 and paragraphs 6.3.12 to 6.3.32 inclusive shall be applied. Where the change should be recorded, the original assignment shall be amended according to the notice.

6.3.35 However, in the case of a change in the basic characteristics of an assignment which is in conformity with paragraph 6.3.8, should the Board reach a favourable finding with respect to paragraph 6.3.9 and, if applicable, paragraph 6.3.10, or find that the change does not increase the probability of harmful interference to assignments already recorded, the amended assignment shall retain the original date in Column 2d. In addition, the date of receipt by the Board of the notice relating to the change shall be entered in the Remarks Column.

6.3.36 The projected date of bringing into use of a frequency assignment may be extended on request of the notifying administration by three months. In the case where the administration states that, due to exceptional circumstances, it needs a further extension of this period, such extension may be provided but it shall in no case exceed six months from the original projected date of bringing into use.

6.3.37 In applying the provisions of this Section, any resubmitted notice which is received by the Board more than two years after the date of its return by the Board shall be considered as a new notice.

6.3.38 *Recording of frequency assignments notified before being brought into use*

6.3.39 If a frequency assignment notified in advance of bringing into use has received a favourable finding by the Board with respect to paragraphs 6.3.8 and 6.3.9, and, where appropriate, 6.3.10, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

6.3.40 Within one month after the date of bringing into use, either as originally notified or as modified in application of paragraph 6.3.36, the notifying administration shall confirm that the frequency assignment has been brought into use. When the Board is informed that the assignment has been brought into use, the special symbol shall be deleted from the Remarks Column.

6.3.41 If the Board does not receive this confirmation within the period referred to in paragraph 6.3.40, the entry concerned shall be cancelled. The Board shall consult the administration concerned before taking such action.

6.3.42 If use by a terrestrial station of an assignment which is not in conformity with the foregoing causes harmful interference to the reception of emissions from a space station in the broadcasting-satellite service, the administration having jurisdiction over the terrestrial station shall, on being advised, take immediate measures to eliminate the interference.

ARTICLE 7

Preliminary Procedures, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Stations in the Fixed-Satellite Service in the Frequency Band 12.2 - 12.7 GHz in Regions 1 and 3, when Frequency Assignments to Broadcasting-Satellite Stations in Conformity with the Region 2 Plan are Involved [1]

Section I. Procedure for the Advance Publication of Information on Planned Fixed-Satellite Systems

Publication of Information

7.1.1 An administration which intends to establish a fixed-satellite system shall, prior to the procedure described in paragraph 7.2.1, where applicable, send to the International Frequency Registration Board, not earlier than five years and preferably not later than two years before the date of bringing into service each satellite network of the planned system, the information listed in Appendix **4** to the Radio Regulations.

7.1.2 Any amendments to the information concerning a planned satellite system sent in accordance with paragraph 7.1.1 shall also be sent to the Board as soon as they become available.

7.1.3 The Board shall publish the information sent under paragraphs 7.1.1 and 7.1.2 in a special section of its weekly circular and shall also, when the weekly circular contains such information, so advise all administrations by circular telegram. The circular telegram shall include the frequency bands to be used and, in the case of a geostationary satellite, the orbital location of the space station.

7.1.4 If the information is found to be incomplete, the Board shall publish it under paragraph 7.1.3 and immediately seek, from the administration concerned, any clarification and information not provided. In such cases, the period of three months specified in paragraph 7.1.5 shall count from the date of publication, under paragraph 7.1.3, of the complete information.

[1] These provisions do not replace the procedures prescribed in Articles **11** and **13** of the Radio Regulations and Appendix **30** thereto.

Comments on Published Information

7.1.5 If, after studying the information published under paragraph 7.1.3, any administration is of the opinion that interference which may be unacceptable may be caused to its frequency assignments in conformity with the Plan, it shall, within three months after the date of the weekly circular publishing the information listed in Appendix **4** to the Radio Regulations, send its comments to the administration concerned. A copy of these comments shall also be sent to the Board. If no such comments are received from an administration within the period mentioned above, it may be assumed that that administration has no basic objections to the planned fixed-satellite network(s) of that system of which details have been published.

Resolution of Difficulties

7.1.6 An administration receiving comments sent in accordance with paragraph 7.1.5 shall endeavour to resolve any difficulties that may arise without considering the possibility of adjustment to broadcasting-satellite stations of other administrations. If no such means can be found, the administration concerned is then free to apply to other administrations concerned in order to solve these difficulties, provided that any modifications which may result to the Plan are in accordance with Article 4 of this Part of the Final Acts.

7.1.7 In their attempts to resolve the difficulties mentioned above, administrations may seek the assistance of the Board.

Results of Advance Publication

7.1.8 An administration, on behalf of which details of planned satellite networks have been published in accordance with the provisions of paragraphs 7.1.1 and 7.1.2 shall, after the period of three months specified in paragraph 7.1.5, inform the Board whether or not comments provided for in paragraph 7.1.5 have been received and of the progress made in resolving any remaining difficulties. Additional information on the progress made in resolving any remaining difficulties shall be sent to the Board at intervals not exceeding six months prior to the commencement of coordination or the sending in of notices to the Board. The Board shall publish this information in a special section of its weekly circular and shall also, when the weekly circular contains such information, so inform all administrations by circular telegram.

Commencement of Coordination or Notification Procedure

7.1.9 In complying with the provisions of paragraphs 7.1.6 and 7.1.7, an administration responsible for a planned fixed-satellite system shall, if necessary, defer its commencement of the coordination procedure of paragraph 7.2.1 or, where this is not applicable, the sending of its notices to the Board until five months after the date of the weekly circular containing the information listed in Appendix **4** to the Radio Regulations on the relevant satellite network. However, in respect of those administrations with which difficulties have been resolved or which have responded favourably, the coordination procedure, where applicable, may be commenced prior to the expiry of the five months mentioned above.

Section II. Coordination Procedures to be Applied in Appropriate Cases

7.2.1 Before an administration notifies to the Board or brings into use any frequency assignment to a space station in the fixed-satellite service, it shall seek the agreement of any other administration having a frequency assignment in conformity with the Plan, if

a) any portion of the necessary bandwidth proposed for the space station in the fixed-satellite service falls within the necessary bandwidth associated with the frequency assignment to the broadcasting-satellite station; *and*

b) the power flux-density which would be produced by the proposed fixed-satellite assignment exceeds the value specified in Annex **4** to this Part of the Final Acts.

For this purpose, the administration seeking agreement shall send to any other such administration the information listed in Appendix **3** to the Radio Regulations.

7.2.2 No additional agreement is necessary when an administration proposes to change the characteristics of an existing assignment in such a way as will, in respect of the broadcasting-satellite service of another administration, meet the requirements of paragraph 7.2.1 above, or when this assignment has previously been the subject of an agreement and when the change will not cause any increase in the interference potential specified in that agreement.

7.2.3 An administration seeking coordination under paragraph 7.2.1 shall at the same time send to the Board a copy of the request for coordination together with the information listed in Appendix **3** to the Radio Regulations and the name(s) of the administration(s) whose agreement is sought. The Board shall determine on the basis of Annex 4 to this Part of the Final Acts which frequency assignments in conformity with the Plan are considered to be affected. The Board shall include the names of those administrations with the information received from the administration seeking coordination and shall publish this information in a special section of its weekly circular, together with a reference to the weekly circular in which details of the satellite system were published in accordance with Section I of this Article. When the weekly circular contains such information, the Board shall so inform all administrations by circular telegram.

7.2.4 An administration believing that it should have been included in the procedure under paragraph 7.2.1 shall have the right to request that it be brought into the procedure.

7.2.5 An administration whose agreement is sought under paragraph 7.2.1 shall acknowledge receipt of the coordination data immediately by telegram. If no acknowledgement is received within one month after the date of the weekly circular publishing the information under paragraph 7.2.3, the administration seeking coordination shall dispatch a telegram requesting acknowledgement, to which the receiving administration shall reply within a further period of one month. Upon receipt of the coordination data, an administration shall, having regard to the proposed date of bringing into use of the assignment for which agreement was requested, promptly examine the matter with regard to interference [1] which would be caused to the service rendered by its stations in respect of which agreement is sought under paragraph 7.2.1, and shall, within three months from the date of the relevant weekly circular, notify its agreement to the requesting administration. If the administration with which coordination is sought does not agree, it shall, within the same period, send to the administration seeking coordination the technical details upon which its disagreement is based, and make such suggestions as it may be able to offer with a view to a satisfactory solution of the problem. A copy of these comments shall also be sent to the Board.

7.2.6 An administration seeking coordination may request the Board to endeavour to effect coordination in those cases where:

a) an administration whose agreement is sought under paragraph 7.2.1 fails to acknowledge receipt, under paragraph 7.2.5, within two months after the date of the weekly circular publishing the information relating to the request for coordination;

b) an administration has acknowledged receipt under paragraph 7.2.5, but fails to give a decision within three months from the date of the relevant weekly circular;

c) there is disagreement between the administration seeking coordination and an administration whose agreement is sought as to the acceptable interference; *or*

d) agreement between administrations is not possible for any other reason.

In so doing, it shall furnish the Board with the necessary information to enable it to endeavour to effect such coordination.

7.2.7 Either the administration seeking coordination or an administration whose agreement is sought, or the Board, may request additional information which they may require to assess the level of interference to the services concerned.

[1] The criteria to be employed in evaluating interference levels shall be based upon the technical information contained in this Part of the Final Acts or upon relevant CCIR Recommendations and shall be agreed between the administrations concerned.

7.2.8 Where the Board receives a request under paragraph 7.2.6 *a)*, it shall forthwith send a telegram to the administration whose agreement is sought requesting immediate acknowledgement.

7.2.9 Where the Board receives an acknowledgement following its action under paragraph 7.2.8, or where the Board receives a request under paragraph 7.2.6 *b)*, it shall forthwith send a telegram to the administration whose agreement is sought requesting an early decision in the matter.

7.2.10 Where the Board receives a request under paragraph 7.2.6 *d)*, it shall endeavour to effect coordination in accordance with the provisions of paragraph 7.2.1. The Board shall also, where appropriate, act in accordance with paragraph 7.2.3. Where the Board receives no acknowledgement to its request for coordination within the periods specified in paragraph 7.2.5, it shall act in accordance with paragraph 7.2.8.

7.2.11 Where an administration fails to reply within one month of dispatch of the Board's telegram requesting an acknowledgement sent under paragraph 7.2.8, or fails to give a decision in the matter within one month of dispatch of the Board's telegram of request under paragraph 7.2.9, it shall be deemed that the administration whose agreement was sought has undertaken:

a) that no complaint will be made in respect of any harmful interference which may be caused to the services rendered by its broadcasting-satellite stations by the use of the assignment for which coordination was requested;

b) that its broadcasting-satellite stations will not cause harmful interference to the use of the assignment for which coordination was requested.

7.2.12 Where necessary, as part of the procedure under paragraph 7.2.6, the Board shall assess the level of interference. In any case, the Board shall inform the administrations concerned of the results obtained.

7.2.13 In the event of continuing disagreement between one administration seeking to effect coordination and one whose agreement has been sought, provided that the assistance of the Board has been requested, the administration seeking coordination may, after five months from the date of the request for coordination, taking into consideration the provisions of paragraph 7.3.4, send its notice concerning the proposed assignment to the Board. In those circumstances the notifying administration shall undertake not to bring the frequency assignment into use until the condition in paragraph 7.4.11.2 can be fulfilled. But the administrations concerned may explore the possibility of reaching an agreement on the use of the proposed frequency assignment for a specified period.

Section III. Notification of Frequency Assignments

7.3.1 Any frequency assignment to a space station in the fixed-satellite service shall be notified to the Board:

a) if the use of the frequency concerned is capable of causing harmful interference to a frequency assignment of another administration which is in conformity with the Plan [1]; *or*

b) if it is desired to obtain international recognition of the use of the frequency.

7.3.2 Similar notice shall be given for any frequency to be used for reception by an earth station where one or more of the conditions specified in paragraph 7.3.1 are applicable.

7.3.3 For any notification under paragraph 7.3.1 or 7.3.2, an individual notice for each frequency assignment shall be drawn up as prescribed in Appendix **3** to the Radio Regulations, the various Sections of which specify the basic characteristics to be furnished according to the case. The notifying administration shall furnish such further data as it considers appropriate.

7.3.4 Each notice must reach the Board not earlier than three years before the date on which the assignment is to be brought into use. The notice must reach the Board in any case not later than three months [2] before this date.

[1] The attention of administrations is specifically drawn to the application of paragraph 7.2.1 above.

[2] The notifying administration shall take this limit into account when deciding, where appropriate, to initiate the coordination procedure(s).

7.3.5 Any frequency assignment to an earth or space station, the notice of which reaches the Board after the applicable period specified in paragraph 7.3.4, shall, where it is to be recorded, bear a mark in the Master Register to indicate that it is not in conformity with paragraph 7.3.4.

Section IV. Procedure for the Examination of Notices and the Recording of Frequency Assignments in the Master Register

7.4.1 Any notice which does not contain at least those basic characteristics specified in Appendix **3** to the Radio Regulations shall be returned by the Board immediately, by airmail, to the notifying administration with the reasons therefor.

7.4.2 Upon receipt of a complete notice, the Board shall include the particulars thereof, with the date of receipt, in its weekly circular which shall contain the particulars of all such notices received since the publication of the previous circular.

7.4.3 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

7.4.4 Complete notices shall be considered by the Board in the order of their receipt. The Board shall not postpone the formulation of a finding unless it lacks sufficient data to render a decision in connection therewith; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board, until it has reached a finding with respect to such earlier notice.

7.4.5 The Board shall examine each notice:

7.4.5.1 with respect to its conformity with the Convention, the relevant provisions of the Radio Regulations and the provisions of this Part of the Final Acts (with the exception of those relating to the coordination procedures and the probability of harmful interference);

7.4.5.2 where appropriate, with respect to its conformity with the provisions of paragraph 7.2.1, relating to the coordination of the use of the frequency assignment with the other administrations concerned having a frequency assignment in conformity with the Plan;

7.4.5.3 where appropriate, with respect to the probability of harmful interference to the service rendered or to be rendered by a broadcasting-satellite station whose frequency assignment is in conformity with the Plan.

7.4.6 Depending upon the findings of the Board subsequent to the examination prescribed in paragraphs 7.4.5.1, 7.4.5.2 and 7.4.5.3, as appropriate, further action shall be as follows:

7.4.7 *Finding favourable with respect to paragraph 7.4.5.1 in cases where the provisions of paragraph 7.4.5.2 are not applicable*

7.4.7.1 The assignment shall be recorded in the Master Register. The date of receipt by the Board of the notice shall be entered in Column 2d.

7.4.8 *Finding unfavourable with respect to paragraph 7.4.5.1*

7.4.8.1 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. **342** of the Radio Regulations and the finding is favourable with respect to paragraph 7.4.5.2 or 7.4.5.3, as appropriate, the assignment shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d.

7.4.8.2 Where the notice includes a specific reference to the fact that the station will be operated in accordance with the provisions of No. **342** of the Radio Regulations and the finding is unfavourable with respect to paragraph 7.4.5.2 or 7.4.5.3, as appropriate, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding. In those circumstances the notifying administration shall undertake not to bring into use the frequency assignment until the condition in paragraph 7.4.8.1 can be

fulfilled. The agreement of the administrations affected can also be obtained in accordance with this Article for a specified period. In that event the Board shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note indicating that the frequency assignment is valid only for the period specified. The notifying administration using the frequency assignment over a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration(s) concerned. The date of receipt of the original notice by the Board shall be entered in Column 2d.

7.4.8.3 Where the notice does not include a specific reference to the fact that the station will be operated in accordance with the provisions of No. **342** of the Radio Regulations, it shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

7.4.8.4 If the notifying administration resubmits the notice unchanged, it shall be treated in accordance with the provisions of paragraph 7.4.8.3. If it is resubmitted with a specific reference to the fact that the station will be operated in accordance with the provisions of No. **342** of the Radio Regulations, it shall be treated in accordance with the provisions of paragraph 7.4.8.1 or 7.4.8.2, as appropriate. If it is resubmitted with modifications which, after re-examination, result in a favourable finding by the Board with respect to paragraph 7.4.5.1, it shall be treated as a new notice.

7.4.9 *Finding favourable with respect to paragraph 7.4.5.1 in cases where the provisions of paragraph 7.4.5.2 are applicable*

7.4.9.1 Where the Board finds that the coordination procedures mentioned in paragraph 7.4.5.2 have been successfully completed with all administrations whose frequency assignments in conformity with the Plan may be affected, the frequency assignment shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d.

7.4.9.2 Where the Board finds that the coordination procedure mentioned in paragraph 7.4.5.2 has not been applied, and the notifying administration requests the Board to effect the required coordination, the Board shall take appropriate action and shall inform the administrations concerned of the results obtained. If the Board's efforts are successful, the notice shall be treated in accordance with paragraph 7.4.9.1. If the Board's efforts are unsuccessful, the notice shall be examined by the Board with respect to the provisions of paragraph 7.4.5.3.

7.4.9.3 Where the Board finds that the coordination procedure mentioned in paragraph 7.4.5.2 has not been applied, and the notifying administration does not request the Board to effect the required coordination, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this action and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

7.4.9.4 Where the notifying administration resubmits the notice and the Board finds that the coordination procedure mentioned in paragraph 7.4.5.2 has been successfully completed with all administrations whose frequency assignments in conformity with the Plan may be affected, the frequency assignment shall be recorded in the Master Register. The date of receipt of the original notice by the Board shall be entered in Column 2d. The date of receipt of the resubmitted notice by the Board shall be entered in the Remarks Column.

7.4.9.5 Where the notifying administration resubmits the notice with a request that the Board effect the required coordination under paragraph 7.2.1, it shall be treated in accordance with the provisions of paragraph 7.4.9.2. However, in any subsequent recording of the assignment, the date of receipt of the resubmitted notice by the Board shall be entered in the Remarks Column.

7.4.9.6 Where the notifying administration resubmits the notice and states it has been unsuccessful in effecting the coordination, the Board shall inform the administrations concerned thereof. The notice shall be examined by the Board with respect to the provisions of paragraph 7.4.5.3. However, in any subsequent recording of the assignment, the date of receipt of the resubmitted notice by the Board shall be entered in the Remarks Column.

7.4.10 *Finding favourable with respect to paragraphs 7.4.5.1 and 7.4.5.3*

7.4.10.1 The assignment shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d.

7.4.11 *Finding favourable with respect to paragraph 7.4.5.1, but unfavourable with respect to paragraph 7.4.5.3*

7.4.11.1 The notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to the satisfactory solution of the problem.

7.4.11.2 Should the notifying administration resubmit the notice with modifications which result, after re-examination, in a favourable finding by the Board with respect to paragraph 7.4.5.3, the assignment shall be recorded in the Master Register. The date of receipt by the Board of the original notice shall be entered in Column 2d. The date of receipt of the resubmitted notice by the Board shall be indicated in the Remarks Column.

7.4.11.3 Should the notifying administration resubmit the notice, either unchanged, or with modifications which decrease the probability of harmful interference, but not sufficiently to permit the provisions of paragraph 7.4.11.2 to be applied, and should that administration insist upon reconsideration of the notice, but should the Board's finding remain unchanged, the notification shall again be returned to the notifying administration in accordance with paragraph 7.4.11.1. In those circumstances, the notifying administration shall undertake not to bring into use the proposed frequency assignment until the condition in paragraph 7.4.11.2 can be fulfilled. The agreement of the administrations affected can also be obtained in accordance with this Article for a specified period. In that event the Board shall be notified of the agreement and the frequency assignment shall be recorded in the Master Register with a note in the Remarks Column indicating that the assignment is valid only for the specified period. The notifying administration using the frequency assignment over a specified period shall not subsequently use this circumstance to justify continued use of the frequency beyond the period specified if it does not obtain the agreement of the administration(s) concerned. The date of receipt of the original notice by the Board shall be entered in Column 2d.

7.4.12 *Change in the basic characteristics of assignments already recorded in the Master Register*

7.4.12.1 A notice of a change in the basic characteristics of an assignment in the fixed-satellite service already recorded, as specified in Appendix **3** to the Radio Regulations (except the name of the station or the name of the locality in which it is situated or the date of bringing into use), shall be examined by the Board according to paragraph 7.4.5.1 and, where appropriate, paragraphs 7.4.5.2 and 7.4.5.3, and the provisions of paragraphs 7.4.7 to 7.4.11.3 inclusive shall apply. Where the change should be recorded, the original assignment shall be amended accordingly.

7.4.12.2 However, in the case of a change in the characteristics of an assignment which is in conformity with paragraph 7.4.5.1, should the Board reach a favourable finding with respect to paragraphs 7.4.5.2 and 7.4.5.3, where appropriate, or find that the changes do not increase the probability of harmful interference to frequency assignments in conformity with the Plan, the amended assignment shall retain the original date in Column 2d. The date of receipt of the notice by the Board relating to the change shall be entered in the Remarks Column.

7.4.12.3 The projected date of bringing into use of a frequency assignment may be extended by four months on request of the notifying administration. If the administration states that, due to exceptional circumstances, it needs a further extension of this period, such extension may be provided but it shall in no case exceed eighteen months from the original projected date of bringing into use.

7.4.12.4 In applying the provisions of this section, any resubmitted notice which is received by the Board more than two years after the date of its return by the Board shall be considered as a new notice.

7.4.13 *Recording of frequency assignments in the fixed-satellite service notified before being brought into use*

7.4.13.1 If a frequency assignment notified in advance of bringing into use has received a favourable finding by the Board with respect to paragraph 7.4.5.1 and, where appropriate, paragraphs 7.4.5.2 and 7.4.5.3, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

7.4.13.2 Within one month after the date of bringing into use, either as originally notified or as modified in application of paragraph 7.4.12.3, the notifying administration shall confirm that the frequency assignment has been brought into use. When the Board is informed that the assignment has been brought into use, the special symbol shall be deleted from the Remarks Column.

7.4.13.3 If the Board does not receive this confirmation within the period referred to in paragraph 7.4.13.2, the entry concerned shall be cancelled. The Board shall consult the administration concerned before taking such action.

Section V. Recording of Findings in the Master Register

7.5 In any case where a frequency assignment is recorded in the Master Register, the finding reached by the Board shall be indicated by a symbol in Column 13a. In addition, a remark indicating the reasons for any unfavourable finding shall be inserted in the Remarks Column.

Section VI. Categories of Frequency Assignments

7.6.1 The date in Column 2c shall be the date of putting into use notified by the administration concerned. It is given for information only.

7.6.2 If harmful interference is actually caused to the reception of any broadcasting-satellite station whose frequency assignment is in accordance with the Plan by the use of a frequency assignment to a space radiocommunication station subsequently recorded in the Master Register in accordance with the provisions of paragraph 7.4.11.3, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

7.6.3 If harmful interference to the reception of any broadcasting-satellite station whose frequency assignment is in conformity with the Plan is actually caused by the use of a frequency assignment which is not in conformity with paragraph 7.4.5.1, the station using the latter frequency assignment must, upon receipt of advice thereof, immediately eliminate this harmful interference.

Section VII. Review of Findings

7.7.1 The review of a finding by the Board may be undertaken:

a) at the request of the notifying administration;

b) at the request of any other administration interested in the question, but only on the grounds of actual harmful interference;

c) on the initiative of the Board itself when it considers this is justified.

7.7.2 The Board, in the light of all the data at its disposal, shall review the matter, taking into account paragraph 7.4.5.1 and, where appropriate, paragraphs 7.4.5.2 and 7.4.5.3, and shall render an appropriate finding, informing the notifying administration prior either to the promulgation of its finding or to any recording action.

7.7.3 If the finding of the Board is then favourable it shall enter in the Master Register the changes that are required so that the entry shall appear in the future as if the original finding had been favourable.

7.7.4 If the finding with regard to the probability of harmful interference remains unfavourable, no change shall be made in the original entry.

Section VIII. Modification, Cancellation and Review of Entries in the Master Register

7.8.1 The Board shall at intervals not exceeding two years request confirmation from the notifying administration that its assignment has been and will continue to be in regular use in accordance with its recorded characteristics.

7.8.2 Where the use of a recorded assignment to a station in the fixed-satellite service is suspended for a period of eighteen months, the notifying administration shall, within this eighteen-month period, inform the Board of the date on which such use was suspended and of the date on which the assignment is to be brought back into regular use.

7.8.3 Whenever it appears to the Board, whether or not as a result of action under paragraph 7.8.2, that a recorded assignment to a space station in the fixed-satellite service has not been in regular use for more than eighteen months, the Board shall inquire of the notifying administration as to when the assignment is to be brought back into regular use.

7.8.4 If no reply is received within six months of action by the Board under paragraph 7.8.3, or if the reply does not confirm that the assignment to a space station in the fixed-satellite service is to be brought back into regular use within this six-month limit, a mark should be entered against the entry in the Master Register.

7.8.5 In case of permanent discontinuance of the use of any recorded frequency assignment, the notifying administration shall inform the Board within three months of such discontinuance, whereupon the entry shall be removed from the Master Register.

7.8.6 Whenever it appears to the Board from the information available that a recorded assignment has not been brought into regular operation in accordance with the notified basic characteristics, or is not being used in accordance with those basic characteristics, the Board shall consult the notifying administration and, subject to its agreement, shall either cancel or suitably modify or retain the basic characteristics of the entry.

7.8.7 If, in connection with an inquiry by the Board under paragraph 7.8.6 the notifying administration has failed to supply the Board within three months with the necessary or pertinent information, the Board shall make suitable entries in the Remarks Column of the Master Register to indicate the situation.

ARTICLE 8

Miscellaneous Provisions Relating to the Procedures

8.1 If it is requested by any administration, the Board, using such means at its disposal as are appropriate in the circumstances, shall conduct a study of cases of alleged contravention or non-observance of these provisions or of harmful interference.

8.2 The Board shall thereupon prepare and forward to the administration concerned a report containing its findings and recommendations for the solution of the problem.

8.3 On receiving the Board's recommendations for the solution of the problem, an administration shall promptly acknowledge the receipt by telegram and shall subsequently indicate the action it intends to take. In cases when the Board's suggestions or recommendations are unacceptable to the administrations concerned, further efforts should be made by the Board to find an acceptable solution to the problem.

8.4 In a case where, as a result of a study, the Board submits to one or more administrations suggestions or recommendations for the solution of a problem, and where no answer has been received from one or more of these administrations within a period of three months, the Board shall consider that the suggestions or recommendations concerned are unacceptable to the administrations which did not answer. If it was the requesting administration which failed to answer within this period, the Board shall close the study.

8.5 If it is requested by any administration, particularly by an administration of a country in need of special assistance, the Board, using such means at its disposal as are appropriate in the circumstances, shall render the following assistance:

a) computation necessary in the application of Annexes 1, 3 and 4 to this Part;

b) any other assistance of a technical nature for completion of the procedures in this Part.

8.6 In making a request to the Board under paragraph 8.5, the administration shall furnish the Board with the necessary information.

ARTICLE 9

Power Flux-Density Limits Between 12.2 and 12.7 GHz to Protect Space Services in Regions 1 and 3 from Interference from Broadcasting-Satellite Space Stations of Region 2

9.1 Broadcasting-satellite space stations of Region 2 shall employ transmitting antennas whose side-lobe characteristics fall within the reference antenna pattern given in Figure 5 of Annex 5 to this Part. Therefore, before making any modifications to the Plan, administrations shall ensure that the power flux-density falling on the territory of any administration of Region 1 in the band 12.5 - 12.7 GHz and of Region 3 in the band 12.2 - 12.7 GHz does not exceed, under all conditions and methods of modulation, the values produced by broadcasting-satellite space stations operating in conformity with the Plan on the date of its entry into force and using the technical characteristics specified in the Plan. The power flux-density values shall be calculated using the method described in Annex 6 to this Part.

ARTICLE 10

The Plan for the Broadcasting-Satellite Service in the Frequency Band 12.2 - 12.7 GHz in Region 2

10.1 COLUMN HEADINGS OF THE PLAN

Col. 1. *Beam identification* (Column 1 contains the symbol designating the country or the geographical area taken from Table No. 1 of the Preface to the International Frequency List followed by the symbol designating the service area).

Col. 2. *Nominal orbital position,* in degrees and hundredths of a degree.

Col. 3. *Channel number* (see Table showing channel numbers and corresponding assigned frequencies).

Col. 4. *Boresight* geographical coordinates, in degrees and hundredths of a degree.

Col. 5. *Antenna beamwidth.* This column contains two figures corresponding to the major axis and the minor axis respectively of the elliptical cross-section half-power beam, in degrees and hundredths of a degree.

Col. 6. *Orientation of the ellipse* determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anti-clockwise from a line parallel to the equatorial plane to the major axis of the ellipse to the nearest degree.

Col. 7. *Polarization* (1 = direct, 2 = indirect) [1].

Col. 8. *E.i.r.p.* in the direction of maximum radiation, in dBW.

Col. 9. *Remarks.*

10.2 TEXT FOR SYMBOLS IN REMARKS COLUMN OF THE PLAN

1. Fast roll-off space station transmitting antenna as defined in Annex 5 (item 3.13.3) to this Part.

2. Television standard with 625 lines using greater video bandwidth and necessary bandwidth of 27 MHz.

3. This assignment will be implemented only if it does not hinder the development and subsequent introduction of a feeder-link Plan for Region 1.

4. This assignment may be utilized in the geographical area of Anguilla (AIA) (which is in the beam area).

5. Feeder-link earth stations for this assignment may also be located in the territories of Puerto Rico and the United States Virgin Islands. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

6. Feeder-link earth stations for this assignment may also be located in the States of Alaska and Hawaii. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

7. The feeder-link earth station for this assignment may also be located at the point with geographical coordinates 3°31′ West, 48°46′ North. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

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[1] See Annex 5 to this Part, paragraph 3.2.

8. Feeder-link earth stations for this assignment may also be located at the points with the following geographical coordinates:

47°55′ West	15°47′ South	34°53′ West	08°04′ South
43°13′ West	22°55′ South	60°02′ West	03°06′ South
46°38′ West	23°33′ South	38°31′ West	12°56′ South
51°13′ West	30°02′ South	49°15′ West	16°40′ South

Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

* 9/GR . . . : This assignment is part of a group, the number of which follows the symbol. The group consists of the beams and has the number of channels assigned to it as indicated in the Table below. Each of the assigned channels can be used by only one of the beams in the group.

Group	*Beams in the group*	*Number of channels assigned to the group*
GR1	ALS00002 HWA00002 USAPSA02	32 channels
GR2	ALS00003 HWA00003 USAPSA03	32 channels
GR3	ARGINSU4 ARGSUR04	16 channels
GR4	ARGINSU5 ARGSUR05	12 channels
GR5	BOLAND01 CLMAND01 EQACAND1 EQAGAND1 PRUAND02 VENAND03	16 channels
GR6	B SU111 B SU211	32 channels
GR7	B CE311 B CE411 B CE511	32 channels
GR8	B NO611 B NO711 B NO811	32 channels
GR9	B SU112 B SU212 B CE312 B CE412	32 channels
GR10	CAN01101 CAN01201	32 channels
GR11	CAN01202 CAN01302	32 channels
GR12	CAN01203 CAN01303 CAN01403	32 channels
GR13	CAN01304 CAN01404 CAN01504	32 channels
GR14	CAN01405 CAN01505 CAN01605	32 channels
GR15	CAN01506 CAN01606	32 channels
GR16	CHLCONT4 CHLCONT6	16 channels
GR17	CHLCONT5 PAQPAC01 CHLPAC02	16 channels
GR18	CRBBER01 CRBBLZ01 CRBJMC01 CRBBAH01 CRBECO01	16 channels
GR19	EQACOO01 EQAGOO01	16 channels
GR20	PTRVIR01 USAEHO02	32 channels
GR21	PTRVIR02 USAEHO03	32 channels
GR22	VEN02VEN VEN11VEN	4 channels

* *Note by the General Secretariat:* This new symbol for the Remarks column has been included at the request of the IFRB.

Country symbols

1. For the explanation of symbols designating countries or geographical areas in Region 2, see the Preface to the International Frequency List.

2. One additional symbol, CRB, has been created for the purposes of the present Conference only, to designate a geographical area in the Caribbean Area. The five Caribbean beams are identified as follows:

CRBBAH01, CRBBER01, CRBBLZ01, CRBEC001 and CRBJMC01

and are intended collectively to provide coverage for the following countries or geographical areas: AIA, ATG, BAH, BER, BLZ, BRB, CYM, DMA, GRD, GUY, JMC, LCA, MSR, SCN, SUR, TCA, TRD, VCT and VRG to be so used if approved by them.

TABLE SHOWING CORRESPONDENCE BETWEEN CHANNEL NUMBERS AND ASSIGNED FREQUENCIES

Channel No.	Assigned frequency (MHz)	Channel No.	Assigned frequency (MHz)
1	12224.00	17	12457.28
2	12238.58	18	12471.86
3	12253.16	19	12486.44
4	12267.74	20	12501.02
5	12282.32	21	12515.60
6	12296.90	22	12530.18
7	12311.48	23	12544.76
8	12326.06	24	12559.34
9	12340.64	25	12573.92
10	12355.22	26	12588.50
11	12369.80	27	12603.08
12	12384.38	28	12617.66
13	12398.96	29	12632.24
14	12413.54	30	12646.82
15	12428.12	31	12661.40
16	12442.70	32	12675.98

Plan for the Broadcasting-Satellite Service in the Frequency Band 12.2 - 12.7 GHz in Region 2

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-166.20	1	-149.66	58.37	3.76	1.24	170	1	59.7	9/GR1
ALS00003	-175.20	1	-150.98	58.53	3.77	1.11	167	1	60.0	9/GR2
ARGINSU4	-94.20	1	-52.98	-59.81	3.40	0.80	19	1	59.9	9/GR3
ARGSUR04	-94.20	1	-65.04	-43.33	3.32	1.50	40	1	60.7	9/GR3
B CE311	-64.20	1	-40.60	-6.07	3.04	2.06	174	1	61.6	8 9/GR7
B CE312	-45.20	1	-40.27	-6.06	3.44	2.09	174	1	61.0	8 9/GR9
B CE411	-64.20	1	-50.97	-15.27	3.86	1.38	49	1	62.6	8 9/GR7
B CE412	-45.20	1	-50.71	-15.30	3.57	1.56	52	1	62.7	8 9/GR9
B CE511	-64.20	1	-53.10	-2.90	2.44	2.13	104	1	63.0	8 9/GR7
B NO611	-74.20	1	-59.60	-11.62	2.85	1.69	165	2	62.8	8 9/GR8
B NO711	-74.20	1	-60.70	-1.78	3.54	1.78	126	2	62.8	8 9/GR8
B NO811	-74.20	1	-68.76	-4.71	2.37	1.65	73	2	62.8	8 9/GR8
B SU111	-81.20	1	-51.12	-25.63	2.76	1.05	50	1	62.8	8 9/GR6
B SU112	-45.20	1	-50.75	-25.62	2.47	1.48	56	1	62.2	8 9/GR9
B SU211	-81.20	1	-44.51	-16.95	3.22	1.36	60	1	62.5	8 9/GR6
B SU212	-45.20	1	-44.00	-16.87	3.20	1.96	58	1	61.3	8 9/GR9
BAHIFRB1	-87.20	1	-76.06	24.16	1.81	0.80	142	1	61.6	
BERBERMU	-96.20	1	-64.77	32.32	0.80	0.80	90	2	56.8	
BERDER02	-31.00	1	-64.77	32.32	0.80	0.80	90	1	56.9	2 3
BOLAND01	-115.20	1	-65.04	-16.76	2.49	1.27	76	1	67.9	9/GR5
CAN01101	-138.20	1	-125.63	57.24	3.45	1.27	157	1	59.5	9/GR10
CAN01201	-138.20	1	-112.04	55.95	3.35	0.97	151	1	59.6	9/GR10
CAN01202	-72.70	1	-107.70	55.63	2.74	1.12	32	1	59.6	9/GR11
CAN01203	-129.20	1	-111.48	55.61	3.08	1.15	151	1	59.5	9/GR12
CAN01303	-129.20	1	-102.42	57.12	3.54	0.91	154	1	60.0	9/GR12
CAN01304	-91.20	1	-99.12	57.36	1.98	1.72	2	1	59.8	9/GR13
CAN01403	-129.20	1	-89.75	52.02	4.68	0.80	148	1	61.8	9/GR12
CAN01404	-91.20	1	-84.82	52.42	3.10	2.05	152	1	60.4	9/GR13

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
CANO1405	-82.20	1	-84.00	52.39	2.84	2.29	172	1	60.3	9/GR14
CANO1504	-91.20	1	-72.66	53.77	3.57	1.67	156	1	60.2	9/GR13
CANO1505	-82.20	1	-71.77	53.79	3.30	1.89	162	1	60.1	9/GR14
CANO1605	-82.20	1	-61.50	49.55	2.65	1.40	143	1	60.3	9/GR14
CANO1606	-70.70	1	-61.30	49.55	2.40	1.65	148	1	60.2	9/GR15
CHLCONT5	-106.20	1	-72.23	-35.57	2.60	0.80	55	1	59.4	9/GR17
CHLPAC02	-106.20	1	-80.06	-30.06	1.36	0.80	69	1	59.2	9/GR17
CLMANDO1	-115.20	1	-74.72	5.93	3.85	1.63	114	1	64.9	9/GR5
CLMOOOO1	-103.20	1	-74.50	5.87	3.98	1.96	118	1	63.5	
EQACAND1	-115.20	1	-78.40	-1.61	1.37	0.95	75	1	64.0	9/GR5
EQAGAND1	-115.20	1	-90.34	-0.62	0.90	0.81	89	1	61.3	9/GR5
FLKANT01	-57.20	1	-44.54	-60.13	3.54	0.80	12	1	59.3	2
FLKFALKS	-31.00	1	-59.90	-51.64	0.80	0.80	90	1	58.1	2 3
GRDOOOO2	-42.20	1	-61.58	12.29	0.80	0.80	90	1	58.8	
HWAOOOO2	-166.20	1	-165.79	23.42	4.20	0.80	160	1	58.8	9/GR1
HWAOOOO3	-175.20	1	-166.10	23.42	4.25	0.80	159	1	58.8	9/GR2
MEXO1NTE	-78.20	1	-105.81	26.01	2.89	2.08	155	1	60.5	1
MEXO1SUR	-69.20	1	-94.84	19.82	3.05	2.09	4	1	62.2	1
MEXO2NTE	-136.20	1	-107.21	26.31	3.84	1.55	148	1	61.2	1
MEXO2SUR	-127.20	1	-96.39	19.88	3.18	1.87	157	1	62.5	1
PAGPAC01	-106.20	1	-109.18	-27.53	0.80	0.80	90	1	56.2	9/GR17
PRGOOC02	-99.20	1	-58.66	-23.32	1.45	1.04	76	1	60.2	
PRCAND02	-115.20	1	-74.69	-8.39	3.41	1.79	95	1	63.9	9/GR5
PTRVIR01	-101.20	1	-65.85	18.12	0.80	0.80	90	1	60.5	1 6 9/GR20
PTRVIR02	-110.20	1	-65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21
SPMFRAN3	-53.20	1	-67.24	47.51	3.16	0.80	7	1	60.4	2 7
TRDOOOO1	-84.70	1	-61.23	10.70	0.80	0.80	90	1	59.4	
URGOOOO1	-71.70	1	-56.22	-32.52	1.02	0.89	11	1	60.0	

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
USAEH001	-61.70	1	-85.19	36.21	5.63	3.33	22	1	61.8	1 5 6
USAEH002	-101.20	1	-89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20
USAEH003	-110.20	1	-90.14	36.11	5.55	3.55	161	1	62.0	1 6 9/GR21
USAEH004	-119.20	1	-91.16	36.05	5.38	3.24	152	1	62.6	1 5 6
USAPSA02	-166.20	1	-117.80	40.58	4.03	0.82	135	1	63.2	9/GR1
USAPSA03	-175.20	1	-118.27	40.12	3.62	0.80	136	1	65.0	9/GR2
USAWH101	-148.20	1	-109.65	38.13	5.53	1.95	142	1	62.1	
USAWH102	-157.20	1	-111.41	38.57	5.51	1.54	138	1	63.2	
VENAND03	-115.20	1	-67.04	6.91	2.37	1.43	111	1	67.2	9/GR5
VRG00001	-79.70	1	-64.37	18.48	0.80	0.80	90	1	58.3	4

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	2	-149.63	58.52	3.81	1.23	171	2	59.7	9/GR1
ALS00003	-174.80	2	-150.95	58.54	3.77	1.11	167	2	60.0	9/GR2
ARGNORT4	-93.80	2	-63.96	-30.01	3.86	1.99	48	2	65.6	
ARGNORT5	-54.80	2	-62.85	-29.80	3.24	2.89	47	2	63.5	
ATNBEAM1	-52.80	2	-66.44	14.87	1.83	0.80	39	2	61.0	
B CE311	-63.80	2	-40.60	-6.07	3.04	2.06	174	2	61.6	8 9/GR7
B CE312	-44.80	2	-40.26	-6.06	3.44	2.09	174	2	61.0	8 9/GR9
B CE411	-63.80	2	-50.97	-15.26	3.86	1.38	49	2	62.6	8 9/GR7
B CE412	-44.80	2	-50.71	-15.30	3.57	1.56	52	2	62.7	8 9/GR9
B CE511	-63.80	2	-53.11	-2.98	2.42	2.15	107	2	63.1	8 9/GR7
B NO611	-73.80	2	-59.60	-11.62	2.86	1.69	165	1	62.8	8 9/GR8
B NO711	-73.80	2	-60.70	-1.78	3.54	1.78	126	1	62.8	8 9/GR8
B NO811	-73.80	2	-68.75	-4.71	2.37	1.65	73	1	62.8	8 9/GR8
B SE911	-101.80	2	-45.99	-19.09	2.22	0.80	62	2	65.3	8
B SU111	-80.80	2	-51.10	-25.64	2.76	1.06	50	2	62.8	8 9/GR6
B SU112	-44.80	2	-50.76	-25.62	2.47	1.48	56	2	62.3	8 9/GR9
B SU211	-80.80	2	-44.51	-16.94	3.22	1.37	60	2	62.5	8 9/GR6
B SU212	-44.80	2	-43.99	-16.97	3.27	1.92	59	2	61.3	8 9/GR9
CAN01101	-137.80	2	-125.60	57.24	3.45	1.27	157	2	59.5	9/GR10
CAN01201	-137.80	2	-111.92	55.89	3.33	0.98	151	2	59.6	9/GR10
CAN01202	-72.30	2	-107.64	55.62	2.75	1.11	32	2	59.6	9/GR11
CAN01203	-128.80	2	-111.43	55.56	3.07	1.15	151	2	59.5	9/GR12
CAN01303	-128.80	2	-102.39	57.12	3.54	0.92	154	2	60.0	9/GR12
CAN01304	-90.80	2	-99.00	57.33	1.96	1.73	1	2	59.8	9/GR13
CAN01403	-128.80	2	-89.70	52.02	4.67	0.80	148	2	61.8	9/GR12
CAN01404	-90.80	2	-84.78	52.41	3.09	2.06	153	2	60.4	9/GR13
CAN01405	-81.80	2	-84.02	52.34	2.82	2.30	172	2	60.3	9/GR14
CAN01504	-90.80	2	-72.68	53.78	3.57	1.67	157	2	60.2	9/GR13

1	2	3	4		5		6	7	8	9
	Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
CAN01505	-81.80	2	-71.76	53.76	3.30	1.89	162	2	60.1	9/GR14
CAN01605	-81.80	2	-61.54	49.50	2.66	1.39	144	2	60.3	9/GR14
CANU1606	-70.30	2	-61.32	49.51	2.41	1.65	148	2	60.2	9/GR15
CHLCONT4	-105.80	2	-69.59	-23.20	2.21	0.80	68	2	59.1	9/GR16
CHLCONT6	-105.80	2	-73.52	-55.52	3.65	1.31	39	2	59.6	9/GR16
CRBBAH01	-92.30	2	-76.09	24.13	1.83	0.80	141	1	61.7	9/GR18
CRBBER01	-92.30	2	-64.76	32.13	0.80	0.80	90	1	56.7	9/GR18
CRBBLZ01	-92.30	2	-88.61	17.26	0.80	0.80	90	1	58.6	9/GR18
CRBEC001	-92.30	2	-60.07	8.26	4.20	0.86	115	1	64.2	9/GR18
CRBJMC01	-92.30	2	-79.45	17.97	0.99	0.80	151	1	61.1	9/GR18
CTRU02G1	-130.80	2	-84.33	9.67	0.82	0.80	119	2	65.6	
EQAC0001	-94.80	2	-78.31	-1.52	1.48	1.15	65	1	63.0	9/GR19
EQAG0001	-94.80	2	-90.36	-0.57	0.94	0.89	99	1	61.0	9/GR19
GUY003G2	-33.80	2	-59.07	4.77	1.43	0.85	91	2	63.5	
HNDIFKB2	-107.30	2	-86.23	15.16	1.14	0.85	8	1	63.4	
HTI00002	-83.30	2	-73.28	18.96	0.82	0.80	11	2	60.9	
HWA00002	-165.80	2	-165.79	23.32	4.20	0.80	160	2	58.8	9/GR1
HWA00003	-174.80	2	-166.10	23.42	4.25	0.80	159	2	58.8	9/GR2
MEX01NTE	-77.80	2	-105.80	25.99	2.88	2.07	155	2	60.5	1
MEX02NTE	-135.80	2	-107.36	26.32	3.80	1.57	149	2	61.2	1
MEX02SUR	-126.80	2	-96.39	19.88	3.19	1.87	158	2	62.5	1
PRU00004	-85.80	2	-74.19	-8.39	3.74	2.45	112	2	62.8	
PTRVIR01	-100.80	2	-65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20
PTRVIR02	-109.80	2	-65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21
TCA00001	-115.80	2	-71.79	21.53	0.80	0.80	90	2	60.4	
USAEH001	-61.30	2	-85.16	36.21	5.63	3.32	22	2	61.8	1 5 6
USAEH002	-100.80	2	-89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20
USAEH003	-109.80	2	-90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

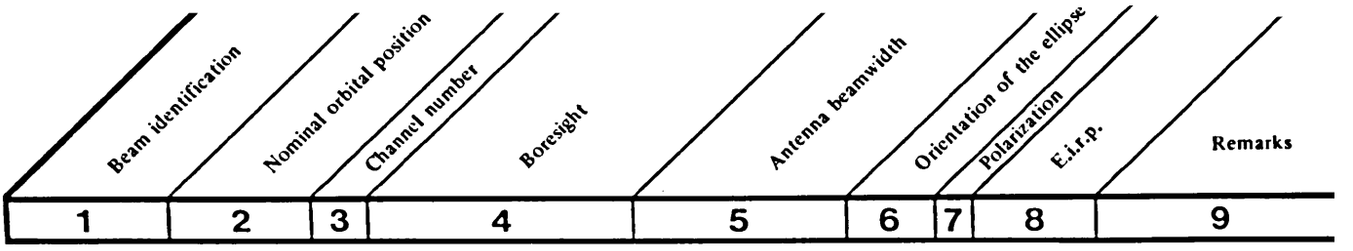
1	2	3	4		5		6	7	8	9
USAEH004	-118.80	2	-91.16	36.05	5.38	3.24	153	2	62.6	1 5 6
USAPSA02	-165.80	2	-117.79	40.58	4.04	0.82	135	2	63.2	9/GR1
USAPSA03	-174.80	2	-118.20	40.15	3.63	0.80	136	2	64.9	9/GR2
USAWH101	-147.80	2	-109.70	38.13	5.52	1.96	142	2	62.1	
USAWH102	-156.80	2	-111.40	38.57	5.51	1.55	138	2	63.2	
VCT00001	-79.30	2	-61.18	13.23	0.80	0.80	90	2	58.4	
VEN11VEN	-103.80	2	-66.79	6.90	2.50	1.77	122	2	65.1	

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
ALS00002	-166.20	3	-149.66	58.37	3.76	1.24	170	1	59.8	9/GR1
ALS00003	-175.20	3	-150.98	58.53	3.77	1.11	167	1	60.0	9/GR2
ARGINSU4	-94.20	3	-52.98	-59.81	3.40	0.80	19	1	59.9	9/GR3
ARGINSU5	-55.20	3	-44.17	-59.91	3.77	0.80	13	1	59.3	9/GR4
ARGSUK04	-94.20	3	-65.04	-43.33	3.32	1.50	40	1	60.7	9/GR3
ARGSUK05	-55.20	3	-63.68	-43.01	2.54	2.38	152	1	60.1	9/GR4
ATGSJN01	-79.70	3	-61.79	17.07	0.80	0.80	90	1	58.4	
B CE311	-64.20	3	-40.60	-6.07	3.04	2.06	174	1	61.6	8 9/GR7
B CE312	-45.20	3	-40.27	-6.06	3.44	2.09	174	1	61.0	8 9/GR9
B CE411	-64.20	3	-50.97	-15.27	3.86	1.38	49	1	62.6	8 9/GR7
B CE412	-45.20	3	-50.71	-15.30	3.57	1.56	52	1	62.7	8 9/GR9
B CE511	-64.20	3	-53.10	-2.90	2.44	2.13	104	1	63.1	8 9/GR7
B NO611	-74.20	3	-59.60	-11.62	2.85	1.69	165	2	62.9	8 9/GR8
B NO711	-74.20	3	-60.70	-1.78	3.54	1.78	126	2	62.8	8 9/GR8
B NO811	-74.20	3	-68.76	-4.71	2.37	1.65	73	2	62.8	8 9/GR8
B SU111	-81.20	3	-51.12	-25.63	2.76	1.05	50	1	62.9	8 9/GR6
B SU112	-45.20	3	-50.75	-25.62	2.47	1.48	56	1	62.3	8 9/GR9
B SU211	-81.20	3	-44.51	-16.95	3.22	1.36	60	1	62.5	8 9/GR6
B SU212	-45.20	3	-44.00	-16.87	3.20	1.96	58	1	61.3	8 9/GR9
BERBERMU	-96.20	3	-64.77	32.32	0.80	0.80	90	2	56.8	
BOLAND01	-115.20	3	-65.04	-16.76	2.49	1.27	76	1	67.9	9/GR5
BOL00001	-87.20	3	-64.61	-16.71	2.52	2.19	85	1	63.8	
BRB00001	-92.70	3	-59.85	12.93	0.80	0.80	90	2	59.1	
CAN01101	-138.20	3	-125.63	57.24	3.45	1.27	157	1	59.5	9/GR10
CAN01201	-138.20	3	-112.04	55.95	3.35	0.97	151	1	59.6	9/GR10
CAN01202	-72.70	3	-107.70	55.63	2.74	1.12	32	1	59.6	9/GR11
CAN01203	-129.20	3	-111.48	55.61	3.08	1.15	151	1	59.5	9/GR12
CAN01303	-129.20	3	-102.42	57.12	3.54	0.91	154	1	60.1	9/GR12

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
CAND1304	-91.20	3	-99.12	57.36	1.98	1.72	2	1	59.8	9/GR13
CAND1403	-129.20	3	-89.75	52.02	4.68	0.80	148	1	61.8	9/GR12
CAND1404	-91.20	3	-84.82	52.42	3.10	2.05	152	1	60.4	9/GR13
CAND1405	-82.20	3	-84.00	52.39	2.84	2.29	172	1	60.3	9/GR14
CAND1504	-91.20	3	-72.66	53.77	3.57	1.67	156	1	60.2	9/GR13
CAND1505	-82.20	3	-71.77	53.79	3.30	1.89	162	1	60.1	9/GR14
CAND1605	-82.20	3	-61.50	49.55	2.65	1.40	143	1	60.3	9/GR14
CAND1606	-70.70	3	-61.30	49.55	2.40	1.65	148	1	60.2	9/GR15
CHLCONT5	-106.20	3	-72.23	-35.57	2.60	0.80	55	1	59.4	9/GR17
CHLPAC02	-106.20	3	-80.06	-30.06	1.36	0.80	69	1	59.2	9/GR17
CLMAND01	-115.20	3	-74.72	5.93	3.85	1.63	114	1	65.0	9/GR5
CLM00001	-103.20	3	-74.50	5.87	3.98	1.96	118	1	63.6	
CUB00001	-89.20	3	-79.81	21.62	2.24	0.80	168	1	61.1	
EQACAND1	-115.20	3	-78.40	-1.61	1.37	0.95	75	1	64.1	9/GR5
EQAGAND1	-115.20	3	-90.34	-0.62	0.90	0.81	89	1	61.3	9/GR5
GRD00002	-42.20	3	-61.58	12.29	0.80	0.80	90	1	58.8	
GRD00059	-57.20	3	-61.58	12.29	0.80	0.80	90	1	58.5	
GRLDNKG1	-53.20	3	-44.89	66.56	2.70	0.82	173	1	60.0	2
HWA00002	-166.20	3	-165.79	23.42	4.20	0.80	160	1	58.8	9/GR1
HWA00003	-175.20	3	-166.10	23.42	4.25	0.80	159	1	58.8	9/GR2
MEX01NTE	-78.20	3	-105.81	26.01	2.89	2.08	155	1	60.5	1
MEX01SUR	-69.20	3	-94.84	19.82	3.05	2.09	4	1	62.3	1
MEX02NTE	-136.20	3	-107.21	26.31	3.84	1.55	148	1	61.2	1
MEX02SUR	-127.20	3	-96.39	19.88	3.18	1.87	157	1	62.6	1
PAQPAC01	-106.20	3	-109.18	-27.53	0.80	0.80	90	1	56.2	9/GR17
PRG00002	-99.20	3	-58.66	-23.32	1.45	1.04	76	1	60.2	
PRUAND02	-115.20	3	-74.69	-8.39	3.41	1.79	95	1	64.0	9/GR5
PTRVIR01	-101.20	3	-65.85	18.12	0.80	0.80	90	1	60.6	1 6 9/GR20

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
PTRVIRC2	-110.20	3	-65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21
SURINAM2	-84.70	3	-55.69	4.35	1.00	0.80	86	1	63.2	
URG00001	-71.70	3	-56.22	-32.52	1.02	0.89	11	1	60.0	
USAEH001	-61.70	3	-85.19	36.21	5.63	3.33	22	1	61.8	1 5 6
USAEH002	-101.20	3	-89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20
USAEH003	-110.20	3	-90.14	36.11	5.55	3.55	161	1	62.1	1 6 9/GR21
USAEH004	-119.20	3	-91.16	36.05	5.38	3.24	152	1	62.6	1 5 6
USAPSA02	-166.20	3	-117.80	40.58	4.03	0.82	135	1	63.3	9/GR1
USAPSA03	-175.20	3	-118.27	40.12	3.62	0.80	136	1	65.0	9/GR2
USAWH101	-148.20	3	-109.65	38.13	5.53	1.95	142	1	62.1	
USAWH102	-157.20	3	-111.41	38.57	5.51	1.54	138	1	63.2	
VENANDU3	-115.20	3	-67.04	6.91	2.37	1.43	111	1	67.3	9/GR5



1	2	3	4		5		6	7	8	9
ALS00002	-165.80	4	-149.63	58.52	3.81	1.23	171	2	59.8	9/GR1
ALS00003	-174.80	4	-150.95	58.54	3.77	1.11	167	2	60.0	9/GR2
ARGNORT4	-93.80	4	-63.96	-30.01	3.86	1.99	48	2	65.7	
ARGNORT5	-54.80	4	-62.85	-29.80	3.24	2.89	47	2	63.5	
B CE311	-63.80	4	-40.60	-6.07	3.04	2.06	174	2	61.6	8 9/GR7
B CE312	-44.80	4	-40.26	-6.06	3.44	2.09	174	2	61.0	8 9/GR9
B CE411	-63.80	4	-50.97	-15.26	3.86	1.38	49	2	62.6	8 9/GR7
B CE412	-44.80	4	-50.71	-15.30	3.57	1.56	52	2	62.8	8 9/GR9
B CE511	-63.80	4	-53.11	-2.98	2.42	2.15	107	2	63.1	8 9/GR7
B NO611	-73.80	4	-59.60	-11.62	2.86	1.69	165	1	62.9	8 9/GR8
B NO711	-73.80	4	-60.70	-1.78	3.54	1.78	126	1	62.8	8 9/GR8
B NO811	-73.80	4	-68.75	-4.71	2.37	1.65	73	1	62.8	8 9/GR8
B SE911	-101.80	4	-45.99	-19.09	2.22	0.80	62	2	65.3	8
B SU111	-80.80	4	-51.10	-25.64	2.76	1.06	50	2	62.9	8 9/GR6
B SU112	-44.80	4	-50.76	-25.62	2.47	1.48	56	2	62.3	8 9/GR9
B SU211	-80.80	4	-44.51	-16.94	3.22	1.37	60	2	62.5	8 9/GR6
B SU212	-44.80	4	-43.99	-16.97	3.27	1.92	59	2	61.3	8 9/GR9
CAN01101	-137.80	4	-125.60	57.24	3.45	1.27	157	2	59.5	9/GR10
CAN01201	-137.80	4	-111.92	55.89	3.33	0.98	151	2	59.6	9/GR10
CAN01202	-72.30	4	-107.64	55.62	2.75	1.11	32	2	59.6	9/GR11
CAN01203	-128.80	4	-111.43	55.56	3.07	1.15	151	2	59.5	9/GR12
CAN01303	-128.80	4	-102.39	57.12	3.54	0.92	154	2	60.1	9/GR12
CAN01304	-90.80	4	-99.00	57.33	1.96	1.73	1	2	59.8	9/GR13
CAN01403	-128.80	4	-89.70	52.02	4.67	0.80	148	2	61.8	9/GR12
CAN01404	-90.80	4	-84.78	52.41	3.09	2.06	153	2	60.4	9/GR13
CAN01405	-81.80	4	-84.02	52.34	2.82	2.30	172	2	60.3	9/GR14
CAN01504	-90.80	4	-72.68	53.78	3.57	1.67	157	2	60.2	9/GR13
CAN01505	-81.80	4	-71.76	53.76	3.30	1.89	162	2	60.2	9/GR14

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
CANO1605	-81.80	4	-61.54	49.50	2.66	1.39	144	2	60.3	9/GR14
CANO1606	-70.30	4	-61.32	49.51	2.41	1.65	148	2	60.2	9/GR15
CHLCONT4	-105.80	4	-69.59	-23.20	2.21	0.80	68	2	59.1	9/GR16
CHLCONT6	-105.80	4	-73.52	-55.52	3.65	1.31	39	2	59.6	9/GR16
CRBBAH01	-92.30	4	-76.09	24.13	1.83	0.80	141	1	61.7	9/GR18
CRBBER01	-92.30	4	-64.76	32.13	0.80	0.80	90	1	56.8	9/GR18
CRBBLZ01	-92.30	4	-88.61	17.26	0.80	0.80	90	1	58.7	9/GR18
CREECO01	-92.30	4	-60.07	8.26	4.20	0.86	115	1	64.3	9/GR18
CREJMC01	-92.30	4	-79.45	17.97	0.99	0.80	151	1	61.1	9/GR18
CYM00001	-115.80	4	-80.58	19.57	0.80	0.80	90	2	59.6	
DOMIFRB2	-83.30	4	-70.51	18.79	0.98	0.80	167	2	61.1	
EQAC0001	-94.80	4	-78.31	-1.52	1.48	1.15	65	1	63.0	9/GR19
EQAG0001	-94.80	4	-90.36	-0.57	0.94	0.89	99	1	61.0	9/GR19
GUFMGG02	-52.80	4	-56.42	8.47	4.16	0.81	123	2	62.7	2 7
HWA00002	-165.80	4	-165.79	23.32	4.20	0.80	160	2	58.8	9/GR1
HWA00003	-174.80	4	-166.10	23.42	4.25	0.80	159	2	58.8	9/GR2
JMC00005	-33.80	4	-77.27	18.12	0.80	0.80	90	2	60.6	
LCAIFRB1	-79.30	4	-61.15	13.90	0.80	0.80	90	2	58.4	
MEX01NTE	-77.80	4	-105.80	25.99	2.88	2.07	155	2	60.5	1
MEX02NTE	-135.80	4	-107.36	26.32	3.80	1.57	149	2	61.2	1
MEX02SUR	-126.80	4	-96.39	19.88	3.19	1.87	158	2	62.5	1
PRU00004	-85.80	4	-74.19	-8.39	3.74	2.45	112	2	62.9	
PTRVIR01	-100.80	4	-65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20
PTRVIR02	-109.80	4	-65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21
SLVIFRB2	-107.30	4	-88.91	13.59	0.80	0.80	90	1	61.7	
USAEH001	-61.30	4	-85.16	36.21	5.63	3.32	22	2	61.9	1 5 6
USAEH002	-100.80	4	-89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20
USAEH003	-109.80	4	-90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
USAEH004	-118.80	4	-91.16	36.05	5.38	3.24	153	2	62.6	1 5.6
USAPSA02	-165.80	4	-117.79	40.58	4.04	0.82	135	2	63.3	9/GR1
USAPSA03	-174.80	4	-118.20	40.15	3.63	0.80	136	2	65.0	9/GR2
USAWH101	-147.80	4	-109.70	38.13	5.52	1.96	142	2	62.1	
USAWH102	-156.80	4	-111.40	38.57	5.51	1.55	138	2	63.2	
VEN11VEN	-103.80	4	-66.79	6.90	2.50	1.77	122	2	65.2	

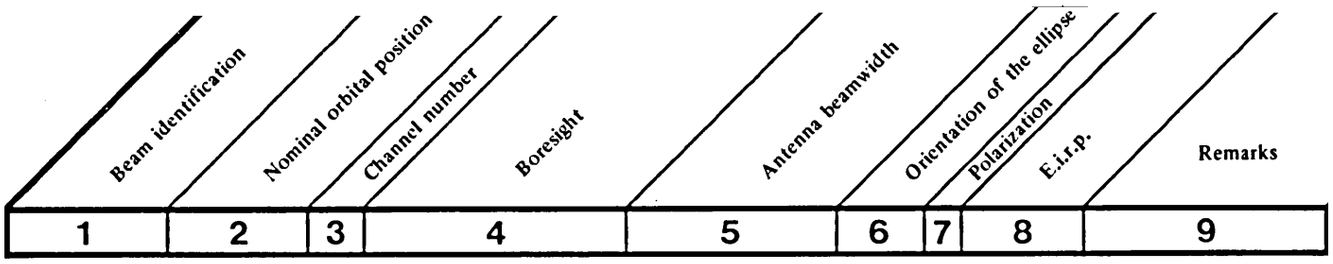
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
ALS00002	-166.20	5	-149.66	58.37	3.76	1.24	170	1	59.7	9/GR1
ALS00003	-175.20	5	-150.98	58.53	3.77	1.11	167	1	60.0	9/GR2
ARGINSU4	-94.20	5	-52.98	-59.81	3.40	0.80	19	1	59.9	9/GR3
ARGSUR04	-94.20	5	-65.04	-43.33	3.32	1.50	40	1	60.7	9/GR3
B CE311	-64.20	5	-40.60	-6.07	3.04	2.06	174	1	61.6	8 9/GR7
B CE312	-45.20	5	-40.27	-6.06	3.44	2.09	174	1	61.0	8 9/GR9
B CE411	-64.20	5	-50.97	-15.27	3.86	1.38	49	1	62.6	8 9/GR7
B CE412	-45.20	5	-50.71	-15.30	3.57	1.56	52	1	62.7	8 9/GR9
B CE511	-64.20	5	-53.10	-2.90	2.44	2.13	104	1	63.0	8 9/GR7
B NO611	-74.20	5	-59.60	-11.62	2.85	1.69	165	2	62.8	8 9/GR8
B NO711	-74.20	5	-60.70	-1.78	3.54	1.78	126	2	62.8	8 9/GR8
B NO811	-74.20	5	-68.76	-4.71	2.37	1.65	73	2	62.8	8 9/GR8
B SU111	-81.20	5	-51.12	-25.63	2.76	1.05	50	1	62.8	8 9/GR6
B SU112	-45.20	5	-50.75	-25.62	2.47	1.48	56	1	62.2	8 9/GR9
B SU211	-81.20	5	-44.51	-16.95	3.22	1.36	60	1	62.5	8 9/GR6
B SU212	-45.20	5	-44.00	-16.87	3.20	1.96	58	1	61.3	8 9/GR9
BAHIFRB1	-87.20	5	-76.06	24.16	1.81	0.80	142	1	61.6	
BERBERMU	-96.20	5	-64.77	32.32	0.80	0.80	90	2	56.8	
BERBER02	-31.00	5	-64.77	32.32	0.80	0.80	90	1	56.9	2 3
BOLAND01	-115.20	5	-65.04	-16.76	2.49	1.27	76	1	67.9	9/GR5
CAN01101	-138.20	5	-125.63	57.24	3.45	1.27	157	1	59.5	9/GR10
CAN01201	-138.20	5	-112.04	55.95	3.35	0.97	151	1	59.6	9/GR10
CAN012U2	-72.70	5	-107.70	55.63	2.74	1.12	32	1	59.6	9/GR11
CAN01203	-129.20	5	-111.48	55.61	3.08	1.15	151	1	59.5	9/GR12
CAN01303	-129.20	5	-102.42	57.12	3.54	0.91	154	1	60.0	9/GR12
CAN01304	-91.20	5	-99.12	57.36	1.98	1.72	2	1	59.8	9/GR13
CAN01403	-129.20	5	-89.75	52.02	4.68	0.80	148	1	61.8	9/GR12
CAN01404	-91.20	5	-84.82	52.42	3.10	2.05	152	1	60.4	9/GR13

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

1	2	3	4		5		6	7	8	9
CAN01405	-82.20	5	-84.00	52.39	2.84	2.29	172	1	60.3	9/GR14
CAN01504	-91.20	5	-72.66	53.77	3.57	1.67	156	1	60.2	9/GR13
CAN01505	-82.20	5	-71.77	53.79	3.30	1.89	162	1	60.1	9/GR14
CAN01605	-82.20	5	-61.50	49.55	2.65	1.40	143	1	60.3	9/GR14
CAN01606	-70.70	5	-61.30	49.55	2.40	1.65	148	1	60.2	9/GR15
CHLCONT5	-106.20	5	-72.23	-35.57	2.60	0.80	55	1	59.4	9/GR17
CHLPACC2	-106.20	5	-80.06	-30.06	1.36	0.80	69	1	59.2	9/GR17
CLMAND01	-115.20	5	-74.72	5.93	3.85	1.63	114	1	64.9	9/GR5
CLM00001	-103.20	5	-74.50	5.87	3.98	1.96	118	1	63.5	
EQACAND1	-115.20	5	-78.40	-1.61	1.37	0.95	75	1	64.0	9/GR5
EQAGAND1	-115.20	5	-90.34	-0.62	0.90	0.81	89	1	61.3	9/GR5
FLKANTU1	-57.20	5	-44.54	-60.13	3.54	0.80	12	1	59.3	2
FLKFALKS	-31.00	5	-59.90	-51.64	0.80	0.80	90	1	58.1	2 3
GRD00002	-42.20	5	-61.58	12.29	0.80	0.80	90	1	58.8	
HWA00002	-166.20	5	-165.79	23.42	4.20	0.80	160	1	58.8	9/GR1
HWA00003	-175.20	5	-166.10	23.42	4.25	0.80	159	1	58.8	9/GR2
MEX01NTE	-78.20	5	-105.81	26.01	2.89	2.08	155	1	60.5	1
MEX01SUR	-69.20	5	-94.84	19.82	3.05	2.09	4	1	62.2	1
MEX02NTE	-136.20	5	-107.21	26.31	3.84	1.55	148	1	61.2	1
MEX02SUR	-127.20	5	-96.39	19.88	3.18	1.87	157	1	62.5	1
PAQPAC01	-106.20	5	-109.18	-27.53	0.80	0.80	90	1	56.2	9/GR17
PRG00002	-99.20	5	-58.66	-23.32	1.45	1.04	76	1	60.2	
PRUAND02	-115.20	5	-74.69	-8.39	3.41	1.79	95	1	63.9	9/GR5
PTRVIR01	-101.20	5	-65.85	18.12	0.80	0.80	90	1	60.5	1 6 9/GR20
PTRVIR02	-110.20	5	-65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21
SPMFRAN3	-53.20	5	-67.24	47.51	3.16	0.80	7	1	60.4	2 7
TRD00001	-84.70	5	-61.23	10.70	0.80	0.80	90	1	59.4	
URG00001	-71.70	5	-56.22	-32.52	1.02	0.89	11	1	60.0	

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
USAEH001	-61.70	5	-85.19	36.21	5.63	3.33	22	1	61.8	1 5 6
USAEH002	-101.20	5	-89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20
USAEH003	-110.20	5	-90.14	36.11	5.55	3.55	161	1	62.0	1 6 9/GR21
USAEH004	-119.20	5	-91.16	36.05	5.38	3.24	152	1	62.6	1 5 6
USAPSA02	-166.20	5	-117.80	40.58	4.03	0.82	135	1	63.2	9/GR1
USAPSA03	-175.20	5	-118.27	40.12	3.62	0.80	136	1	65.0	9/GR2
USAWH101	-148.20	5	-109.65	38.13	5.53	1.95	142	1	62.1	
USAWH102	-157.20	5	-111.41	38.57	5.51	1.54	138	1	63.2	
VENAND03	-115.20	5	-67.04	6.91	2.37	1.43	111	1	67.2	9/GR5
VRG00001	-79.70	5	-64.37	18.48	0.80	0.80	90	1	58.3	4



1	2	3	4		5		6	7	8	9
ALS00002	-165.80	6	-149.63	58.52	3.81	1.23	171	2	59.7	9/GR1
ALS00003	-174.80	6	-150.95	58.54	3.77	1.11	167	2	60.0	9/GR2
ARGNORT4	-93.80	6	-63.96	-30.01	3.86	1.99	48	2	65.6	
ARGNORT5	-54.80	6	-62.85	-29.80	3.24	2.89	47	2	63.5	
ATNBEAM1	-52.80	6	-66.44	14.87	1.83	0.80	39	2	61.0	
B CE311	-63.80	6	-40.60	-6.07	3.04	2.06	174	2	61.6	8 9/GR7
B CE312	-44.80	6	-40.26	-6.06	3.44	2.09	174	2	61.0	8 9/GR9
B CE411	-63.80	6	-50.97	-15.26	3.86	1.38	49	2	62.6	8 9/GR7
B CE412	-44.80	6	-50.71	-15.30	3.57	1.56	52	2	62.7	8 9/GR9
B CE511	-63.80	6	-53.11	-2.98	2.42	2.15	107	2	63.1	8 9/GR7
B NO611	-73.80	6	-59.60	-11.62	2.86	1.69	165	1	62.8	8 9/GR8
B NO711	-73.80	6	-60.70	-1.78	3.54	1.78	126	1	62.8	8 9/GR8
B NO811	-73.80	6	-68.75	-4.71	2.37	1.65	73	1	62.8	8 9/GR8
B SE911	-101.80	6	-45.99	-19.09	2.22	0.80	62	2	65.3	8
B SU111	-80.80	6	-51.10	-25.64	2.76	1.06	50	2	62.8	8 9/GR6
B SU112	-44.80	6	-50.76	-25.62	2.47	1.48	56	2	62.3	8 9/GR9
B SU211	-80.80	6	-44.51	-16.94	3.22	1.37	60	2	62.5	8 9/GR6
B SU212	-44.80	6	-43.99	-16.97	3.27	1.92	59	2	61.3	8 9/GR9
CAN01101	-137.80	6	-125.60	57.24	3.45	1.27	157	2	59.5	9/GR10
CAN01201	-137.80	6	-111.92	55.89	3.33	0.98	151	2	59.6	9/GR10
CAN01202	-72.30	6	-107.64	55.62	2.75	1.11	32	2	59.6	9/GR11
CAN01203	-128.80	6	-111.43	55.56	3.07	1.15	151	2	59.5	9/GR12
CAN01303	-128.80	6	-102.39	57.12	3.54	0.92	154	2	60.0	9/GR12
CAN01304	-90.80	6	-99.00	57.33	1.96	1.73	1	2	59.8	9/GR13
CAN01403	-128.80	6	-89.70	52.02	4.67	0.80	148	2	61.8	9/GR12
CAN01404	-90.80	6	-84.78	52.41	3.09	2.06	153	2	60.4	9/GR13
CAN01405	-81.80	6	-84.02	52.34	2.82	2.30	172	2	60.3	9/GR14
CAN01504	-90.80	6	-72.68	53.78	3.57	1.67	157	2	60.2	9/GR13

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
CAND1505	-81.80	6	-71.76	53.76	3.30	1.89	162	2	60.1	9/GR14
CAND1605	-81.80	6	-61.54	49.50	2.66	1.39	144	2	60.3	9/GR14
CAND1606	-70.30	6	-61.32	49.51	2.41	1.65	148	2	60.2	9/GR15
CHLCONT4	-105.80	6	-69.59	-23.20	2.21	0.80	68	2	59.1	9/GR16
CHLCONT6	-105.80	6	-73.52	-55.52	3.65	1.31	39	2	59.6	9/GR16
CRBBAH01	-92.30	6	-76.09	24.13	1.83	0.80	141	1	61.7	9/GR18
CRBBER01	-92.30	6	-64.76	32.13	0.80	0.80	90	1	56.7	9/GR18
CRBBLZ01	-92.30	6	-88.61	17.26	0.80	0.80	90	1	58.6	9/GR18
CRBECOU1	-92.30	6	-60.07	8.26	4.20	0.86	115	1	64.2	9/GR18
CREJMC01	-92.30	6	-79.45	17.97	0.99	0.80	151	1	61.1	9/GR18
CTR00201	-130.80	6	-84.33	9.67	0.82	0.80	119	2	65.6	
EQACU001	-94.80	6	-78.31	-1.52	1.48	1.15	65	1	63.0	9/GR19
EQAG0001	-94.80	6	-90.36	-0.57	0.94	0.89	99	1	61.0	9/GR19
GUY00302	-33.80	6	-59.07	4.77	1.43	0.85	91	2	63.5	
HNDIFRB2	-107.30	6	-86.23	15.16	1.14	0.85	8	1	63.4	
HTI00C02	-83.30	6	-73.28	18.96	0.82	0.80	11	2	60.9	
HWA00002	-165.80	6	-165.79	23.32	4.20	0.80	160	2	58.8	9/GR1
HWA00003	-174.80	6	-166.10	23.42	4.25	0.80	159	2	58.8	9/GR2
MEX01NTE	-77.80	6	-105.80	25.99	2.88	2.07	155	2	60.5	1
MEX02NTE	-135.80	6	-107.36	26.32	3.80	1.57	149	2	61.2	1
MEX02SUR	-126.80	6	-96.39	19.88	3.19	1.87	158	2	62.5	1
PRU00004	-85.80	6	-74.19	-8.39	3.74	2.45	112	2	62.8	
PTRVIR01	-100.80	6	-65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20
PTRVIR02	-109.80	6	-65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21
TCA00001	-115.80	6	-71.79	21.53	0.80	0.80	90	2	60.4	
USAEH001	-61.30	6	-85.16	36.21	5.63	3.32	22	2	61.8	1 5 6
USAEH002	-100.80	6	-89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20
USAEH003	-109.80	6	-90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
USAEH004	-118.80	6	-91.16	36.05	5.38	3.24	153	2	62.6	1 5 6
USAPSA02	-165.80	6	-117.79	40.58	4.04	0.82	135	2	63.2	9/GR1
USAPSA03	-174.80	6	-118.20	40.15	3.63	0.80	136	2	64.9	9/GR2
USAWH101	-147.80	6	-109.70	38.13	5.52	1.96	142	2	62.1	
USAWH102	-156.80	6	-111.40	38.57	5.51	1.55	138	2	63.2	
VCTU0001	-79.30	6	-61.18	13.23	0.80	0.80	90	2	58.4	
VEN11VEN	-103.80	6	-66.79	6.90	2.50	1.77	122	2	65.1	

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
ALS00002	-166.20	7	-149.66	58.37	3.76	1.24	170	1	59.8	9/GR1
ALS00003	-175.20	7	-150.98	58.53	3.77	1.11	167	1	60.0	9/GR2
ARGINSU4	-94.20	7	-52.98	-59.81	3.40	0.80	19	1	59.9	9/GR3
ARGINSU5	-55.20	7	-44.17	-59.91	3.77	0.80	13	1	59.3	9/GR4
ARGSUR04	-94.20	7	-65.04	-43.33	3.32	1.50	40	1	60.7	9/GR3
ARGSUR05	-55.20	7	-63.68	-43.01	2.54	2.38	152	1	60.1	9/GR4
ATGSJN01	-79.70	7	-61.79	17.07	0.80	0.80	90	1	58.4	
B CE311	-64.20	7	-40.60	-6.07	3.04	2.06	174	1	61.6	8 9/GR7
B CE312	-45.20	7	-40.27	-6.06	3.44	2.09	174	1	61.0	8 9/GR9
B CE411	-64.20	7	-50.97	-15.27	3.86	1.38	49	1	62.6	8 9/GR7
B CE412	-45.20	7	-50.71	-15.30	3.57	1.56	52	1	62.7	8 9/GR9
B CE511	-64.20	7	-53.10	-2.90	2.44	2.13	104	1	63.1	8 9/GR7
B NO611	-74.20	7	-59.60	-11.62	2.85	1.69	165	2	62.9	8 9/GR8
B NO711	-74.20	7	-60.70	-1.78	3.54	1.78	126	2	62.8	8 9/GR8
B NO811	-74.20	7	-68.76	-4.71	2.37	1.65	73	2	62.8	8 9/GR8
B SU111	-81.20	7	-51.12	-25.63	2.76	1.05	50	1	62.9	8 9/GR6
B SU112	-45.20	7	-50.75	-25.62	2.47	1.48	56	1	62.3	8 9/GR9
B SU211	-81.20	7	-44.51	-16.95	3.22	1.36	60	1	62.5	8 9/GR6
B SU212	-45.20	7	-44.00	-16.87	3.20	1.96	58	1	61.3	8 9/GR9
BERBERMU	-96.20	7	-64.77	32.32	0.80	0.80	90	2	56.8	
BOLAND01	-115.20	7	-65.04	-16.76	2.49	1.27	76	1	67.9	9/GR5
BOL00001	-87.20	7	-64.61	-16.71	2.52	2.19	85	1	63.8	
BRB00001	-92.70	7	-59.85	12.93	0.80	0.80	90	2	59.1	
CAN01101	-138.20	7	-125.63	57.24	3.45	1.27	157	1	59.5	9/GR10
CAN01201	-138.20	7	-112.04	55.95	3.35	0.97	151	1	59.6	9/GR10
CAN01202	-72.70	7	-107.70	55.63	2.74	1.12	32	1	59.6	9/GR11
CAN01203	-129.20	7	-111.48	55.61	3.08	1.15	151	1	59.5	9/GR12
CAN01303	-129.20	7	-102.42	57.12	3.54	0.91	154	1	60.1	9/GR12

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
CAN01304	-91.20	7	-99.12	57.36	1.98	1.72	2	1	59.8	9/GR13
CAN01403	-129.20	7	-89.75	52.02	4.68	0.80	148	1	61.8	9/GR12
CAN01404	-91.20	7	-84.82	52.42	3.10	2.05	152	1	60.4	9/GR13
CAN01405	-82.20	7	-84.00	52.39	2.84	2.29	172	1	60.3	9/GR14
CAN01504	-91.20	7	-72.66	53.77	3.57	1.67	156	1	60.2	9/GR13
CAN01505	-82.20	7	-71.77	53.79	3.30	1.89	162	1	60.1	9/GR14
CAN01605	-82.20	7	-61.50	49.55	2.65	1.40	143	1	60.3	9/GR14
CAN01606	-70.70	7	-61.30	49.55	2.40	1.65	148	1	60.2	9/GR15
CHLCONT5	-106.20	7	-72.23	-35.57	2.60	0.80	55	1	59.4	9/GR17
CHLPAC02	-106.20	7	-80.06	-30.06	1.36	0.80	69	1	59.2	9/GR17
CLMAND01	-115.20	7	-74.72	5.93	3.85	1.63	114	1	65.0	9/GR5
CLM00001	-103.20	7	-74.50	5.87	3.98	1.96	118	1	63.6	
CUB00001	-89.20	7	-79.81	21.62	2.24	0.80	168	1	61.1	
EQACAND1	-115.20	7	-78.40	-1.61	1.37	0.95	75	1	64.1	9/GR5
EQAGAND1	-115.20	7	-90.34	-0.62	0.90	0.81	89	1	61.3	9/GR5
GRD00002	-42.20	7	-61.58	12.29	0.80	0.80	90	1	58.8	
GRD00059	-57.20	7	-61.58	12.29	0.80	0.80	90	1	58.5	
GRLDNK01	-53.20	7	-44.89	66.56	2.70	0.82	173	1	60.0	2
HWA00002	-166.20	7	-165.79	23.42	4.20	0.80	160	1	58.8	9/GR1
HWA00003	-175.20	7	-166.10	23.42	4.25	0.80	159	1	58.8	9/GR2
MEX01NTE	-78.20	7	-105.81	26.01	2.89	2.08	155	1	60.5	1
MEX01SUR	-69.20	7	-94.84	19.82	3.05	2.09	4	1	62.3	1
MEX02NTE	-136.20	7	-107.21	26.31	3.84	1.55	148	1	61.2	1
MEX02SUR	-127.20	7	-96.39	19.88	3.18	1.87	157	1	62.6	1
PACPAC01	-106.20	7	-109.18	-27.53	0.80	0.80	90	1	56.2	9/GR17
PRG00002	-99.20	7	-58.66	-23.32	1.45	1.04	76	1	60.2	
PRUAND02	-115.20	7	-74.69	-8.39	3.41	1.79	95	1	64.0	9/GR5
PTRVIF01	-101.20	7	-65.85	18.12	0.80	0.80	90	1	60.6	1 6 9/GR20

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
PTRVIR02	-110.20	7	-65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21
SURINAM2	-84.70	7	-55.69	4.35	1.00	0.80	86	1	63.2	
UPG00001	-71.70	7	-56.22	-32.52	1.02	0.89	11	1	60.0	
USAEH001	-61.70	7	-85.19	36.21	5.63	3.33	22	1	61.8	1 5 6
USAEH002	-101.20	7	-89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20
USAEH003	-110.20	7	-90.14	36.11	5.55	3.55	161	1	62.1	1 6 9/GR21
USAEH004	-119.20	7	-91.16	36.05	5.38	3.24	152	1	62.6	1 5 6
USAPSA02	-166.20	7	-117.80	40.58	4.03	0.82	135	1	63.3	9/GR1
USAPSA03	-175.20	7	-118.27	40.12	3.62	0.80	136	1	65.0	9/GR2
USAWH101	-148.20	7	-109.65	38.13	5.53	1.95	142	1	62.1	
USAWH102	-157.20	7	-111.41	38.57	5.51	1.54	138	1	63.2	
VENAND03	-115.20	7	-67.04	6.91	2.37	1.43	111	1	67.3	9/GR5

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
ALS00002	-165.80	8	-149.63	58.52	3.81	1.23	171	2	59.8	9/GR1
ALS00003	-174.80	8	-150.95	58.54	3.77	1.11	167	2	60.0	9/GR2
ARGNORT4	-93.80	8	-63.96	-30.01	3.86	1.99	48	2	65.7	
ARGNORT5	-54.80	8	-62.85	-29.80	3.24	2.89	47	2	63.5	
B CE311	-63.80	8	-40.60	-6.07	3.04	2.06	174	2	61.6	8 9/GR7
B CE312	-44.80	8	-40.26	-6.06	3.44	2.09	174	2	61.0	8 9/GR9
B CE411	-63.80	8	-50.97	-15.26	3.86	1.38	49	2	62.6	8 9/GR7
B CE412	-44.80	8	-50.71	-15.30	3.57	1.56	52	2	62.8	8 9/GR9
B CE511	-63.80	8	-53.11	-2.98	2.42	2.15	107	2	63.1	8 9/GR7
B NO611	-73.80	8	-59.60	-11.62	2.86	1.69	165	1	62.9	8 9/GR8
B NO711	-73.80	8	-60.70	-1.78	3.54	1.78	126	1	62.8	8 9/GR8
B NO811	-73.80	8	-68.75	-4.71	2.37	1.65	73	1	62.8	8 9/GR8
B SE911	-101.80	8	-45.99	-19.09	2.22	0.80	62	2	65.3	8
B SU111	-80.80	8	-51.10	-25.64	2.76	1.06	50	2	62.9	8 9/GR6
B SU112	-44.80	8	-50.76	-25.62	2.47	1.48	56	2	62.3	8 9/GR9
B SU211	-80.80	8	-44.51	-16.94	3.22	1.37	60	2	62.5	8 9/GR6
B SU212	-44.80	8	-43.99	-16.97	3.27	1.92	59	2	61.3	8 9/GR9
CAN01101	-137.80	8	-125.60	57.24	3.45	1.27	157	2	59.5	9/GR10
CAN01201	-137.80	8	-111.92	55.89	3.33	0.98	151	2	59.6	9/GR10
CAN01202	-72.30	8	-107.64	55.62	2.75	1.11	32	2	59.6	9/GR11
CAN01203	-128.80	8	-111.43	55.56	3.07	1.15	151	2	59.5	9/GR12
CAN01303	-128.80	8	-102.39	57.12	3.54	0.92	154	2	60.1	9/GR12
CAN01304	-90.80	8	-99.00	57.33	1.96	1.73	1	2	59.8	9/GR13
CAN01403	-128.80	8	-89.70	52.02	4.67	0.80	148	2	61.8	9/GR12
CAN01404	-90.80	8	-84.78	52.41	3.09	2.06	153	2	60.4	9/GR13
CAN01405	-81.80	8	-84.02	52.34	2.82	2.30	172	2	60.3	9/GR14
CAN01504	-90.80	8	-72.68	53.78	3.57	1.67	157	2	60.2	9/GR13
CAN01505	-81.80	8	-71.76	53.76	3.30	1.89	162	2	60.2	9/GR14

1	2	3	4		5		6	7	8	9
	Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
CAN01605	-81.80	8	-61.54	49.50	2.66	1.39	144	2	60.3	9/GR14
CAN01606	-70.30	8	-61.32	49.51	2.41	1.65	148	2	60.2	9/GR15
CHLCONT4	-105.80	8	-69.59	-23.20	2.21	0.80	68	2	59.1	9/GR16
CHLCONT6	-105.80	8	-73.52	-55.52	3.65	1.31	39	2	59.6	9/GR16
CRBBAH01	-92.30	8	-76.09	24.13	1.83	0.80	141	1	61.7	9/GR18
CRBBER01	-92.30	8	-64.76	32.13	0.80	0.80	90	1	56.8	9/GR18
CRBBLZ01	-92.30	8	-88.61	17.26	0.80	0.80	90	1	58.7	9/GR18
CRBEC001	-92.30	8	-60.07	8.26	4.20	0.86	115	1	64.3	9/GR18
CRBJMC01	-92.30	8	-79.45	17.97	0.99	0.80	151	1	61.1	9/GR18
CYM00001	-115.80	8	-80.58	19.57	0.80	0.80	90	2	59.6	
DOMIFRB2	-83.30	8	-70.51	18.79	0.98	0.80	167	2	61.1	
EGAC0001	-94.80	8	-78.31	-1.52	1.48	1.15	65	1	63.0	9/GR19
EGAGU001	-94.80	8	-90.36	-0.57	0.94	0.89	99	1	61.0	9/GR19
GUFMG602	-52.80	8	-56.42	8.47	4.16	0.81	123	2	62.7	2 7
HWA00002	-165.80	8	-165.79	23.32	4.20	0.80	160	2	58.8	9/GR1
HWA00003	-174.80	8	-166.10	23.42	4.25	0.80	159	2	58.8	9/GR2
JMC00005	-33.80	8	-77.27	18.12	0.80	0.80	90	2	60.6	
LCAIFRB1	-79.30	8	-61.15	13.90	0.80	0.80	90	2	58.4	
MEX01NTE	-77.80	8	-105.80	25.99	2.88	2.07	155	2	60.5	1
MEX02NTE	-135.80	8	-107.36	26.32	3.80	1.57	149	2	61.2	1
MEX02SUR	-126.80	8	-96.39	19.88	3.19	1.87	158	2	62.5	1
PRU00004	-85.80	8	-74.19	-8.39	3.74	2.45	112	2	62.9	
PTRVIR01	-100.80	8	-65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20
PTRVIR02	-109.80	8	-65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21
SLVIFRB2	-107.30	8	-88.91	13.59	0.80	0.80	90	1	61.7	
USAEH001	-61.30	8	-85.16	36.21	5.63	3.32	22	2	61.9	1 5 6
USAEH002	-100.80	8	-89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20
USAEH003	-109.80	8	-90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21

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Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

1	2	3	4		5		6	7	8	9
USAEH004	-118.80	8	-91.16	36.05	5.38	3.24	153	2	62.6	1 5 6
USAPSA02	-165.80	8	-117.79	40.58	4.04	0.82	135	2	63.3	9/GR1
USAPSA03	-174.80	8	-118.20	40.15	3.63	0.80	136	2	65.0	9/GR2
USAWH101	-147.80	8	-109.70	38.13	5.52	1.96	142	2	62.1	
USAWH102	-156.80	8	-111.40	38.57	5.51	1.55	138	2	63.2	
VEN11VEN	-103.80	8	-66.79	6.90	2.50	1.77	122	2	65.2	

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-166.20	9	-149.66	58.37	3.76	1.24	170	1	59.7	9/GR1
ALS00003	-175.20	9	-150.98	58.53	3.77	1.11	167	1	60.0	9/GR2
ARGINSU4	-94.20	9	-52.98	-59.81	3.40	0.80	19	1	59.9	9/GR3
ARGSURC4	-94.20	9	-65.04	-43.33	3.32	1.50	40	1	60.7	9/GR3
B CE311	-64.20	9	-40.60	-6.07	3.04	2.06	174	1	61.6	8 9/GR7
B CE312	-45.20	9	-40.27	-6.06	3.44	2.09	174	1	61.0	8 9/GR9
B CE411	-64.20	9	-50.97	-15.27	3.86	1.38	49	1	62.6	8 9/GR7
B CE412	-45.20	9	-50.71	-15.30	3.57	1.56	52	1	62.7	8 9/GR9
B CE511	-64.20	9	-53.10	-2.90	2.44	2.13	104	1	63.0	8 9/GR7
B NO611	-74.20	9	-59.60	-11.62	2.85	1.69	165	2	62.8	8 9/GR8
B NO711	-74.20	9	-60.70	-1.78	3.54	1.78	126	2	62.8	8 9/GR8
B NO811	-74.20	9	-68.76	-4.71	2.37	1.65	73	2	62.8	8 9/GR8
B SU111	-81.20	9	-51.12	-25.63	2.76	1.05	50	1	62.8	8 9/GR6
B SU112	-45.20	9	-50.75	-25.62	2.47	1.48	56	1	62.2	8 9/GR9
B SU211	-81.20	9	-44.51	-16.95	3.22	1.36	60	1	62.5	8 9/GR6
B SU212	-45.20	9	-44.00	-16.87	3.20	1.96	58	1	61.3	8 9/GR9
BAHIFRB1	-87.20	9	-76.06	24.16	1.81	0.80	142	1	61.6	
BERBERMU	-96.20	9	-64.77	32.32	0.80	0.80	90	2	56.8	
BERBER02	-31.00	9	-64.77	32.32	0.80	0.80	90	1	56.9	2 3
BOLAND01	-115.20	9	-65.04	-16.76	2.49	1.27	76	1	67.9	9/GR5
CAN01101	-138.20	9	-125.63	57.24	3.45	1.27	157	1	59.5	9/GR10
CAN01201	-138.20	9	-112.04	55.95	3.35	0.97	151	1	59.6	9/GR10
CAN01202	-72.70	9	-107.70	55.63	2.74	1.12	32	1	59.6	9/GR11
CAN01203	-129.20	9	-111.48	55.61	3.08	1.15	151	1	59.5	9/GR12
CAN01303	-129.20	9	-102.42	57.12	3.54	0.91	154	1	60.0	9/GR12
CAN01304	-91.20	9	-99.12	57.36	1.98	1.72	2	1	59.8	9/GR13
CAN01403	-129.20	9	-89.75	52.02	4.68	0.80	148	1	61.8	9/GR12
CAN01404	-91.20	9	-84.82	52.42	3.10	2.05	152	1	60.4	9/GR13

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
CAND1405	-82.20	9	-84.00	52.39	2.84	2.29	172	1	60.3	9/GR14
CAND1504	-91.20	9	-72.66	53.77	3.57	1.67	156	1	60.2	9/GR13
CAND1505	-82.20	9	-71.77	53.79	3.30	1.89	162	1	60.1	9/GR14
CAND1605	-82.20	9	-61.50	49.55	2.65	1.40	143	1	60.3	9/GR14
CAND1606	-70.70	9	-61.30	49.55	2.40	1.65	148	1	60.2	9/GR15
CHLCONT5	-106.20	9	-72.23	-35.57	2.60	0.80	55	1	59.4	9/GR17
CHLPAC02	-106.20	9	-80.06	-30.06	1.36	0.80	69	1	59.2	9/GR17
CLMAND01	-115.20	9	-74.72	5.93	3.85	1.63	114	1	64.9	9/GR5
CLM00001	-103.20	9	-74.50	5.87	3.98	1.96	118	1	63.5	
EQACAND1	-115.20	9	-78.40	-1.61	1.37	0.95	75	1	64.0	9/GR5
EQAGAND1	-115.20	9	-90.34	-0.62	0.90	0.81	89	1	61.3	9/GR5
FLKANT01	-57.20	9	-44.54	-60.13	3.54	0.80	12	1	59.3	2
FLKFALKS	-31.00	9	-59.90	-51.64	0.80	0.80	90	1	58.1	2 3
GRD00002	-42.20	9	-61.58	12.29	0.80	0.80	90	1	58.8	
HWA00002	-166.20	9	-165.79	23.42	4.20	0.80	160	1	58.8	9/GR1
HWA00003	-175.20	9	-166.10	23.42	4.25	0.80	159	1	58.8	9/GR2
MEX01NTE	-78.20	9	-105.81	26.01	2.89	2.08	155	1	60.5	1
MEX01SUR	-69.20	9	-94.84	19.82	3.05	2.09	4	1	62.2	1
MEX02NTE	-136.20	9	-107.21	26.31	3.84	1.55	148	1	61.2	1
MEX02SUR	-127.20	9	-96.39	19.88	3.18	1.87	157	1	62.5	1
PAQPAC01	-106.20	9	-109.18	-27.53	0.80	0.80	90	1	56.2	9/GR17
PRG00002	-99.20	9	-58.66	-23.32	1.45	1.04	76	1	60.2	
PRUAND02	-115.20	9	-74.69	-8.39	3.41	1.79	95	1	63.9	9/GR5
PTRVIRC1	-101.20	9	-65.85	18.12	0.80	0.80	90	1	60.5	1 6 9/GR20
PTRVIR02	-110.20	9	-65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21
SPMFRAN3	-53.20	9	-67.24	47.51	3.16	0.80	7	1	60.4	2 7
TRD00001	-84.70	9	-61.23	10.70	0.80	0.80	90	1	59.4	
URG00001	-71.70	9	-56.22	-32.52	1.02	0.89	11	1	60.0	

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
USAEH001	-61.70	9	-85.19	36.21	5.63	3.33	22	1	61.8	1 5 6
USAEH002	-101.20	9	-89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20
USAEH003	-110.20	9	-90.14	36.11	5.55	3.55	161	1	62.0	1 6 9/GR21
USAEH004	-119.20	9	-91.16	36.05	5.38	3.24	152	1	62.6	1 5 6
USAPSA02	-166.20	9	-117.80	40.58	4.03	0.82	135	1	63.2	9/GR1
USAPSA03	-175.20	9	-118.27	40.12	3.62	0.80	136	1	65.0	9/GR2
USAWH101	-148.20	9	-109.65	38.13	5.53	1.95	142	1	62.1	
USAWH102	-157.20	9	-111.41	38.57	5.51	1.54	138	1	63.2	
VENAND03	-115.20	9	-67.04	6.91	2.37	1.43	111	1	67.2	9/GR5
VRG00001	-79.70	9	-64.37	18.48	0.80	0.80	90	1	58.3	4

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	10	-149.63	58.52	3.81	1.23	171	2	59.7	9/GR1
ALS00003	-174.80	10	-150.95	58.54	3.77	1.11	167	2	60.0	9/GR2
ARGNORT4	-93.80	10	-63.96	-30.01	3.86	1.99	48	2	65.6	
ARGNORT5	-54.80	10	-62.85	-29.80	3.24	2.89	47	2	63.5	
ATNBEAM1	-52.80	10	-66.44	14.87	1.83	0.80	39	2	61.0	
B CE311	-63.80	10	-40.60	-6.07	3.04	2.06	174	2	61.6	8 9/GR7
B CE312	-44.80	10	-40.26	-6.06	3.44	2.09	174	2	61.0	8 9/GR9
B CE411	-63.80	10	-50.97	-15.26	3.86	1.38	49	2	62.6	8 9/GR7
B CE412	-44.80	10	-50.71	-15.30	3.57	1.56	52	2	62.7	8 9/GR9
B CE511	-63.80	10	-53.11	-2.98	2.42	2.15	107	2	63.1	8 9/GR7
B NO611	-73.80	10	-59.60	-11.62	2.86	1.69	165	1	62.8	8 9/GR8
B NO711	-73.80	10	-60.70	-1.78	3.54	1.78	126	1	62.8	8 9/GR8
B NO811	-73.80	10	-68.75	-4.71	2.37	1.65	73	1	62.8	8 9/GR8
B SE911	-101.80	10	-45.99	-19.09	2.22	0.80	62	2	65.3	8
B SU111	-80.80	10	-51.10	-25.64	2.76	1.06	50	2	62.8	8 9/GR6
B SU112	-44.80	10	-50.76	-25.62	2.47	1.48	56	2	62.3	8 9/GR9
B SU211	-80.80	10	-44.51	-16.94	3.22	1.37	60	2	62.5	8 9/GR6
B SU212	-44.80	10	-43.99	-16.97	3.27	1.92	59	2	61.3	8 9/GR9
CAN01101	-137.80	10	-125.60	57.24	3.45	1.27	157	2	59.5	9/GR10
CAN01201	-137.80	10	-111.92	55.89	3.33	0.98	151	2	59.6	9/GR10
CAN01202	-72.30	10	-107.64	55.62	2.75	1.11	32	2	59.6	9/GR11
CAN01203	-128.80	10	-111.43	55.56	3.07	1.15	151	2	59.5	9/GR12
CAN01303	-128.80	10	-102.39	57.12	3.54	0.92	154	2	60.0	9/GR12
CAN01304	-90.80	10	-99.00	57.33	1.96	1.73	1	2	59.8	9/GR13
CAN01403	-128.80	10	-89.70	52.02	4.67	0.80	148	2	61.8	9/GR12
CAN01404	-90.80	10	-84.78	52.41	3.09	2.06	153	2	60.4	9/GR13
CAN01405	-81.80	10	-84.02	52.34	2.82	2.30	172	2	60.3	9/GR14
CAN01504	-90.80	10	-72.68	53.78	3.57	1.67	157	2	60.2	9/GR13

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

1	2	3	4		5		6	7	8	9
CAN01505	-81.80	10	-71.76	53.76	3.30	1.89	162	2	60.1	9/GR14
CAN01605	-81.80	10	-61.54	49.50	2.66	1.39	144	2	60.3	9/GR14
CAN01606	-70.30	10	-61.32	49.51	2.41	1.65	148	2	60.2	9/GR15
CHLCONT4	-105.80	10	-69.59	-23.20	2.21	0.80	68	2	59.1	9/GR16
CHLCONT6	-105.80	10	-73.52	-55.52	3.65	1.31	39	2	59.6	9/GR16
CRBBAH01	-92.30	10	-76.09	24.13	1.83	0.80	141	1	61.7	9/GR18
CRBBER01	-92.30	10	-64.76	32.13	0.80	0.80	90	1	56.7	9/GR18
CRBBLZ01	-92.30	10	-88.61	17.26	0.80	0.80	90	1	58.6	9/GR18
CRBEC001	-92.30	10	-60.07	8.26	4.20	0.86	115	1	64.2	9/GR18
CRBJMC01	-92.30	10	-79.45	17.97	0.99	0.80	151	1	61.1	9/GR18
CTR00201	-130.80	10	-84.33	9.67	0.82	0.80	119	2	65.6	
EQACU0G1	-94.80	10	-78.31	-1.52	1.48	1.15	65	1	63.0	9/GR19
EQAG0001	-94.80	10	-90.36	-0.57	0.94	0.89	99	1	61.0	9/GR19
GUY00302	-33.80	10	-59.07	4.77	1.43	0.85	91	2	63.5	
HNDIFRB2	-107.30	10	-86.23	15.16	1.14	0.85	8	1	63.4	
HTI00002	-83.30	10	-73.28	18.96	0.82	0.80	11	2	60.9	
HWA00002	-165.80	10	-165.79	23.32	4.20	0.80	160	2	58.8	9/GR1
HWA00003	-174.80	10	-166.10	23.42	4.25	0.80	159	2	58.8	9/GR2
MEX01NTE	-77.80	10	-105.80	25.99	2.88	2.07	155	2	60.5	1
MEX02NTE	-135.80	10	-107.36	26.32	3.80	1.57	149	2	61.2	1
MEX02SUR	-126.80	10	-96.39	19.88	3.19	1.87	158	2	62.5	1
PRU00004	-85.80	10	-74.19	-8.39	3.74	2.45	112	2	62.8	
PTRVIR01	-100.80	10	-65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20
PTRVIR02	-109.80	10	-65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21
TCA00001	-115.80	10	-71.79	21.53	0.80	0.80	90	2	60.4	
USAEH001	-61.30	10	-85.16	36.21	5.63	3.32	22	2	61.8	1 5 6
USAEH002	-100.80	10	-89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20
USAEH003	-109.80	10	-90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

1	2	3	4		5		6	7	8	9
USAEH004	-118.80	10	-91.16	36.05	5.38	3.24	153	2	62.6	1 5 6
USAPSA02	-165.80	10	-117.79	40.58	4.04	0.82	135	2	63.2	9/GR1
USAPSA03	-174.80	10	-118.20	40.15	3.63	0.80	136	2	64.9	9/GR2
USAWH101	-147.80	10	-109.70	38.13	5.52	1.96	142	2	62.1	
USAWH102	-156.80	10	-111.40	38.57	5.51	1.55	138	2	63.2	
VCT00001	-79.30	10	-61.18	13.23	0.80	0.80	90	2	58.4	
VEN11VEN	-103.80	10	-66.79	6.90	2.50	1.77	122	2	65.1	

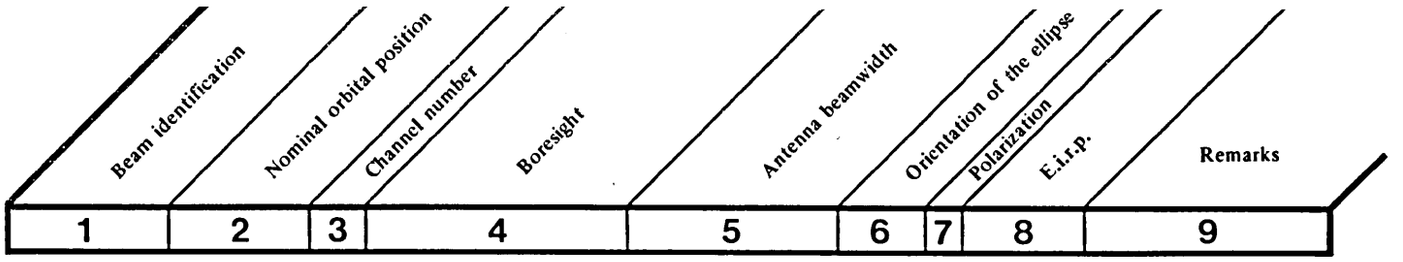
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-166.20	11	-149.66	58.37	3.76	1.24	170	1	59.8	9/GR1
ALS00003	-175.20	11	-150.98	58.53	3.77	1.11	167	1	60.0	9/GR2
ARGINSU4	-94.20	11	-52.98	-59.81	3.40	0.80	19	1	59.9	9/GR3
ARGINSU5	-55.20	11	-44.17	-59.91	3.77	0.80	13	1	59.3	9/GR4
ARGSUR04	-94.20	11	-65.04	-43.33	3.32	1.50	40	1	60.7	9/GR3
ARGSUR05	-55.20	11	-63.68	-43.01	2.54	2.38	152	1	60.1	9/GR4
ATGSJN01	-79.70	11	-61.79	17.07	0.80	0.80	90	1	58.4	
B CE311	-64.20	11	-40.60	-6.07	3.04	2.06	174	1	61.6	8 9/GR7
B CE312	-45.20	11	-40.27	-6.06	3.44	2.09	174	1	61.0	8 9/GR9
B CE411	-64.20	11	-50.97	-15.27	3.86	1.38	49	1	62.6	8 9/GR7
B CE412	-45.20	11	-50.71	-15.30	3.57	1.56	52	1	62.7	8 9/GR9
B CE511	-64.20	11	-53.10	-2.90	2.44	2.13	104	1	63.1	8 9/GR7
B NO611	-74.20	11	-59.60	-11.62	2.85	1.69	165	2	62.9	8 9/GR8
B NO711	-74.20	11	-60.70	-1.78	3.54	1.78	126	2	62.8	8 9/GR8
B NO811	-74.20	11	-68.76	-4.71	2.37	1.65	73	2	62.8	8 9/GR8
B SU111	-81.20	11	-51.12	-25.63	2.76	1.05	50	1	62.9	8 9/GR6
B SU112	-45.20	11	-50.75	-25.62	2.47	1.48	56	1	62.3	8 9/GR9
B SU211	-81.20	11	-44.51	-16.95	3.22	1.36	60	1	62.5	8 9/GR6
B SU212	-45.20	11	-44.00	-16.87	3.20	1.96	58	1	61.3	8 9/GR9
BERBERMU	-96.20	11	-64.77	32.32	0.80	0.80	90	2	56.8	
BOLAND01	-115.20	11	-65.04	-16.76	2.49	1.27	76	1	67.9	9/GR5
BOL00001	-87.20	11	-64.61	-16.71	2.52	2.19	85	1	63.8	
BRB00001	-92.70	11	-59.85	12.93	0.80	0.80	90	2	59.1	
CAN01101	-138.20	11	-125.63	57.24	3.45	1.27	157	1	59.5	9/GR10
CAN01201	-138.20	11	-112.04	55.95	3.35	0.97	151	1	59.6	9/GR10
CAN01202	-72.70	11	-107.70	55.63	2.74	1.12	32	1	59.6	9/GR11
CAN01203	-129.20	11	-111.48	55.61	3.08	1.15	151	1	59.5	9/GR12
CAN01303	-129.20	11	-102.42	57.12	3.54	0.91	154	1	60.1	9/GR12

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
CAN01304	-91.20	11	-99.12	57.36	1.98	1.72	2	1	59.8	9/GR13
CAN01403	-129.20	11	-89.75	52.02	4.68	0.80	148	1	61.8	9/GR12
CAN01404	-91.20	11	-84.82	52.42	3.10	2.05	152	1	60.4	9/GR13
CAN01405	-82.20	11	-84.00	52.39	2.84	2.29	172	1	60.3	9/GR14
CAN01504	-91.20	11	-72.66	53.77	3.57	1.67	156	1	60.2	9/GR13
CAN01505	-82.20	11	-71.77	53.79	3.30	1.89	162	1	60.1	9/GR14
CAN01605	-82.20	11	-61.50	49.55	2.65	1.40	143	1	60.3	9/GR14
CAN01606	-70.70	11	-61.30	49.55	2.40	1.65	148	1	60.2	9/GR15
CHLCONT5	-106.20	11	-72.23	-35.57	2.60	0.80	55	1	59.4	9/GR17
CHLPAC02	-106.20	11	-80.06	-30.06	1.36	0.80	69	1	59.2	9/GR17
CLMAND01	-115.20	11	-74.72	5.93	3.85	1.63	114	1	65.0	9/GR5
CLM00001	-103.20	11	-74.50	5.87	3.98	1.96	118	1	63.6	
CUB00001	-89.20	11	-79.81	21.62	2.24	0.80	168	1	61.1	
EQACAN01	-115.20	11	-78.40	-1.61	1.37	0.95	75	1	64.1	9/GR5
EQAGAN01	-115.20	11	-90.34	-0.62	0.90	0.81	89	1	61.3	9/GR5
GRD00002	-42.20	11	-61.58	12.29	0.80	0.80	90	1	58.8	
GRD00059	-57.20	11	-61.58	12.29	0.80	0.80	90	1	58.5	
GRLDNK01	-53.20	11	-44.89	66.56	2.70	0.82	173	1	60.0	2
GUY00201	-84.70	11	-59.19	4.78	1.44	0.85	95	1	63.5	
HWA00002	-166.20	11	-165.79	23.42	4.20	0.80	160	1	58.8	9/GR1
HWA00003	-175.20	11	-166.10	23.42	4.25	0.80	159	1	58.8	9/GR2
MEX01NTE	-78.20	11	-105.81	26.01	2.89	2.08	155	1	60.5	1
MEX01SUR	-69.20	11	-94.84	19.82	3.05	2.09	4	1	62.3	1
MEX02NTE	-136.20	11	-107.21	26.31	3.84	1.55	148	1	61.2	1
MEX02SUR	-127.20	11	-96.39	19.88	3.18	1.87	157	1	62.6	1
PAQPAC01	-106.20	11	-109.18	-27.53	0.80	0.80	90	1	56.2	9/GR17
PRG00002	-99.20	11	-58.66	-23.32	1.45	1.04	76	1	60.2	
PRUAND02	-115.20	11	-74.69	-8.39	3.41	1.79	95	1	64.0	9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9



1	2	3	4		5		6	7	8	9
PTRVIR01	-101.20	11	-65.85	18.12	0.80	0.80	90	1	60.6	1 6 9/GR20
PTRVIR02	-110.20	11	-65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21
URG00001	-71.70	11	-56.22	-32.52	1.02	0.89	11	1	60.0	
USAEH001	-61.70	11	-85.19	36.21	5.63	3.33	22	1	61.8	1 5 6
USAEH002	-101.20	11	-89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20
USAEH003	-110.20	11	-90.14	36.11	5.55	3.55	161	1	62.1	1 6 9/GR21
USAEH004	-119.20	11	-91.16	36.05	5.38	3.24	152	1	62.6	1 5 6
USAPSA02	-166.20	11	-117.80	40.58	4.03	0.82	135	1	63.3	9/GR1
USAPSA03	-175.20	11	-118.27	40.12	3.62	0.80	136	1	65.0	9/GR2
USAWH101	-148.20	11	-109.65	38.13	5.53	1.95	142	1	62.1	
USAWH102	-157.20	11	-111.41	38.57	5.51	1.54	138	1	63.2	
VENAND03	-115.20	11	-67.04	6.91	2.37	1.43	111	1	67.3	9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	12	-149.63	58.52	3.81	1.23	171	2	59.8	9/GR1
ALS00003	-174.80	12	-150.95	58.54	3.77	1.11	167	2	60.0	9/GR2
ARGNORT4	-93.80	12	-63.96	-30.01	3.86	1.99	48	2	65.7	
ARGNORT5	-54.80	12	-62.85	-29.80	3.24	2.89	47	2	63.5	
B CE311	-63.80	12	-40.60	-6.07	3.04	2.06	174	2	61.6	8 9/GR7
B CE312	-44.80	12	-40.26	-6.06	3.44	2.09	174	2	61.0	8 9/GR9
B CE411	-63.80	12	-50.97	-15.26	3.86	1.38	49	2	62.6	8 9/GR7
B CE412	-44.80	12	-50.71	-15.30	3.57	1.56	52	2	62.8	8 9/GR9
B CE511	-63.80	12	-53.11	-2.98	2.42	2.15	107	2	63.1	8 9/GR7
B NO611	-73.80	12	-59.60	-11.62	2.86	1.69	165	1	62.9	8 9/GR8
B NO711	-73.80	12	-60.70	-1.78	3.54	1.78	126	1	62.8	8 9/GR8
B NO811	-73.80	12	-68.75	-4.71	2.37	1.65	73	1	62.8	8 9/GR8
B SE911	-101.80	12	-45.99	-19.09	2.22	0.80	62	2	65.3	8
B SU111	-80.80	12	-51.10	-25.64	2.76	1.06	50	2	62.9	8 9/GR6
B SU112	-44.80	12	-50.76	-25.62	2.47	1.48	56	2	62.3	8 9/GR9
B SU211	-80.80	12	-44.51	-16.94	3.22	1.37	60	2	62.5	8 9/GR6
B SU212	-44.80	12	-43.99	-16.97	3.27	1.92	59	2	61.3	8 9/GR9
CAN01101	-137.80	12	-125.60	57.24	3.45	1.27	157	2	59.5	9/GR10
CAN01201	-137.80	12	-111.92	55.89	3.33	0.98	151	2	59.6	9/GR10
CAN01202	-72.30	12	-107.64	55.62	2.75	1.11	32	2	59.6	9/GR11
CAN01203	-128.80	12	-111.43	55.56	3.07	1.15	151	2	59.5	9/GR12
CAN01303	-128.80	12	-102.39	57.12	3.54	0.92	154	2	60.1	9/GR12
CAN01304	-90.80	12	-99.00	57.33	1.96	1.73	1	2	59.8	9/GR13
CAN01403	-128.80	12	-89.70	52.02	4.67	0.80	148	2	61.8	9/GR12
CAN01404	-90.80	12	-84.78	52.41	3.09	2.06	153	2	60.4	9/GR13
CAN01405	-81.80	12	-84.02	52.34	2.82	2.30	172	2	60.3	9/GR14
CAN01504	-90.80	12	-72.68	53.78	3.57	1.67	157	2	60.2	9/GR13
CAN01505	-81.80	12	-71.76	53.76	3.30	1.89	162	2	60.2	9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
CAN01605	-81.80	12	-61.54	49.50	2.66	1.39	144	2	60.3	9/GR14
CAN01606	-70.30	12	-61.32	49.51	2.41	1.65	148	2	60.2	9/GR15
CHLCONT4	-105.80	12	-69.59	-23.20	2.21	0.80	68	2	59.1	9/GR16
CHLCONT6	-105.80	12	-73.52	-55.52	3.65	1.31	39	2	59.6	9/GR16
CRBBAH01	-92.30	12	-76.09	24.13	1.83	0.80	141	1	61.7	9/GR18
CRBBEA01	-92.30	12	-64.76	32.13	0.80	0.80	90	1	56.8	9/GR18
CRBBLZ01	-92.30	12	-88.61	17.26	0.80	0.80	90	1	58.7	9/GR18
CRBECD01	-92.30	12	-60.07	8.26	4.20	0.86	115	1	64.3	9/GR18
CRBJMC01	-92.30	12	-79.45	17.97	0.99	0.80	151	1	61.1	9/GR18
CYM00001	-115.80	12	-80.58	19.57	0.80	0.80	90	2	59.6	
DOMIFRB2	-83.30	12	-70.51	18.79	0.98	0.80	167	2	61.1	
EQAC0001	-94.80	12	-78.31	-1.52	1.48	1.15	65	1	63.0	9/GR19
EQAG0001	-94.80	12	-90.36	-0.57	0.94	0.89	99	1	61.0	9/GR19
GUFMGG02	-52.80	12	-56.42	8.47	4.16	0.81	123	2	62.7	2 7
HWA00002	-165.80	12	-165.79	23.32	4.20	0.80	160	2	58.8	9/GR1
HWA00003	-174.80	12	-166.10	23.42	4.25	0.80	159	2	58.8	9/GR2
JMC00005	-33.80	12	-77.27	18.12	0.80	0.80	90	2	60.6	
LCAIFFB1	-79.30	12	-61.15	13.90	0.80	0.80	90	2	58.4	
MEX01NTE	-77.80	12	-105.80	25.99	2.88	2.07	155	2	60.5	1
MEX02NTE	-135.80	12	-107.36	26.32	3.80	1.57	149	2	61.2	1
MEX02SUR	-126.80	12	-96.39	19.88	3.19	1.87	158	2	62.5	1
PRU00004	-85.80	12	-74.19	-8.39	3.74	2.45	112	2	62.9	
PTRVIR01	-100.80	12	-65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20
PTRVIR02	-109.80	12	-65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21
SLVIFRB2	-107.30	12	-88.91	13.59	0.80	0.80	90	1	61.7	
USAEH001	-61.30	12	-85.16	36.21	5.63	3.32	22	2	61.9	1 5 6
USAEH002	-100.80	12	-89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20
USAEH003	-109.80	12	-90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
USAEH004	-118.80	12	-91.16	36.05	5.38	3.24	153	2	62.6	1 5 6
USAPSA02	-165.80	12	-117.79	40.58	4.04	0.82	135	2	63.3	9/GR1
USAPSA03	-174.80	12	-118.20	40.15	3.63	0.80	136	2	65.0	9/GR2
USAWH101	-147.80	12	-109.70	38.13	5.52	1.96	142	2	62.1	
USAWH102	-156.80	12	-111.40	38.57	5.51	1.55	138	2	63.2	
VEN11VEN	-103.80	12	-66.79	6.90	2.50	1.77	122	2	65.2	

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
ALS00002	-166.20	13	-149.66	58.37	3.76	1.24	170	1	59.7	9/GR1
ALS00003	-175.20	13	-150.98	58.53	3.77	1.11	167	1	60.0	9/GR2
ARGINSU4	-94.20	13	-52.98	-59.81	3.40	0.80	19	1	59.9	9/GR3
ARGSUR04	-94.20	13	-65.04	-43.33	3.32	1.50	40	1	60.7	9/GR3
B CE311	-64.20	13	-40.60	-6.07	3.04	2.06	174	1	61.6	8 9/GR7
B CE312	-45.20	13	-40.27	-6.06	3.44	2.09	174	1	61.0	8 9/GR9
B CE411	-64.20	13	-50.97	-15.27	3.86	1.38	49	1	62.6	8 9/GR7
B CE412	-45.20	13	-50.71	-15.30	3.57	1.56	52	1	62.7	8 9/GR9
B CE511	-64.20	13	-53.10	-2.90	2.44	2.13	104	1	63.0	8 9/GR7
B NO611	-74.20	13	-59.60	-11.62	2.85	1.69	165	2	62.8	8 9/GR8
B NO711	-74.20	13	-60.70	-1.78	3.54	1.78	126	2	62.8	8 9/GR8
B NO811	-74.20	13	-68.76	-4.71	2.37	1.65	73	2	62.8	8 9/GR8
B SU111	-81.20	13	-51.12	-25.63	2.76	1.05	50	1	62.8	8 9/GR6
B SU112	-45.20	13	-50.75	-25.62	2.47	1.48	56	1	62.2	8 9/GR9
B SU211	-81.20	13	-44.51	-16.95	3.22	1.36	60	1	62.5	8 9/GR6
B SU212	-45.20	13	-44.00	-16.87	3.20	1.96	58	1	61.3	8 9/GR9
BAHIFRB1	-87.20	13	-76.06	24.16	1.81	0.80	142	1	61.6	
BERBERMU	-96.20	13	-64.77	32.32	0.80	0.80	90	2	56.8	
BERBER02	-31.00	13	-64.77	32.32	0.80	0.80	90	1	56.9	2 3
BOLAND01	-115.20	13	-65.04	-16.76	2.49	1.27	76	1	67.9	9/GR5
CAN01101	-138.20	13	-125.63	57.24	3.45	1.27	157	1	59.5	9/GR10
CAN01201	-138.20	13	-112.04	55.95	3.35	0.97	151	1	59.6	9/GR10
CAN01202	-72.70	13	-107.70	55.63	2.74	1.12	32	1	59.6	9/GR11
CAN01203	-129.20	13	-111.48	55.61	3.08	1.15	151	1	59.5	9/GR12
CAN01303	-129.20	13	-102.42	57.12	3.54	0.91	154	1	60.0	9/GR12
CAN01304	-91.20	13	-99.12	57.36	1.98	1.72	2	1	59.8	9/GR13
CAN01403	-129.20	13	-89.75	52.02	4.68	0.80	148	1	61.8	9/GR12
CAN01404	-91.20	13	-84.82	52.42	3.10	2.05	152	1	60.4	9/GR13

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
CAND1405	-82.20	13	-84.00	52.39	2.84	2.29	172	1	60.3	9/GR14
CAND1504	-91.20	13	-72.66	53.77	3.57	1.67	156	1	60.2	9/GR13
CAND1505	-82.20	13	-71.77	53.79	3.30	1.89	162	1	60.1	9/GR14
CAND1605	-82.20	13	-61.50	49.55	2.65	1.40	143	1	60.3	9/GR14
CAND1606	-70.70	13	-61.30	49.55	2.40	1.65	148	1	60.2	9/GR15
CHLCONT5	-106.20	13	-72.23	-35.57	2.60	0.80	55	1	59.4	9/GR17
CHLPAC02	-106.20	13	-80.06	-30.06	1.36	0.80	69	1	59.2	9/GR17
CLMAND01	-115.20	13	-74.72	5.93	3.85	1.63	114	1	64.9	9/GR5
CLM00001	-103.20	13	-74.50	5.87	3.98	1.96	118	1	63.5	
EGACAND1	-115.20	13	-78.40	-1.61	1.37	0.95	75	1	64.0	9/GR5
EQAGAND1	-115.20	13	-90.34	-0.62	0.90	0.81	89	1	61.3	9/GR5
FLKANT01	-57.20	13	-44.54	-60.13	3.54	0.80	12	1	59.3	2
FLKFALKS	-31.00	13	-59.90	-51.64	0.80	0.80	90	1	58.1	2 3
GRD00002	-42.20	13	-61.58	12.29	0.80	0.80	90	1	58.8	
HWA00002	-166.20	13	-165.79	23.42	4.20	0.80	160	1	58.8	9/GR1
HWA00003	-175.20	13	-166.10	23.42	4.25	0.80	159	1	58.8	9/GR2
MEX01NTE	-78.20	13	-105.81	26.01	2.89	2.08	155	1	60.5	1
MEX01SUR	-69.20	13	-94.84	19.82	3.05	2.09	4	1	62.2	1
MEX02NTE	-136.20	13	-107.21	26.31	3.84	1.55	148	1	61.2	1
MEX02SUR	-127.20	13	-96.39	19.88	3.18	1.87	157	1	62.5	1
PAGPAC01	-106.20	13	-109.18	-27.53	0.80	0.80	90	1	56.2	9/GR17
PRG00002	-99.20	13	-58.66	-23.32	1.45	1.04	76	1	60.2	
PRUAND02	-115.20	13	-74.69	-8.39	3.41	1.79	95	1	63.9	9/GR5
PTRVIR01	-101.20	13	-65.85	18.12	0.80	0.80	90	1	60.5	1 6 9/GR20
PTRVIR02	-110.20	13	-65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21
SPMFRAN3	-53.20	13	-67.24	47.51	3.16	0.80	7	1	60.4	2 7
TRD00001	-84.70	13	-61.23	10.70	0.80	0.80	90	1	59.4	
URG00001	-71.70	13	-56.22	-32.52	1.02	0.89	11	1	60.0	

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
USAEH001	-61.70	13	-85.19	36.21	5.63	3.33	22	1	61.8	1 5 6
USAEH002	-101.20	13	-89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20
USAEH003	-110.20	13	-90.14	36.11	5.55	3.55	161	1	62.0	1 6 9/GR21
USAEH004	-119.20	13	-91.16	36.05	5.38	3.24	152	1	62.6	1 5 6
USAPSA02	-166.20	13	-117.80	40.58	4.03	0.82	135	1	63.2	9/GR1
USAPSA03	-175.20	13	-118.27	40.12	3.62	0.80	136	1	65.0	9/GR2
USAWH101	-148.20	13	-109.65	38.13	5.53	1.95	142	1	62.1	
USAWH102	-157.20	13	-111.41	38.57	5.51	1.54	138	1	63.2	
VENAND03	-115.20	13	-67.04	6.91	2.37	1.43	111	1	67.2	9/GR5
VRGOOOO1	-79.70	13	-64.37	18.48	0.80	0.80	90	1	58.3	4

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	14	-149.63	58.52	3.81	1.23	171	2	59.7	9/GR1
ALS00003	-174.80	14	-150.95	58.54	3.77	1.11	167	2	60.0	9/GR2
ARGNORT4	-93.80	14	-63.96	-30.01	3.86	1.99	48	2	65.6	
ARGNORT5	-54.80	14	-62.85	-29.80	3.24	2.89	47	2	63.5	
ATNBEAM1	-52.80	14	-66.44	14.87	1.83	0.80	39	2	61.0	
B CE311	-63.80	14	-40.60	-6.07	3.04	2.06	174	2	61.6	8 9/GR7
B CE312	-44.80	14	-40.26	-6.06	3.44	2.09	174	2	61.0	8 9/GR9
B CE411	-63.80	14	-50.97	-15.26	3.86	1.38	49	2	62.6	8 9/GR7
B CE412	-44.80	14	-50.71	-15.30	3.57	1.56	52	2	62.7	8 9/GR9
B CE511	-63.80	14	-53.11	-2.98	2.42	2.15	107	2	63.1	8 9/GR7
B NO611	-73.80	14	-59.60	-11.62	2.86	1.69	165	1	62.8	8 9/GR8
B NO711	-73.80	14	-60.70	-1.78	3.54	1.78	126	1	62.8	8 9/GR8
B NO811	-73.80	14	-68.75	-4.71	2.37	1.65	73	1	62.8	8 9/GR8
B SE911	-101.80	14	-45.99	-19.09	2.22	0.80	62	2	65.3	8
B SU111	-80.80	14	-51.10	-25.64	2.76	1.06	50	2	62.8	8 9/GR6
B SU112	-44.80	14	-50.76	-25.62	2.47	1.48	56	2	62.3	8 9/GR9
B SU211	-80.80	14	-44.51	-16.94	3.22	1.37	60	2	62.5	8 9/GR6
B SU212	-44.80	14	-43.99	-16.97	3.27	1.92	59	2	61.3	8 9/GR9
CAN01101	-137.80	14	-125.60	57.24	3.45	1.27	157	2	59.5	9/GR10
CAN01201	-137.80	14	-111.92	55.89	3.33	0.98	151	2	59.6	9/GR10
CAN01202	-72.30	14	-107.64	55.62	2.75	1.11	32	2	59.6	9/GR11
CAN01203	-128.80	14	-111.43	55.56	3.07	1.15	151	2	59.5	9/GR12
CAN01303	-128.80	14	-102.39	57.12	3.54	0.92	154	2	60.0	9/GR12
CAN01304	-90.80	14	-99.00	57.33	1.96	1.73	1	2	59.8	9/GR13
CAN01403	-128.80	14	-89.70	52.02	4.67	0.80	148	2	61.8	9/GR12
CAN01404	-90.80	14	-84.78	52.41	3.09	2.06	153	2	60.4	9/GR13
CAN01405	-81.80	14	-84.02	52.34	2.82	2.30	172	2	60.3	9/GR14
CAN01504	-90.80	14	-72.68	53.78	3.57	1.67	157	2	60.2	9/GR13

1	2	3	4		5		6	7	8	9
	Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
CAN01505	-81.80	14	-71.76	53.76	3.30	1.89	162	2	60.1	9/GR14
CAN01605	-81.80	14	-61.54	49.50	2.66	1.39	144	2	60.3	9/GR14
CAN01606	-70.30	14	-61.32	49.51	2.41	1.65	148	2	60.2	9/GR15
CHLCONT4	-105.80	14	-69.59	-23.20	2.21	0.80	68	2	59.1	9/GR16
CHLCONT6	-105.80	14	-73.52	-55.52	3.65	1.31	39	2	59.6	9/GR16
CRBBAH01	-92.30	14	-76.09	24.13	1.83	0.80	141	1	61.7	9/GR18
CRBBLR01	-92.30	14	-64.76	32.13	0.80	0.80	90	1	56.7	9/GR18
CRBBLZ01	-92.30	14	-88.61	17.26	0.80	0.80	90	1	58.6	9/GR18
CRBEC001	-92.30	14	-60.07	8.26	4.20	0.86	115	1	64.2	9/GR18
CRBJMC01	-92.30	14	-79.45	17.97	0.99	0.80	151	1	61.1	9/GR18
CTR00201	-130.80	14	-84.33	9.67	0.82	0.80	119	2	65.6	
EQAC0001	-94.80	14	-78.31	-1.52	1.48	1.15	65	1	63.0	9/GR19
EQAG0001	-94.80	14	-90.36	-0.57	0.94	0.89	99	1	61.0	9/GR19
GUY00302	-33.80	14	-59.07	4.77	1.43	0.85	91	2	63.5	
HNDIFRB2	-107.30	14	-86.23	15.16	1.14	0.85	8	1	63.4	
HTI00002	-83.30	14	-73.28	18.96	0.82	0.80	11	2	60.9	
HWA00002	-165.80	14	-165.79	23.32	4.20	0.80	160	2	58.8	9/GR1
HWA00003	-174.80	14	-166.10	23.42	4.25	0.80	159	2	58.8	9/GR2
MEX01NTE	-77.80	14	-105.80	25.99	2.88	2.07	155	2	60.5	1
MEX02NTE	-135.80	14	-107.36	26.32	3.80	1.57	149	2	61.2	1
MEX02SUR	-126.80	14	-96.39	19.88	3.19	1.87	158	2	62.5	1
PRU00004	-85.80	14	-74.19	-8.39	3.74	2.45	112	2	62.8	
PTRVIR01	-100.80	14	-65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20
PTRVIR02	-109.80	14	-65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21
TCA00001	-115.80	14	-71.79	21.53	0.80	0.80	90	2	60.4	
USAEH001	-61.30	14	-85.16	36.21	5.63	3.32	22	2	61.8	1 5 6
USAEH002	-100.80	14	-89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20
USAEH003	-109.80	14	-90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
USAEH004	-118.80	14	-91.16	36.05	5.38	3.24	153	2	62.6	1 5 6
USAPSA02	-165.80	14	-117.79	40.58	4.04	0.82	135	2	63.2	9/GR1
USAPSA03	-174.80	14	-118.20	40.15	3.63	0.80	136	2	64.9	9/GR2
USAWH101	-147.80	14	-109.70	38.13	5.52	1.96	142	2	62.1	
USAWH102	-156.80	14	-111.40	38.57	5.51	1.55	138	2	63.2	
VCTOOC01	-79.30	14	-61.18	13.23	0.80	0.80	90	2	58.4	
VEN11VEN	-103.80	14	-66.79	6.90	2.50	1.77	122	2	65.1	

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
ALS00002	-166.20	15	-149.66	58.37	3.76	1.24	170	1	59.8	9/GR1
ALS00003	-175.20	15	-150.98	58.53	3.77	1.11	167	1	60.0	9/GR2
ARGINSU4	-94.20	15	-52.98	-59.81	3.40	0.80	19	1	59.9	9/GR3
ARGINSU5	-55.20	15	-44.17	-59.91	3.77	0.80	13	1	59.3	9/GR4
ARGSUR04	-94.20	15	-65.04	-43.33	3.32	1.50	40	1	60.7	9/GR3
ARGSUR05	-55.20	15	-63.68	-43.01	2.54	2.38	152	1	60.1	9/GR4
ATGSJN01	-79.70	15	-61.79	17.07	0.80	0.80	90	1	58.4	
B CE311	-64.20	15	-40.60	-6.07	3.04	2.06	174	1	61.6	8 9/GR7
B CE312	-45.20	15	-40.27	-6.06	3.44	2.09	174	1	61.0	8 9/GR9
B CE411	-64.20	15	-50.97	-15.27	3.86	1.38	49	1	62.6	8 9/GR7
B CE412	-45.20	15	-50.71	-15.30	3.57	1.56	52	1	62.7	8 9/GR9
B CE511	-64.20	15	-53.10	-2.90	2.44	2.13	104	1	63.1	8 9/GR7
B NO611	-74.20	15	-59.60	-11.62	2.85	1.69	165	2	62.9	8 9/GR8
B NO711	-74.20	15	-60.70	-1.78	3.54	1.78	126	2	62.8	8 9/GR8
B NO811	-74.20	15	-68.76	-4.71	2.37	1.65	73	2	62.8	8 9/GR8
B SU111	-81.20	15	-51.12	-25.63	2.76	1.05	50	1	62.9	8 9/GR6
B SU112	-45.20	15	-50.75	-25.62	2.47	1.48	56	1	62.3	8 9/GR9
B SU211	-81.20	15	-44.51	-16.95	3.22	1.36	60	1	62.5	8 9/GR6
B SU212	-45.20	15	-44.00	-16.87	3.20	1.96	58	1	61.3	8 9/GR9
BERBERMU	-96.20	15	-64.77	32.32	0.80	0.80	90	2	56.8	
BOLAND01	-115.20	15	-65.04	-16.76	2.49	1.27	76	1	67.9	9/GR5
BOL00001	-87.20	15	-64.61	-16.71	2.52	2.19	85	1	63.8	
BRBU0001	-92.70	15	-59.85	12.93	0.80	0.80	90	2	59.1	
CAN01101	-138.20	15	-125.63	57.24	3.45	1.27	157	1	59.5	9/GR10
CAN01201	-138.20	15	-112.04	55.95	3.35	0.97	151	1	59.6	9/GR10
CAN01202	-72.70	15	-107.70	55.63	2.74	1.12	32	1	59.6	9/GR11
CAN01203	-129.20	15	-111.48	55.61	3.08	1.15	151	1	59.5	9/GR12
CAN01303	-129.20	15	-102.42	57.12	3.54	0.91	154	1	60.1	9/GR12

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
CAN01304	-91.20	15	-99.12	57.36	1.98	1.72	2	1	59.8	9/GR13
CAN01403	-129.20	15	-89.75	52.02	4.68	0.80	148	1	61.8	9/GR12
CAN01404	-91.20	15	-84.82	52.42	3.10	2.05	152	1	60.4	9/GR13
CAN01405	-82.20	15	-84.00	52.39	2.84	2.29	172	1	60.3	9/GR14
CAN01504	-91.20	15	-72.66	53.77	3.57	1.67	156	1	60.2	9/GR13
CAN01505	-82.20	15	-71.77	53.79	3.30	1.89	162	1	60.1	9/GR14
CAN01605	-82.20	15	-61.50	49.55	2.65	1.40	143	1	60.3	9/GR14
CAN01606	-70.70	15	-61.30	49.55	2.40	1.65	148	1	60.2	9/GR15
CHLCONT5	-106.20	15	-72.23	-35.57	2.60	0.80	55	1	59.4	9/GR17
CHLPAC02	-106.20	15	-80.06	-30.06	1.36	0.80	69	1	59.2	9/GR17
CLMAND01	-115.20	15	-74.72	5.93	3.85	1.63	114	1	65.0	9/GR5
CLMG0001	-103.20	15	-74.50	5.87	3.98	1.96	118	1	63.6	
CUB00001	-89.20	15	-79.81	21.62	2.24	0.80	168	1	61.1	
EQACAND1	-115.20	15	-78.40	-1.61	1.37	0.95	75	1	64.1	9/GR5
EQAGAND1	-115.20	15	-90.34	-0.62	0.90	0.81	89	1	61.3	9/GR5
GRD00002	-42.20	15	-61.58	12.29	0.80	0.80	90	1	58.8	
GRDJ0059	-57.20	15	-61.58	12.29	0.80	0.80	90	1	58.5	
GRLDNK01	-53.20	15	-44.89	66.56	2.70	0.82	173	1	60.0	2
GUY00201	-84.70	15	-59.19	4.78	1.44	0.85	95	1	63.5	
HWA00002	-166.20	15	-165.79	23.42	4.20	0.80	160	1	58.8	9/GR1
HWA00003	-175.20	15	-166.10	23.42	4.25	0.80	159	1	58.8	9/GR2
MEX01NTE	-78.20	15	-105.81	26.01	2.89	2.08	155	1	60.5	1
MEX01SUR	-69.20	15	-94.84	19.82	3.05	2.09	4	1	62.3	1
MEX02NTE	-136.20	15	-107.21	26.31	3.84	1.55	148	1	61.2	1
MEX02SUR	-127.20	15	-96.39	19.88	3.18	1.87	157	1	62.6	1
PAQPAC01	-106.20	15	-109.18	-27.53	0.80	0.80	90	1	56.2	9/GR17
PRG00002	-99.20	15	-58.66	-23.32	1.45	1.04	76	1	60.2	
PRUAND02	-115.20	15	-74.69	-8.39	3.41	1.79	95	1	64.0	9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
PTRVIR01	-101.20	15	-65.85	18.12	0.80	0.80	90	1	60.6	1 6 9/GR20
PTRVIR02	-110.20	15	-65.86	18.12	0.80	0.80	90	1	61.0	1 6 9/GR21
URG00001	-71.70	15	-56.22	-32.52	1.02	0.89	11	1	60.0	
USAEH001	-61.70	15	-85.19	36.21	5.63	3.33	22	1	61.8	1 5 6
USAEH002	-101.20	15	-89.24	36.16	5.67	3.76	170	1	61.7	1 6 9/GR20
USAEH003	-110.20	15	-90.14	36.11	5.55	3.55	161	1	62.1	1 6 9/GR21
USAEH004	-119.20	15	-91.16	36.05	5.38	3.24	152	1	62.6	1 5 6
USAPSA02	-166.20	15	-117.80	40.58	4.03	0.82	135	1	63.3	9/GR1
USAPSA03	-175.20	15	-118.27	40.12	3.62	0.80	136	1	65.0	9/GR2
USAWH101	-148.20	15	-109.65	38.13	5.53	1.95	142	1	62.1	
USAWH102	-157.20	15	-111.41	38.57	5.51	1.54	138	1	63.2	
VENAND03	-115.20	15	-67.04	6.91	2.37	1.43	111	1	67.3	9/GR5

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	16	-149.63	58.52	3.81	1.23	171	2	59.8	9/GR1
ALS00003	-174.80	16	-150.95	58.54	3.77	1.11	167	2	60.0	9/GR2
ARGNORT4	-93.80	16	-63.96	-30.01	3.86	1.99	48	2	65.7	
ARGNORT5	-54.80	16	-62.85	-29.80	3.24	2.89	47	2	63.5	
B CE311	-63.80	16	-40.60	-6.07	3.04	2.06	174	2	61.6	8 9/GR7
B CE312	-44.80	16	-40.26	-6.06	3.44	2.09	174	2	61.0	8 9/GR9
B CE411	-63.80	16	-50.97	-15.26	3.86	1.38	49	2	62.6	8 9/GR7
B CE412	-44.80	16	-50.71	-15.30	3.57	1.56	52	2	62.8	8 9/GR9
B CE511	-63.80	16	-53.11	-2.98	2.42	2.15	107	2	63.1	8 9/GR7
B NO611	-73.80	16	-59.60	-11.62	2.86	1.69	165	1	62.9	8 9/GR8
B NO711	-73.80	16	-60.70	-1.78	3.54	1.78	126	1	62.8	8 9/GR8
B NO811	-73.80	16	-68.75	-4.71	2.37	1.65	73	1	62.8	8 9/GR8
B SE911	-101.80	16	-45.99	-19.09	2.22	0.80	62	2	65.3	8
B SU111	-80.80	16	-51.10	-25.64	2.76	1.06	50	2	62.9	8 9/GR6
B SU112	-44.80	16	-50.76	-25.62	2.47	1.48	56	2	62.3	8 9/GR9
B SU211	-80.80	16	-44.51	-16.94	3.22	1.37	60	2	62.5	8 9/GR6
B SU212	-44.80	16	-43.99	-16.97	3.27	1.92	59	2	61.3	8 9/GR9
CAN01101	-137.80	16	-125.60	57.24	3.45	1.27	157	2	59.5	9/GR10
CAN01201	-137.80	16	-111.92	55.89	3.33	0.98	151	2	59.6	9/GR10
CAN01202	-72.30	16	-107.64	55.62	2.75	1.11	32	2	59.6	9/GR11
CAN01203	-128.80	16	-111.43	55.56	3.07	1.15	151	2	59.5	9/GR12
CAN01303	-128.80	16	-102.39	57.12	3.54	0.92	154	2	60.1	9/GR12
CAN01304	-90.80	16	-99.00	57.33	1.96	1.73	1	2	59.8	9/GR13
CAN01403	-128.80	16	-89.70	52.02	4.67	0.80	148	2	61.8	9/GR12
CAN01404	-90.80	16	-84.78	52.41	3.09	2.06	153	2	60.4	9/GR13
CAN01405	-81.80	16	-84.02	52.34	2.82	2.30	172	2	60.3	9/GR14
CAN01504	-90.80	16	-72.68	53.78	3.57	1.67	157	2	60.2	9/GR13
CAN01505	-81.80	16	-71.76	53.76	3.30	1.89	162	2	60.2	9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
CAN01605	-81.80	16	-61.54	49.50	2.66	1.39	144	2	60.3	9/GR14
CAN01606	-70.30	16	-61.32	49.51	2.41	1.65	148	2	60.2	9/GR15
CHLCONT4	-105.80	16	-69.59	-23.20	2.21	0.80	68	2	59.1	9/GR16
CHLCONT6	-105.80	16	-73.52	-55.52	3.65	1.31	39	2	59.6	9/GR16
CRBBAH01	-92.30	16	-76.09	24.13	1.83	0.80	141	1	61.7	9/GR18
CRBBER01	-92.30	16	-64.76	32.13	0.80	0.80	90	1	56.8	9/GR18
CRBBLZ01	-92.30	16	-88.61	17.26	0.80	0.80	90	1	58.7	9/GR18
CRBEC001	-92.30	16	-60.07	8.26	4.20	0.86	115	1	64.3	9/GR18
CRBJMC01	-92.30	16	-79.45	17.97	0.99	0.80	151	1	61.1	9/GR18
CYM00001	-115.80	16	-80.58	19.57	0.80	0.80	90	2	59.6	
DOMIFRB2	-83.30	16	-70.51	18.79	0.98	0.80	167	2	61.1	
EQAC0001	-94.80	16	-78.31	-1.52	1.48	1.15	65	1	63.0	9/GR19
EQAG0001	-94.80	16	-90.36	-0.57	0.94	0.89	99	1	61.0	9/GR19
GUFMGG02	-52.80	16	-56.42	8.47	4.16	0.81	123	2	62.7	2 7
HWA00002	-165.80	16	-165.79	23.32	4.20	0.80	160	2	58.8	9/GR1
HWA00003	-174.80	16	-166.10	23.42	4.25	0.80	159	2	58.8	9/GR2
JMC00005	-33.80	16	-77.27	18.12	0.80	0.80	90	2	60.6	
LCAIFRB1	-79.30	16	-61.15	13.90	0.80	0.80	90	2	58.4	
MEX01NTE	-77.80	16	-105.80	25.99	2.88	2.07	155	2	60.5	1
MEX02NTE	-135.80	16	-107.36	26.32	3.80	1.57	149	2	61.2	1
MEX02SUR	-126.80	16	-96.39	19.88	3.19	1.87	158	2	62.5	1
PRU00004	-85.80	16	-74.19	-8.39	3.74	2.45	112	2	62.9	
PTRVIR01	-100.80	16	-65.85	18.12	0.80	0.80	90	2	60.6	1 6 9/GR20
PTRVIR02	-109.80	16	-65.85	18.12	0.80	0.80	90	2	61.1	1 6 9/GR21
SLVIFRB2	-107.30	16	-88.91	13.59	0.80	0.80	90	1	61.7	
USAEH001	-61.30	16	-85.16	36.21	5.63	3.32	22	2	61.9	1 5 6
USAEH002	-100.80	16	-89.28	36.16	5.65	3.78	170	2	61.7	1 6 9/GR20
USAEH003	-109.80	16	-90.12	36.11	5.55	3.56	161	2	62.1	1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
USAEH004	-118.80	16	-91.16	36.05	5.38	3.24	153	2	62.6	1 5 6
USAPSA02	-165.80	16	-117.79	40.58	4.04	0.82	135	2	63.3	9/GR1
USAPSA03	-174.80	16	-118.20	40.15	3.63	0.80	136	2	65.0	9/GR2
USAWH101	-147.80	16	-109.70	38.13	5.52	1.96	142	2	62.1	
USAWH102	-156.80	16	-111.40	38.57	5.51	1.55	138	2	63.2	
VEN11VEN	-103.80	16	-66.79	6.90	2.50	1.77	122	2	65.2	

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
ALS00002	-166.20	17	-149.66	58.37	3.76	1.24	170	1	59.9	9/GR1
ALS00003	-175.20	17	-150.98	58.53	3.77	1.11	167	1	60.2	9/GR2
ARGINSU4	-94.20	17	-52.98	-59.81	3.40	0.80	19	1	60.1	9/GR3
ARGINSU5	-55.20	17	-44.17	-59.91	3.77	0.80	13	1	59.5	9/GR4
ARGSUR04	-94.20	17	-65.04	-43.33	3.32	1.50	40	1	60.9	9/GR3
ARGSUR05	-55.20	17	-63.68	-43.01	2.54	2.38	152	1	60.2	9/GR4
B CE311	-64.20	17	-40.60	-6.07	3.04	2.06	174	1	61.9	8 9/GR7
B CE312	-45.20	17	-40.27	-6.06	3.44	2.09	174	1	61.2	8 9/GR9
B CE411	-64.20	17	-50.97	-15.27	3.86	1.38	49	1	62.9	8 9/GR7
B CE412	-45.20	17	-50.71	-15.30	3.57	1.56	52	1	63.0	8 9/GR9
B CE511	-64.20	17	-53.10	-2.90	2.44	2.13	104	1	63.4	8 9/GR7
B NO611	-74.20	17	-59.60	-11.62	2.85	1.69	165	2	63.1	8 9/GR8
B NO711	-74.20	17	-60.70	-1.78	3.54	1.78	126	2	63.1	8 9/GR8
B NO811	-74.20	17	-68.76	-4.71	2.37	1.65	73	2	63.1	8 9/GR8
B SU111	-81.20	17	-51.12	-25.63	2.76	1.05	50	1	63.2	8 9/GR6
B SU112	-45.20	17	-50.75	-25.62	2.47	1.48	56	1	62.5	8 9/GR9
B SU211	-81.20	17	-44.51	-16.95	3.22	1.36	60	1	62.8	8 9/GR6
B SU212	-45.20	17	-44.00	-16.87	3.20	1.96	58	1	61.6	8 9/GR9
BERBERMU	-96.20	17	-64.77	32.32	0.80	0.80	90	2	57.0	
BERBER02	-31.00	17	-64.77	32.32	0.80	0.80	90	1	57.1	2 3
BOLAND01	-115.20	17	-65.04	-16.76	2.49	1.27	76	1	68.0	9/GR5
CAN01101	-138.20	17	-125.63	57.24	3.45	1.27	157	1	59.7	9/GR10
CAN01201	-138.20	17	-112.04	55.95	3.35	0.97	151	1	59.8	9/GR10
CAN01202	-72.70	17	-107.70	55.63	2.74	1.12	32	1	59.8	9/GR11
CAN01203	-129.20	17	-111.48	55.61	3.08	1.15	151	1	59.7	9/GR12
CAN01303	-129.20	17	-102.42	57.12	3.54	0.91	154	1	60.2	9/GR12
CAN01304	-91.20	17	-99.12	57.36	1.98	1.72	2	1	60.0	9/GR13
CAN01403	-129.20	17	-89.75	52.02	4.68	0.80	148	1	62.1	9/GR12

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
CAN01404	-91.20	17	-84.82	52.42	3.10	2.05	152	1	60.6	9/GR13
CAN01405	-82.20	17	-84.00	52.39	2.84	2.29	172	1	60.5	9/GR14
CAN01504	-91.20	17	-72.66	53.77	3.57	1.67	156	1	60.4	9/GR13
CAN01505	-82.20	17	-71.77	53.79	3.30	1.89	162	1	60.3	9/GR14
CAN01605	-82.20	17	-61.50	49.55	2.65	1.40	143	1	60.5	9/GR14
CAN01606	-70.70	17	-61.30	49.55	2.40	1.65	148	1	60.4	9/GR15
CHLCONT5	-106.20	17	-72.23	-35.57	2.60	0.80	55	1	59.6	9/GR17
CHLPAC02	-106.20	17	-80.06	-30.06	1.36	0.80	69	1	59.4	9/GR17
CLMAND01	-115.20	17	-74.72	5.93	3.85	1.63	114	1	65.3	9/GR5
CLM00001	-103.20	17	-74.50	5.87	3.98	1.96	118	1	63.9	
EQACAND1	-115.20	17	-78.40	-1.61	1.37	0.95	75	1	64.4	9/GR5
EQAGAND1	-115.20	17	-90.34	-0.62	0.90	0.81	89	1	61.5	9/GR5
FLKFALKS	-31.00	17	-59.90	-51.64	0.80	0.80	90	1	58.2	2 3
HWA00002	-166.20	17	-165.79	23.42	4.20	0.80	160	1	59.0	9/GR1
HWA00003	-175.20	17	-166.10	23.42	4.25	0.80	159	1	58.9	9/GR2
JMC00002	-92.70	17	-77.30	18.12	0.80	0.80	90	2	60.1	
MEX01NTE	-78.20	17	-105.81	26.01	2.89	2.08	155	1	60.7	1
MEX01SUR	-69.20	17	-94.84	19.82	3.05	2.09	4	1	62.5	1
MEX02NTE	-136.20	17	-107.21	26.31	3.84	1.55	148	1	61.4	1
MEX02SUR	-127.20	17	-96.39	19.88	3.18	1.87	157	1	62.8	1
PAQPAC01	-106.20	17	-109.18	-27.53	0.80	0.80	90	1	56.4	9/GR17
PRG00002	-99.20	17	-58.66	-23.32	1.45	1.04	76	1	60.4	
PRUAND02	-115.20	17	-74.69	-8.39	3.41	1.79	95	1	64.3	9/GR5
PTRVIR01	-101.20	17	-65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20
PTRVIR02	-110.20	17	-65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21
SCN00001	-79.70	17	-62.46	17.44	0.80	0.80	90	1	58.6	
SPMFRAN3	-53.20	17	-67.24	47.51	3.16	0.80	7	1	60.6	2 7
SURINAM2	-84.70	17	-55.69	4.35	1.00	0.80	86	1	63.5	

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
URG00001	-71.70	17	-56.22	-32.52	1.02	0.89	11	1	60.2	
USAEH001	-61.70	17	-85.19	36.21	5.63	3.33	22	1	62.1	1 5 6
USAEH002	-101.20	17	-89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20
USAEH003	-110.20	17	-90.14	36.11	5.55	3.55	161	1	62.3	1 6 9/GR21
USAEH004	-119.20	17	-91.16	36.05	5.38	3.24	152	1	62.9	1 5 6
USAPSA02	-166.20	17	-117.80	40.58	4.03	0.82	135	1	63.5	9/GR1
USAPSA03	-175.20	17	-118.27	40.12	3.62	0.80	136	1	65.3	9/GR2
USAWH101	-148.20	17	-109.65	38.13	5.53	1.95	142	1	62.3	
USAWH102	-157.20	17	-111.41	38.57	5.51	1.54	138	1	63.5	
VENAND03	-115.20	17	-67.04	6.91	2.37	1.43	111	1	67.6	9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	18	-149.63	58.52	3.81	1.23	171	2	59.9	9/GR1
ALS00003	-174.80	18	-150.95	58.54	3.77	1.11	167	2	60.2	9/GR2
ARGNORT4	-93.80	18	-63.96	-30.01	3.86	1.99	48	2	66.0	
ARGNORT5	-54.80	18	-62.85	-29.80	3.24	2.89	47	2	63.8	
ATNBEAM1	-52.80	18	-66.44	14.87	1.83	0.80	39	2	61.3	
B CE311	-63.80	18	-40.60	-6.07	3.04	2.06	174	2	61.9	8 9/GR7
B CE312	-44.80	18	-40.26	-6.06	3.44	2.09	174	2	61.2	8 9/GR9
B CE411	-63.80	18	-50.97	-15.26	3.86	1.38	49	2	62.9	8 9/GR7
B CE412	-44.80	18	-50.71	-15.30	3.57	1.56	52	2	63.0	8 9/GR9
B CE511	-63.80	18	-53.11	-2.98	2.42	2.15	107	2	63.4	8 9/GR7
B NO611	-73.80	18	-59.60	-11.62	2.86	1.69	165	1	63.1	8 9/GR8
B NO711	-73.80	18	-60.70	-1.78	3.54	1.78	126	1	63.1	8 9/GR8
B NO811	-73.80	18	-68.75	-4.71	2.37	1.65	73	1	63.1	8 9/GR8
B SE911	-101.80	18	-45.99	-19.09	2.22	0.80	62	2	65.7	8
B SU111	-80.80	18	-51.10	-25.64	2.76	1.06	50	2	63.1	8 9/GR6
B SU112	-44.80	18	-50.76	-25.62	2.47	1.48	56	2	62.6	8 9/GR9
B SU211	-80.80	18	-44.51	-16.94	3.22	1.37	60	2	62.8	8 9/GR6
B SU212	-44.80	18	-43.99	-16.97	3.27	1.92	59	2	61.6	8 9/GR9
BLZ00001	-115.80	18	-88.68	17.27	0.80	0.80	90	2	59.2	
CAN01101	-137.80	18	-125.60	57.24	3.45	1.27	157	2	59.7	9/GR10
CAN01201	-137.80	18	-111.92	55.89	3.33	0.98	151	2	59.8	9/GR10
CAN01202	-72.30	18	-107.64	55.62	2.75	1.11	32	2	59.8	9/GR11
CAN01203	-128.80	18	-111.43	55.56	3.07	1.15	151	2	59.7	9/GR12
CAN01303	-128.80	18	-102.39	57.12	3.54	0.92	154	2	60.3	9/GR12
CAN01304	-90.80	18	-99.00	57.33	1.96	1.73	1	2	60.0	9/GR13
CAN01403	-128.80	18	-89.70	52.02	4.67	0.80	148	2	62.1	9/GR12
CAN01404	-90.80	18	-84.78	52.41	3.09	2.06	153	2	60.6	9/GR13
CAN01405	-81.80	18	-84.02	52.34	2.82	2.30	172	2	60.5	9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
CAN01504	-90.80	18	-72.68	53.78	3.57	1.67	157	2	60.4	9/GR13
CAN01505	-81.80	18	-71.76	53.76	3.30	1.89	162	2	60.3	9/GR14
CAN01605	-81.80	18	-61.54	49.50	2.66	1.39	144	2	60.5	9/GR14
CAN01606	-70.30	18	-61.32	49.51	2.41	1.65	148	2	60.4	9/GR15
CHLCONT4	-105.80	18	-69.59	-23.20	2.21	0.80	68	2	59.3	9/GR16
CHLCONT6	-105.80	18	-73.52	-55.52	3.65	1.31	39	2	59.7	9/GR16
CRBBAH01	-92.30	18	-76.09	24.13	1.83	0.80	141	1	61.9	9/GR18
CRBBER01	-92.30	18	-64.76	32.13	0.80	0.80	90	1	56.9	9/GR18
CRBBLZ01	-92.30	18	-88.61	17.26	0.80	0.80	90	1	58.9	9/GR18
CRBECO01	-92.30	18	-60.07	8.26	4.20	0.86	115	1	64.6	9/GR18
CRBJMC01	-92.30	18	-79.45	17.97	0.99	0.80	151	1	61.3	9/GR18
CTR00201	-130.80	18	-84.33	9.67	0.82	0.80	119	2	66.0	
DMAIFRE1	-79.30	18	-61.30	15.35	0.80	0.80	90	2	58.7	
EQAC0001	-94.80	18	-78.31	-1.52	1.48	1.15	65	1	63.3	9/GR19
EQAG0001	-94.80	18	-90.36	-0.57	0.94	0.89	99	1	61.2	9/GR19
HWA00002	-165.80	18	-165.79	23.32	4.20	0.80	160	2	59.0	9/GR1
HWA00003	-174.80	18	-166.10	23.42	4.25	0.80	159	2	59.0	9/GR2
MEX01NTE	-77.80	18	-105.80	25.99	2.88	2.07	155	2	60.7	1
MEX02NTE	-135.80	18	-107.36	26.32	3.80	1.57	149	2	61.4	1
MEX02SUR	-126.80	18	-96.39	19.88	3.19	1.87	158	2	62.8	1
NCG00003	-107.30	18	-84.99	12.90	1.05	1.01	176	1	63.6	
PRU00004	-85.80	18	-74.19	-8.39	3.74	2.45	112	2	63.1	
PTRVIR01	-100.80	18	-65.85	18.12	0.80	0.80	90	2	60.8	1 6 9/GR20
PTRVIR02	-109.80	18	-65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21
USAEH001	-61.30	18	-85.16	36.21	5.63	3.32	22	2	62.1	1 5 6
USAEH002	-100.80	18	-89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20
USAEH003	-109.80	18	-90.12	36.11	5.55	3.56	161	2	62.3	1 6 9/GR21
USAEH004	-118.80	18	-91.16	36.05	5.38	3.24	153	2	62.9	1 5 6

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

1	2	3	4		5		6	7	8	9
USAPSA02	-165.80	18	-117.79	40.58	4.04	0.82	135	2	63.5	9/GR1
USAPSA03	-174.80	18	-118.20	40.15	3.63	0.80	136	2	65.3	9/GR2
USAWH101	-147.80	18	-109.70	38.13	5.52	1.96	142	2	62.3	
USAWH102	-156.80	18	-111.40	38.57	5.51	1.55	138	2	63.5	
VEN11VEN	-103.80	18	-66.79	6.90	2.50	1.77	122	2	65.5	

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
ALSC0002	-166.20	19	-149.66	58.37	3.76	1.24	170	1	60.0	9/GR1
ALS00003	-175.20	19	-150.98	58.53	3.77	1.11	167	1	60.2	9/GR2
ARGINSU4	-94.20	19	-52.98	-59.81	3.40	0.80	19	1	60.1	9/GR3
ARGINSU5	-55.20	19	-44.17	-59.91	3.77	0.80	13	1	59.5	9/GR4
ARGSUR04	-94.20	19	-65.04	-43.33	3.32	1.50	40	1	60.9	9/GR3
ARGSUR05	-55.20	19	-63.68	-43.01	2.54	2.38	152	1	60.3	9/GR4
B CE311	-64.20	19	-40.60	-6.07	3.04	2.06	174	1	61.9	8 9/GR7
B CE312	-45.20	19	-40.27	-6.06	3.44	2.09	174	1	61.3	8 9/GR9
B CE411	-64.20	19	-50.97	-15.27	3.86	1.38	49	1	62.9	8 9/GR7
B CE412	-45.20	19	-50.71	-15.30	3.57	1.56	52	1	63.1	8 9/GR9
B CE511	-64.20	19	-53.10	-2.90	2.44	2.13	104	1	63.4	8 9/GR7
B NO011	-74.20	19	-59.60	-11.62	2.85	1.69	165	2	63.2	8 9/GR8
B NO711	-74.20	19	-60.70	-1.78	3.54	1.78	126	2	63.2	8 9/GR8
B NO811	-74.20	19	-68.76	-4.71	2.37	1.65	73	2	63.1	8 9/GR8
B SU111	-81.20	19	-51.12	-25.63	2.76	1.05	50	1	63.2	8 9/GR6
B SU112	-45.20	19	-50.75	-25.62	2.47	1.48	56	1	62.6	8 9/GR9
B SU211	-81.20	19	-44.51	-16.95	3.22	1.36	60	1	62.8	8 9/GR6
B SU212	-45.20	19	-44.00	-16.87	3.20	1.96	58	1	61.6	8 9/GR9
BERBERMU	-96.20	19	-64.77	32.32	0.80	0.80	90	2	57.0	
BOLAND01	-115.20	19	-65.04	-16.76	2.49	1.27	76	1	68.1	9/GR5
BOL00001	-87.20	19	-64.61	-16.71	2.52	2.19	85	1	64.2	
BRB00001	-92.70	19	-59.85	12.93	0.80	0.80	90	2	59.4	
CAN01101	-138.20	19	-125.63	57.24	3.45	1.27	157	1	59.7	9/GR10
CAN01201	-138.20	19	-112.04	55.95	3.35	0.97	151	1	59.8	9/GR10
CAN01202	-72.70	19	-107.70	55.63	2.74	1.12	32	1	59.8	9/GR11
CAN01203	-129.20	19	-111.48	55.61	3.08	1.15	151	1	59.7	9/GR12
CAN01303	-129.20	19	-102.42	57.12	3.54	0.91	154	1	60.3	9/GR12
CAN01304	-91.20	19	-99.12	57.36	1.98	1.72	2	1	60.1	9/GR13

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
CAN01403	-129.20	19	-89.75	52.02	4.68	0.80	148	1	62.1	9/GR12
CAN01404	-91.20	19	-84.82	52.42	3.10	2.05	152	1	60.6	9/GR13
CAN01405	-82.20	19	-84.00	52.39	2.84	2.29	172	1	60.5	9/GR14
CAN01504	-91.20	19	-72.66	53.77	3.57	1.67	156	1	60.4	9/GR13
CAN01505	-82.20	19	-71.77	53.79	3.30	1.89	162	1	60.4	9/GR14
CAN01605	-82.20	19	-61.50	49.55	2.65	1.40	143	1	60.5	9/GR14
CAN01606	-70.70	19	-61.30	49.55	2.40	1.65	148	1	60.5	9/GR15
CHLCONT5	-106.20	19	-72.23	-35.57	2.60	0.80	55	1	59.6	9/GR17
CHLPAC02	-106.20	19	-80.06	-30.06	1.36	0.80	69	1	59.4	9/GR17
CLMAND01	-115.20	19	-74.72	5.93	3.85	1.63	114	1	65.4	9/GR5
CLM00001	-103.20	19	-74.50	5.87	3.98	1.96	118	1	63.9	
CUB00001	-89.20	19	-79.81	21.62	2.24	0.80	168	1	61.3	
EQACAND1	-115.20	19	-78.40	-1.61	1.37	0.95	75	1	64.4	9/GR5
EQAGAND1	-115.20	19	-90.34	-0.62	0.90	0.81	89	1	61.6	9/GR5
GRD00059	-57.20	19	-61.58	12.29	0.80	0.80	90	1	58.7	
GRLDNK01	-53.20	19	-44.89	66.56	2.70	0.82	173	1	60.2	2
GUY00201	-84.70	19	-59.19	4.78	1.44	0.85	95	1	63.8	
HWA00002	-166.20	19	-165.79	23.42	4.20	0.80	160	1	59.0	9/GR1
HWA00003	-175.20	19	-166.10	23.42	4.25	0.80	159	1	59.0	9/GR2
MEX01NTE	-78.20	19	-105.81	26.01	2.89	2.08	155	1	60.8	1
MEX01SUR	-69.20	19	-94.84	19.82	3.05	2.09	4	1	62.5	1
MEX02NTE	-136.20	19	-107.21	26.31	3.84	1.55	148	1	61.5	1
MEX02SUR	-127.20	19	-96.39	19.88	3.18	1.87	157	1	62.8	1
MSR00001	-79.70	19	-61.73	16.75	0.80	0.80	90	1	58.9	4
PAQPAC01	-106.20	19	-109.18	-27.53	0.80	0.80	90	1	56.4	9/GR17
PRG00002	-99.20	19	-58.66	-23.32	1.45	1.04	76	1	60.5	
PRUAND02	-115.20	19	-74.69	-8.39	3.41	1.79	95	1	64.3	9/GR5
PTRVIR01	-101.20	19	-65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
PTRVIR02	-110.20	19	-65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21
URG00001	-71.70	19	-56.22	-32.52	1.02	0.89	11	1	60.2	
USAEH001	-61.70	19	-85.19	36.21	5.63	3.33	22	1	62.1	1 5 6
USAEH002	-101.20	19	-89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20
USAEH003	-110.20	19	-90.14	36.11	5.55	3.55	161	1	62.4	1 6 9/GR21
USAEH004	-119.20	19	-91.16	36.05	5.38	3.24	152	1	62.9	1 5 6
USAPSA02	-166.20	19	-117.80	40.58	4.03	0.82	135	1	63.6	9/GR1
USAPSA03	-175.20	19	-118.27	40.12	3.62	0.80	136	1	65.4	9/GR2
USAWH101	-148.20	19	-109.65	38.13	5.53	1.95	142	1	62.4	
USAWH102	-157.20	19	-111.41	38.57	5.51	1.54	138	1	63.5	
VENAND03	-115.20	19	-67.04	6.91	2.37	1.43	111	1	67.7	9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	20	-149.63	58.52	3.81	1.23	171	2	59.9	9/GR1
ALS00003	-174.80	20	-150.95	58.54	3.77	1.11	167	2	60.2	9/GR2
ARGNORT4	-93.80	20	-63.96	-30.01	3.86	1.99	48	2	66.1	
ARGNORT5	-54.80	20	-62.85	-29.80	3.24	2.89	47	2	63.9	
B CE311	-63.80	20	-40.60	-6.07	3.04	2.06	174	2	61.9	8 9/GR7
B CE312	-44.80	20	-40.26	-6.06	3.44	2.09	174	2	61.3	8 9/GR9
B CE411	-63.80	20	-50.97	-15.26	3.86	1.38	49	2	62.9	8 9/GR7
B CE412	-44.80	20	-50.71	-15.30	3.57	1.56	52	2	63.1	8 9/GR9
B CE511	-63.80	20	-53.11	-2.98	2.42	2.15	107	2	63.4	8 9/GR7
B NO611	-73.80	20	-59.60	-11.62	2.86	1.69	165	1	63.2	8 9/GR8
B NO711	-73.80	20	-60.70	-1.78	3.54	1.78	126	1	63.2	8 9/GR8
B NO811	-73.80	20	-68.75	-4.71	2.37	1.65	73	1	63.2	8 9/GR8
B SE911	-101.80	20	-45.99	-19.09	2.22	0.80	62	2	65.7	8
B SU111	-80.80	20	-51.10	-25.64	2.76	1.06	50	2	63.2	8 9/GR6
B SU112	-44.80	20	-50.76	-25.62	2.47	1.48	56	2	62.6	8 9/GR9
B SU211	-80.80	20	-44.51	-16.94	3.22	1.37	60	2	62.8	8 9/GR6
B SU212	-44.80	20	-43.99	-16.97	3.27	1.92	59	2	61.6	8 9/GR9
CAN01101	-137.80	20	-125.60	57.24	3.45	1.27	157	2	59.7	9/GR10
CAN01201	-137.80	20	-111.92	55.89	3.33	0.98	151	2	59.8	9/GR10
CAN01202	-72.30	20	-107.64	55.62	2.75	1.11	32	2	59.8	9/GR11
CAN01203	-128.80	20	-111.43	55.56	3.07	1.15	151	2	59.7	9/GR12
CAN01303	-128.80	20	-102.39	57.12	3.54	0.92	154	2	60.3	9/GR12
CAN01304	-90.80	20	-99.00	57.33	1.96	1.73	1	2	60.0	9/GR13
CAN01403	-128.80	20	-89.70	52.02	4.67	0.80	148	2	62.1	9/GR12
CAN01404	-90.80	20	-84.78	52.41	3.09	2.06	153	2	60.6	9/GR13
CAN01405	-81.80	20	-84.02	52.34	2.82	2.30	172	2	60.5	9/GR14
CAN01504	-90.80	20	-72.68	53.78	3.57	1.67	157	2	60.4	9/GR13
CAN01505	-81.80	20	-71.76	53.76	3.30	1.89	162	2	60.4	9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
CANO1605	-81.80	20	-61.54	49.50	2.66	1.39	144	2	60.5	9/GR14
CANO1606	-70.30	20	-61.32	49.51	2.41	1.65	148	2	60.5	9/GR15
CHLCONT4	-105.80	20	-69.59	-23.20	2.21	0.80	68	2	59.3	9/GR16
CHLCONT6	-105.80	20	-73.52	-55.52	3.65	1.31	39	2	59.8	9/GR16
CRBBAH01	-92.30	20	-76.09	24.13	1.83	0.80	141	1	62.0	9/GR18
CRBBERC1	-92.30	20	-64.76	32.13	0.80	0.80	90	1	57.0	9/GR18
CRBBLZ01	-92.30	20	-88.61	17.26	0.80	0.80	90	1	58.9	9/GR18
CRBEC001	-92.30	20	-60.07	8.26	4.20	0.86	115	1	64.6	9/GR18
CRBJMC01	-92.30	20	-79.45	17.97	0.99	0.80	151	1	61.4	9/GR18
EQAC0001	-94.80	20	-78.31	-1.52	1.48	1.15	65	1	63.3	9/GR19
EQAG0001	-94.80	20	-90.36	-0.57	0.94	0.89	99	1	61.3	9/GR19
GRD00003	-79.30	20	-61.62	12.34	0.80	0.80	90	2	58.9	
GTMIFRB2	-107.30	20	-90.50	15.64	1.03	0.80	84	1	61.4	
GUFMGG02	-52.80	20	-56.42	8.47	4.16	0.81	123	2	63.0	2 7
HWA00002	-165.80	20	-165.79	23.32	4.20	0.80	160	2	59.0	9/GR1
HWA00003	-174.80	20	-166.10	23.42	4.25	0.80	159	2	59.0	9/GR2
MEX01NTE	-77.80	20	-105.80	25.99	2.88	2.07	155	2	60.8	1
MEX02NTE	-135.80	20	-107.36	26.32	3.80	1.57	149	2	61.5	1
MEX02SUR	-126.80	20	-96.39	19.88	3.19	1.87	158	2	62.8	1
PNRIFRB2	-121.00	20	-80.15	8.46	1.01	0.80	170	1	65.1	
PRU00004	-85.80	20	-74.19	-8.39	3.74	2.45	112	2	63.2	
PTRVIR01	-100.80	20	-65.85	18.12	0.80	0.80	90	2	60.9	1 6 9/GR20
PTRVIR02	-109.80	20	-65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21
USAEH001	-61.30	20	-85.16	36.21	5.63	3.32	22	2	62.1	1 5 6
USAEH002	-100.80	20	-89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20
USAEH003	-109.80	20	-90.12	36.11	5.55	3.56	161	2	62.4	1 6 9/GR21
USAEH004	-118.80	20	-91.16	36.05	5.38	3.24	153	2	62.9	1 5 6
USAPSA02	-165.80	20	-117.79	40.58	4.04	0.82	135	2	63.6	9/GR1

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
USAPSA03	-174.80	20	-118.20	40.15	3.63	0.80	136	2	65.3	9/GR2
USAWH101	-147.80	20	-109.70	38.13	5.52	1.96	142	2	62.4	
USAWH102	-156.80	20	-111.40	38.57	5.51	1.55	138	2	63.5	
VEN02VEN	-103.80	20	-63.50	15.50	0.80	0.80	90	2	60.1	9/GR22
VEN11VEN	-103.80	20	-66.79	6.90	2.50	1.77	122	2	65.6	9/GR22

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-166.20	21	-149.66	58.37	3.76	1.24	170	1	59.9	9/GR1
ALS00003	-175.20	21	-150.98	58.53	3.77	1.11	167	1	60.2	9/GR2
ARGINSU4	-94.20	21	-52.98	-59.81	3.40	0.80	19	1	60.1	9/GR3
ARGINSU5	-55.20	21	-44.17	-59.91	3.77	0.80	13	1	59.5	9/GR4
ARGSUR04	-94.20	21	-65.04	-43.33	3.32	1.50	40	1	60.9	9/GR3
ARGSUR05	-55.20	21	-63.68	-43.01	2.54	2.38	152	1	60.2	9/GR4
B CE311	-64.20	21	-40.60	-6.07	3.04	2.06	174	1	61.9	8 9/GR7
B CE312	-45.20	21	-40.27	-6.06	3.44	2.09	174	1	61.2	8 9/GR9
B CE411	-64.20	21	-50.97	-15.27	3.86	1.38	49	1	62.9	8 9/GR7
B CE412	-45.20	21	-50.71	-15.30	3.57	1.56	52	1	63.0	8 9/GR9
B CE511	-64.20	21	-53.10	-2.90	2.44	2.13	104	1	63.4	8 9/GR7
B NO611	-74.20	21	-59.60	-11.62	2.85	1.69	165	2	63.1	8 9/GR8
B NO711	-74.20	21	-60.70	-1.78	3.54	1.78	126	2	63.1	8 9/GR8
B NO811	-74.20	21	-68.76	-4.71	2.37	1.65	73	2	63.1	8 9/GR8
B SU111	-81.20	21	-51.12	-25.63	2.76	1.05	50	1	63.2	8 9/GR6
B SU112	-45.20	21	-50.75	-25.62	2.47	1.48	56	1	62.5	8 9/GR9
B SU211	-81.20	21	-44.51	-16.95	3.22	1.36	60	1	62.8	8 9/GR6
B SU212	-45.20	21	-44.00	-16.87	3.20	1.96	58	1	61.6	8 9/GR9
BERBERMU	-96.20	21	-64.77	32.32	0.80	0.80	90	2	57.0	
BOLAND01	-115.20	21	-65.04	-16.76	2.49	1.27	76	1	68.0	9/GR5
CAN01101	-138.20	21	-125.63	57.24	3.45	1.27	157	1	59.7	9/GR10
CAN01201	-138.20	21	-112.04	55.95	3.35	0.97	151	1	59.8	9/GR10
CAN01202	-72.70	21	-107.70	55.63	2.74	1.12	32	1	59.8	9/GR11
CAN01203	-129.20	21	-111.48	55.61	3.08	1.15	151	1	59.7	9/GR12
CAN01303	-129.20	21	-102.42	57.12	3.54	0.91	154	1	60.2	9/GR12
CAN01304	-91.20	21	-99.12	57.36	1.98	1.72	2	1	60.0	9/GR13
CAN01403	-129.20	21	-89.75	52.02	4.68	0.80	148	1	62.1	9/GR12
CAN01404	-91.20	21	-84.82	52.42	3.10	2.05	152	1	60.6	9/GR13

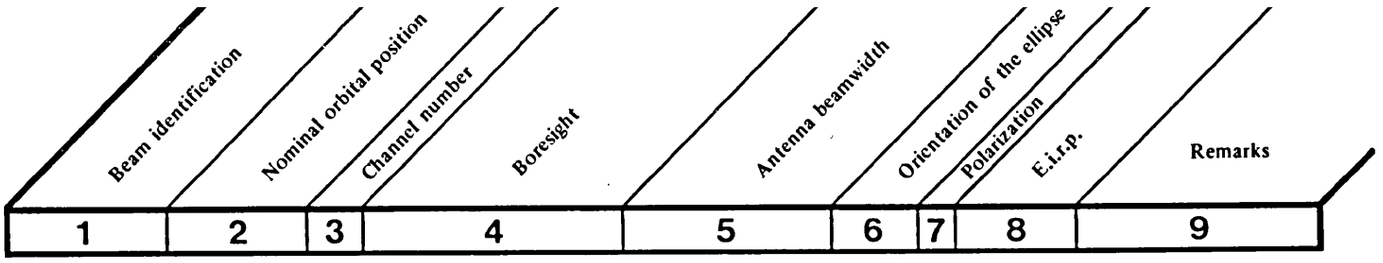
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
CAND1405	-82.20	21	-84.00	52.39	2.84	2.29	172	1	60.5	9/GR14
CAND1504	-91.20	21	-72.66	53.77	3.57	1.67	156	1	60.4	9/GR13
CAND1505	-82.20	21	-71.77	53.79	3.30	1.89	162	1	60.3	9/GR14
CAND1605	-82.20	21	-61.50	49.55	2.65	1.40	143	1	60.5	9/GR14
CAND1606	-70.70	21	-61.30	49.55	2.40	1.65	148	1	60.4	9/GR15
CHLCONT5	-106.20	21	-72.23	-35.57	2.60	0.80	55	1	59.6	9/GR17
CHLFAC02	-106.20	21	-80.06	-30.06	1.36	0.80	69	1	59.4	9/GR17
CLMAND01	-115.20	21	-74.72	5.93	3.85	1.63	114	1	65.3	9/GR5
CLM00001	-103.20	21	-74.50	5.87	3.98	1.96	118	1	63.9	
EGACAND1	-115.20	21	-78.40	-1.61	1.37	0.95	75	1	64.4	9/GR5
EQAGAND1	-115.20	21	-90.34	-0.62	0.90	0.81	89	1	61.5	9/GR5
HWA00002	-166.20	21	-165.79	23.42	4.20	0.80	160	1	59.0	9/GR1
HWA00003	-175.20	21	-166.10	23.42	4.25	0.80	159	1	58.9	9/GR2
JMC00002	-92.70	21	-77.30	18.12	0.80	0.80	90	2	60.1	
MEX01NTE	-78.20	21	-105.81	26.01	2.89	2.08	155	1	60.7	1
MEX01SUR	-69.20	21	-94.84	19.82	3.05	2.09	4	1	62.5	1
MEX02NTE	-136.20	21	-107.21	26.31	3.84	1.55	148	1	61.4	1
MEX02SUR	-127.20	21	-96.39	19.88	3.18	1.87	157	1	62.8	1
PAQPAC01	-106.20	21	-109.18	-27.53	0.80	0.80	90	1	56.4	9/GR17
PRG00002	-99.20	21	-58.66	-23.32	1.45	1.04	76	1	60.4	
PRUAND02	-115.20	21	-74.69	-8.39	3.41	1.79	95	1	64.3	9/GR5
PTRVIRC1	-101.20	21	-65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20
PTRVIR02	-110.20	21	-65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21
SCN00001	-79.70	21	-62.46	17.44	0.80	0.80	90	1	58.6	
SPMFRAN3	-53.20	21	-67.24	47.51	3.16	0.80	7	1	60.6	2 7
SURINAM2	-84.70	21	-55.69	4.35	1.00	0.80	86	1	63.5	
URG00001	-71.70	21	-56.22	-32.52	1.02	0.89	11	1	60.2	
USAEH001	-61.70	21	-85.19	36.21	5.63	3.33	22	1	62.1	1 5 6

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
USAEH002	-101.20	21	-89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20
USAEH003	-110.20	21	-90.14	36.11	5.55	3.55	161	1	62.3	1 6 9/GR21
USAEH004	-119.20	21	-91.16	36.05	5.38	3.24	152	1	62.9	1 5 6
USAPSA02	-166.20	21	-117.80	40.58	4.03	0.82	135	1	63.5	9/GR1
USAPSA03	-175.20	21	-118.27	40.12	3.62	0.80	136	1	65.3	9/GR2
USAWH101	-148.20	21	-109.65	38.13	5.53	1.95	142	1	62.3	
USAWH102	-157.20	21	-111.41	38.57	5.51	1.54	138	1	63.5	
VENAND03	-115.20	21	-67.04	6.91	2.37	1.43	111	1	67.6	9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	22	-149.63	58.52	3.81	1.23	171	2	59.9	9/GR1
ALS00003	-174.80	22	-150.95	58.54	3.77	1.11	167	2	60.2	9/GR2
ARGNORT4	-93.80	22	-63.96	-30.01	3.86	1.99	48	2	66.0	
ARGNORT5	-54.80	22	-62.85	-29.80	3.24	2.89	47	2	63.8	
ATNBEAM1	-52.80	22	-66.44	14.87	1.83	0.80	39	2	61.3	
B CE311	-63.80	22	-40.60	-6.07	3.04	2.06	174	2	61.9	8 9/GR7
B CE312	-44.80	22	-40.26	-6.06	3.44	2.09	174	2	61.2	8 9/GR9
B CE411	-63.80	22	-50.97	-15.26	3.86	1.38	49	2	62.9	8 9/GR7
B CE412	-44.80	22	-50.71	-15.30	3.57	1.56	52	2	63.0	8 9/GR9
B CE511	-63.80	22	-53.11	-2.98	2.42	2.15	107	2	63.4	8 9/GR7
B NO611	-73.80	22	-59.60	-11.62	2.86	1.69	165	1	63.1	8 9/GR8
B NO711	-73.80	22	-60.70	-1.78	3.54	1.78	126	1	63.1	8 9/GR8
B NO811	-73.80	22	-68.75	-4.71	2.37	1.65	73	1	63.1	8 9/GR8
B SE911	-101.80	22	-45.99	-19.09	2.22	0.80	62	2	65.7	8
B SU111	-80.80	22	-51.10	-25.64	2.76	1.06	50	2	63.1	8 9/GR6
B SU112	-44.80	22	-50.76	-25.62	2.47	1.48	56	2	62.6	8 9/GR9
B SU211	-80.80	22	-44.51	-16.94	3.22	1.37	60	2	62.8	8 9/GR6
B SU212	-44.80	22	-43.99	-16.97	3.27	1.92	59	2	61.6	8 9/GR9
BLZ00001	-115.80	22	-88.68	17.27	0.80	0.80	90	2	59.2	
CAN01101	-137.80	22	-125.60	57.24	3.45	1.27	157	2	59.7	9/GR10
CAN01201	-137.80	22	-111.92	55.89	3.33	0.98	151	2	59.8	9/GR10
CAN01202	-72.30	22	-107.64	55.62	2.75	1.11	32	2	59.8	9/GR11
CAN01203	-128.80	22	-111.43	55.56	3.07	1.15	151	2	59.7	9/GR12
CAN01303	-128.80	22	-102.39	57.12	3.54	0.92	154	2	60.3	9/GR12
CAN01304	-90.80	22	-99.00	57.33	1.96	1.73	1	2	60.0	9/GR13
CAN01403	-128.80	22	-89.70	52.02	4.67	0.80	148	2	62.1	9/GR12
CAN01404	-90.80	22	-84.78	52.41	3.09	2.06	153	2	60.6	9/GR13
CAN01405	-81.80	22	-84.02	52.34	2.82	2.30	172	2	60.5	9/GR14



1	2	3	4		5		6	7	8	9
CANO1504	-90.80	22	-72.68	53.78	3.57	1.67	157	2	60.4	9/GR13
CANO1505	-81.80	22	-71.76	53.76	3.30	1.89	162	2	60.3	9/GR14
CANO16C5	-81.80	22	-61.54	49.50	2.66	1.39	144	2	60.5	9/GR14
CANO1606	-70.30	22	-61.32	49.51	2.41	1.65	148	2	60.4	9/GR15
CHLCONT4	-105.80	22	-69.59	-23.20	2.21	0.80	68	2	59.3	9/GR16
CHLCONT6	-105.80	22	-73.52	-55.52	3.65	1.31	39	2	59.7	9/GR16
CRBBAH01	-92.30	22	-76.09	24.13	1.83	0.80	141	1	61.9	9/GR18
CRBBERC1	-92.30	22	-64.76	32.13	0.80	0.80	90	1	56.9	9/GR18
CRBBLZ01	-92.30	22	-88.61	17.26	0.80	0.80	90	1	58.9	9/GR18
CRBECO01	-92.30	22	-60.07	8.26	4.20	0.86	115	1	64.6	9/GR18
CRBJMC01	-92.30	22	-79.45	17.97	0.99	0.80	151	1	61.3	9/GR18
CTR00201	-130.80	22	-84.33	9.67	0.82	0.80	119	2	66.0	
DMAIFRB1	-79.30	22	-61.30	15.35	0.80	0.80	90	2	58.7	
EQAC0001	-94.80	22	-78.31	-1.52	1.48	1.15	65	1	63.3	9/GR19
EQAG0001	-94.80	22	-90.36	-0.57	0.94	0.89	99	1	61.2	9/GR19
HWA00002	-165.80	22	-165.79	23.32	4.20	0.80	160	2	59.0	9/GR1
HWA00003	-174.80	22	-166.10	23.42	4.25	0.80	159	2	59.0	9/GR2
MEX01NTE	-77.80	22	-105.80	25.99	2.88	2.07	155	2	60.7	1
MEX02NTE	-135.80	22	-107.36	26.32	3.80	1.57	149	2	61.4	1
MEX02SUR	-126.80	22	-96.39	19.88	3.19	1.87	158	2	62.8	1
NCG00003	-107.30	22	-84.99	12.90	1.05	1.01	176	1	63.6	
PRU00004	-85.80	22	-74.19	-8.39	3.74	2.45	112	2	63.1	
PTRVIR01	-100.80	22	-65.85	18.12	0.80	0.80	90	2	60.8	1 6 9/GR20
PTRVIR02	-109.80	22	-65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21
USAEH001	-61.30	22	-85.16	36.21	5.63	3.32	22	2	62.1	1 5 6
USAEH002	-100.80	22	-89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20
USAEH003	-109.80	22	-90.12	36.11	5.55	3.56	161	2	62.3	1 6 9/GR21
USAEH004	-118.80	22	-91.16	36.05	5.38	3.24	153	2	62.9	1 5 6

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
USAPSA02	-165.80	22	-117.79	40.58	4.04	0.82	135	2	63.5	9/GR1
USAPSA03	-174.80	22	-118.20	40.15	3.63	0.80	136	2	65.3	9/GR2
USAWH101	-147.80	22	-109.70	38.13	5.52	1.96	142	2	62.3	
USAWH102	-156.80	22	-111.40	38.57	5.51	1.55	138	2	63.5	
VEN11VEN	-103.80	22	-66.79	6.90	2.50	1.77	122	2	65.5	

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
ALS00002	-166.20	23	-149.66	58.37	3.76	1.24	170	1	60.0	9/GR1
ALS00003	-175.20	23	-150.98	58.53	3.77	1.11	167	1	60.2	9/GR2
ARGINSU4	-94.20	23	-52.98	-59.81	3.40	0.80	19	1	60.1	9/GR3
ARGINSU5	-55.20	23	-44.17	-59.91	3.77	0.80	13	1	59.5	9/GR4
ARGSUR04	-94.20	23	-65.04	-43.33	3.32	1.50	40	1	60.9	9/GR3
ARGSUR05	-55.20	23	-63.68	-43.01	2.54	2.38	152	1	60.3	9/GR4
B CE311	-64.20	23	-40.60	-6.07	3.04	2.06	174	1	61.9	8 9/GR7
B CE312	-45.20	23	-40.27	-6.06	3.44	2.09	174	1	61.3	8 9/GR9
B CE411	-64.20	23	-50.97	-15.27	3.86	1.38	49	1	62.9	8 9/GR7
B CE412	-45.20	23	-50.71	-15.30	3.57	1.56	52	1	63.1	8 9/GR9
B CE511	-64.20	23	-53.10	-2.90	2.44	2.13	104	1	63.4	8 9/GR7
B NOo11	-74.20	23	-59.60	-11.62	2.85	1.69	165	2	63.2	8 9/GR8
B NO711	-74.20	23	-60.70	-1.78	3.54	1.78	126	2	63.2	8 9/GR8
B NO811	-74.20	23	-68.76	-4.71	2.37	1.65	73	2	63.1	8 9/GR8
B SU111	-81.20	23	-51.12	-25.63	2.76	1.05	50	1	63.2	8 9/GR6
B SU112	-45.20	23	-50.75	-25.62	2.47	1.48	56	1	62.6	8 9/GR9
B SU211	-81.20	23	-44.51	-16.95	3.22	1.36	60	1	62.8	8 9/GR6
B SU212	-45.20	23	-44.00	-16.87	3.20	1.96	58	1	61.6	8 9/GR9
BERBERMU	-96.20	23	-64.77	32.32	0.80	0.80	90	2	57.0	
BOLAND01	-115.20	23	-65.04	-16.76	2.49	1.27	76	1	68.1	9/GR5
BOL00001	-87.20	23	-64.61	-16.71	2.52	2.19	85	1	64.2	
BRB00001	-92.70	23	-59.85	12.93	0.80	0.80	90	2	59.4	
CAN01101	-138.20	23	-125.63	57.24	3.45	1.27	157	1	59.7	9/GR10
CAN01201	-138.20	23	-112.04	55.95	3.35	0.97	151	1	59.8	9/GR10
CAN01202	-72.70	23	-107.70	55.63	2.74	1.12	32	1	59.8	9/GR11
CAN01203	-129.20	23	-111.48	55.61	3.08	1.15	151	1	59.7	9/GR12
CAN01303	-129.20	23	-102.42	57.12	3.54	0.91	154	1	60.3	9/GR12
CAN01304	-91.20	23	-99.12	57.36	1.98	1.72	2	1	60.1	9/GR13

1	Beam identification	2	Nominal orbital position	3	Channel number	4	Boresight	5	Antenna beamwidth	6	Orientation of the ellipse	7	Polarization	8	E.i.r.p.	9	Remarks

1	2	3	4		5		6	7	8	9
CAND1403	-129.20	23	-89.75	52.02	4.68	0.80	148	1	62.1	9/GR12
CAND1404	-91.20	23	-84.82	52.42	3.10	2.05	152	1	60.6	9/GR13
CAND1405	-82.20	23	-84.00	52.39	2.84	2.29	172	1	60.5	9/GR14
CAND1504	-91.20	23	-72.66	53.77	3.57	1.67	156	1	60.4	9/GR13
CAND1505	-82.20	23	-71.77	53.79	3.30	1.89	162	1	60.4	9/GR14
CAND1605	-82.20	23	-61.50	49.55	2.65	1.40	143	1	60.5	9/GR14
CAND1606	-70.70	23	-61.30	49.55	2.40	1.65	148	1	60.5	9/GR15
CHLCONT5	-106.20	23	-72.23	-35.57	2.60	0.80	55	1	59.6	9/GR17
CHLPAC02	-106.20	23	-80.06	-30.06	1.36	0.80	69	1	59.4	9/GR17
CLMAND01	-115.20	23	-74.72	5.93	3.85	1.63	114	1	65.4	9/GR5
CLMCOL01	-103.20	23	-74.50	5.87	3.98	1.96	118	1	63.9	
CUB00001	-89.20	23	-79.81	21.62	2.24	0.80	168	1	61.3	
EQACAND1	-115.20	23	-78.40	-1.61	1.37	0.95	75	1	64.4	9/GR5
EQAGAND1	-115.20	23	-90.34	-0.62	0.90	0.81	89	1	61.6	9/GR5
GRD00059	-57.20	23	-61.58	12.29	0.80	0.80	90	1	58.7	
GRLDNK01	-53.20	23	-44.89	66.56	2.70	0.82	173	1	60.2	2
GUY00201	-84.70	23	-59.19	4.78	1.44	0.85	95	1	63.8	
HWA00002	-166.20	23	-165.79	23.42	4.20	0.80	160	1	59.0	9/GR1
HWA00003	-175.20	23	-166.10	23.42	4.25	0.80	159	1	59.0	9/GR2
MEX01NTE	-78.20	23	-105.81	26.01	2.89	2.08	155	1	60.8	1
MEX01SUR	-69.20	23	-94.84	19.82	3.05	2.09	4	1	62.5	1
MEX02NTE	-136.20	23	-107.21	26.31	3.84	1.55	148	1	61.5	1
MEX02SUR	-127.20	23	-96.39	19.88	3.18	1.87	157	1	62.8	1
MSR00001	-79.70	23	-61.73	16.75	0.80	0.80	90	1	58.9	4
PAQPAC01	-106.20	23	-109.18	-27.53	0.80	0.80	90	1	56.4	9/GR17
PRG00002	-99.20	23	-58.66	-23.32	1.45	1.04	76	1	60.5	
PRUAND02	-115.20	23	-74.69	-8.39	3.41	1.79	95	1	64.3	9/GR5
PTRVIR01	-101.20	23	-65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
PTRVIR02	-110.20	23	-65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21
URGCOD01	-71.70	23	-56.22	-32.52	1.02	0.89	11	1	60.2	
USAEH001	-61.70	23	-85.19	36.21	5.63	3.33	22	1	62.1	1 5 6
USAEH002	-101.20	23	-89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20
USAEH003	-110.20	23	-90.14	36.11	5.55	3.55	161	1	62.4	1 6 9/GR21
USAEH004	-119.20	23	-91.16	36.05	5.38	3.24	152	1	62.9	1 5 6
USAPSA02	-166.20	23	-117.80	40.58	4.03	0.82	135	1	63.6	9/GR1
USAPSA03	-175.20	23	-118.27	40.12	3.62	0.80	136	1	65.4	9/GR2
USAWH101	-148.20	23	-109.65	38.13	5.53	1.95	142	1	62.4	
USAWH102	-157.20	23	-111.41	38.57	5.51	1.54	138	1	63.5	
VENAND03	-115.20	23	-67.04	6.91	2.37	1.43	111	1	67.7	9/GR5

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	24	-149.63	58.52	3.81	1.23	171	2	59.9	9/GR1
ALS00003	-174.80	24	-150.95	58.54	3.77	1.11	167	2	60.2	9/GR2
ARGNORT4	-93.80	24	-63.96	-30.01	3.86	1.99	48	2	66.1	
ARGNORT5	-54.80	24	-62.85	-29.80	3.24	2.89	47	2	63.9	
B CE311	-63.80	24	-40.60	-6.07	3.04	2.06	174	2	61.9	8 9/GR7
B CE312	-44.80	24	-40.26	-6.06	3.44	2.09	174	2	61.3	8 9/GR9
B CE411	-63.80	24	-50.97	-15.26	3.86	1.38	49	2	62.9	8 9/GR7
B CE412	-44.80	24	-50.71	-15.30	3.57	1.56	52	2	63.1	8 9/GR9
B CE511	-63.80	24	-53.11	-2.98	2.42	2.15	107	2	63.4	8 9/GR7
B NO611	-73.80	24	-59.60	-11.62	2.86	1.69	165	1	63.2	8 9/GR8
B NO711	-73.80	24	-60.70	-1.78	3.54	1.78	126	1	63.2	8 9/GR8
B NO811	-73.80	24	-68.75	-4.71	2.37	1.65	73	1	63.2	8 9/GR8
B SE911	-101.80	24	-45.99	-19.09	2.22	0.80	62	2	65.7	8
B SU111	-80.80	24	-51.10	-25.64	2.76	1.06	50	2	63.2	8 9/GR6
B SU112	-44.80	24	-50.76	-25.62	2.47	1.48	56	2	62.6	8 9/GR9
B SU211	-80.80	24	-44.51	-16.94	3.22	1.37	60	2	62.8	8 9/GR6
B SU212	-44.80	24	-43.99	-16.97	3.27	1.92	59	2	61.6	8 9/GR9
CAN01101	-137.80	24	-125.60	57.24	3.45	1.27	157	2	59.7	9/GR10
CAN01201	-137.80	24	-111.92	55.89	3.33	0.98	151	2	59.8	9/GR10
CAN01202	-72.30	24	-107.64	55.62	2.75	1.11	32	2	59.8	9/GR11
CAN01203	-128.80	24	-111.43	55.56	3.07	1.15	151	2	59.7	9/GR12
CAN01303	-128.80	24	-102.39	57.12	3.54	0.92	154	2	60.3	9/GR12
CAN01304	-90.80	24	-99.00	57.33	1.96	1.73	1	2	60.0	9/GR13
CAN01403	-128.80	24	-89.70	52.02	4.67	0.80	148	2	62.1	9/GR12
CAN01404	-90.80	24	-84.78	52.41	3.09	2.06	153	2	60.6	9/GR13
CAN01405	-81.80	24	-84.02	52.34	2.82	2.30	172	2	60.5	9/GR14
CAN01504	-90.80	24	-72.68	53.78	3.57	1.67	157	2	60.4	9/GR13
CAN01505	-81.80	24	-71.76	53.76	3.30	1.89	162	2	60.4	9/GR14

1	2	3	4		5		6	7	8	9
	Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
CANO16G5	-81.80	24	-61.54	49.50	2.66	1.39	144	2	60.5	9/GR14
CANO16G6	-70.30	24	-61.32	49.51	2.41	1.65	148	2	60.5	9/GR15
CHLCONT4	-105.80	24	-69.59	-23.20	2.21	0.80	68	2	59.3	9/GR16
CHLCONT6	-105.80	24	-73.52	-55.52	3.65	1.31	39	2	59.8	9/GR16
CRBBAHO1	-92.30	24	-76.09	24.13	1.83	0.80	141	1	62.0	9/GR18
CRBBERO1	-92.30	24	-64.76	32.13	0.80	0.80	90	1	57.0	9/GR18
CRBBLZO1	-92.30	24	-88.61	17.26	0.80	0.80	90	1	58.9	9/GR18
CRBECCO1	-92.30	24	-60.07	8.26	4.20	0.86	115	1	64.6	9/GR18
CRBJMCO1	-92.30	24	-79.45	17.97	0.99	0.80	151	1	61.4	9/GR18
EGACOOO1	-94.80	24	-78.31	-1.52	1.48	1.15	65	1	63.3	9/GR19
EGAGOOO1	-94.80	24	-90.36	-0.57	0.94	0.89	99	1	61.3	9/GR19
GRDCOOO3	-79.30	24	-61.62	12.34	0.80	0.80	90	2	58.9	
GTMIFRB2	-107.30	24	-90.50	15.64	1.03	0.80	84	1	61.4	
GUFMGGO2	-52.80	24	-56.42	8.47	4.16	0.81	123	2	63.0	2 7
HWACOOO2	-165.80	24	-165.79	23.32	4.20	0.80	160	2	59.0	9/GR1
HWAOOOO3	-174.80	24	-166.10	23.42	4.25	0.80	159	2	59.0	9/GR2
MEXO1NTE	-77.80	24	-105.80	25.99	2.88	2.07	155	2	60.8	1
MEXO2NTE	-135.80	24	-107.36	26.32	3.80	1.57	149	2	61.5	1
MEXO2SUR	-126.80	24	-96.39	19.88	3.19	1.87	158	2	62.8	1
PNRIFRB2	-121.00	24	-80.15	8.46	1.01	0.80	170	1	65.1	
PRUOOOO4	-85.80	24	-74.19	-8.39	3.74	2.45	112	2	63.2	
PTRVIKO1	-100.80	24	-65.85	18.12	0.80	0.80	90	2	60.9	1 6 9/GR20
PTRVIRO2	-109.80	24	-65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21
USAEHOO1	-61.30	24	-85.16	36.21	5.63	3.32	22	2	62.1	1 5 6
USAEHOO2	-100.80	24	-89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20
USAEHOO3	-109.80	24	-90.12	36.11	5.55	3.56	161	2	62.4	1 6 9/GR21
USAEHOO4	-118.80	24	-91.16	36.05	5.38	3.24	153	2	62.9	1 5 6
USAPSAO2	-165.80	24	-117.79	40.58	4.04	0.82	135	2	63.6	9/GR1

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
USAPSA03	-174.80	24	-118.20	40.15	3.63	0.80	136	2	65.3	9/GR2
USAWH101	-147.80	24	-109.70	38.13	5.52	1.96	142	2	62.4	
USAWH102	-156.80	24	-111.40	38.57	5.51	1.55	138	2	63.5	
VEN02VEN	-103.80	24	-63.50	15.50	0.80	0.80	90	2	60.1	9/GR22
VEN11VEN	-103.80	24	-66.79	6.90	2.50	1.77	122	2	65.6	9/GR22

1	2	3	4		5		6	7	8	9
	Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
ALS00002	-166.20	25	-149.66	58.37	3.76	1.24	170	1	59.9	9/GR1
ALS00003	-175.20	25	-150.98	58.53	3.77	1.11	167	1	60.2	9/GR2
ARGINSU4	-94.20	25	-52.98	-59.81	3.40	0.80	19	1	60.1	9/GR3
ARGINSU5	-55.20	25	-44.17	-59.91	3.77	0.80	13	1	59.5	9/GR4
ARGSUK04	-94.20	25	-65.04	-43.33	3.32	1.50	40	1	60.9	9/GR3
ARGSUK05	-55.20	25	-63.68	-43.01	2.54	2.38	152	1	60.2	9/GR4
B CE311	-64.20	25	-40.60	-6.07	3.04	2.06	174	1	61.9	8 9/GR7
B CE312	-45.20	25	-40.27	-6.06	3.44	2.09	174	1	61.2	8 9/GR9
B CE411	-64.20	25	-50.97	-15.27	3.86	1.38	49	1	62.9	8 9/GR7
B CE412	-45.20	25	-50.71	-15.30	3.57	1.56	52	1	63.0	8 9/GR9
B CE511	-64.20	25	-53.10	-2.90	2.44	2.13	104	1	63.4	8 9/GR7
B NO611	-74.20	25	-59.60	-11.62	2.85	1.69	165	2	63.1	8 9/GR8
B NO711	-74.20	25	-60.70	-1.78	3.54	1.78	126	2	63.1	8 9/GR8
B NO811	-74.20	25	-68.76	-4.71	2.37	1.65	73	2	63.1	8 9/GR8
B SU111	-81.20	25	-51.12	-25.63	2.76	1.05	50	1	63.2	8 9/GR6
B SU112	-45.20	25	-50.75	-25.62	2.47	1.48	56	1	62.5	8 9/GR9
B SU211	-81.20	25	-44.51	-16.95	3.22	1.36	60	1	62.8	8 9/GR6
B SU212	-45.20	25	-44.00	-16.87	3.20	1.96	58	1	61.6	8 9/GR9
BERBERMU	-96.20	25	-64.77	32.32	0.80	0.80	90	2	57.0	
BOLAND01	-115.20	25	-65.04	-16.76	2.49	1.27	76	1	68.0	9/GR5
CAN01101	-138.20	25	-125.63	57.24	3.45	1.27	157	1	59.7	9/GR10
CAN01201	-138.20	25	-112.04	55.95	3.35	0.97	151	1	59.8	9/GR10
CAN01202	-72.70	25	-107.70	55.63	2.74	1.12	32	1	59.8	9/GR11
CAN01203	-129.20	25	-111.48	55.61	3.08	1.15	151	1	59.7	9/GR12
CAN01303	-129.20	25	-102.42	57.12	3.54	0.91	154	1	60.2	9/GR12
CAN01304	-91.20	25	-99.12	57.36	1.98	1.72	2	1	60.0	9/GR13
CAN01403	-129.20	25	-89.75	52.02	4.68	0.80	148	1	62.1	9/GR12
CAN01404	-91.20	25	-84.82	52.42	3.10	2.05	152	1	60.6	9/GR13

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Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
CANU1405	-82.20	25	-84.00	52.39	2.84	2.29	172	1	60.5	9/GR14
CAN01504	-91.20	25	-72.66	53.77	3.57	1.67	156	1	60.4	9/GR13
CAN01505	-82.20	25	-71.77	53.79	3.30	1.89	162	1	60.3	9/GR14
CAN01605	-82.20	25	-61.50	49.55	2.65	1.40	143	1	60.5	9/GR14
CAN01606	-70.70	25	-61.30	49.55	2.40	1.65	148	1	60.4	9/GR15
CHLCONT5	-106.20	25	-72.23	-35.57	2.60	0.80	55	1	59.6	9/GR17
CHLPACC2	-106.20	25	-80.06	-30.06	1.36	0.80	69	1	59.4	9/GR17
CLMANDC1	-115.20	25	-74.72	5.93	3.85	1.63	114	1	65.3	9/GR5
CLMOCOC1	-103.20	25	-74.50	5.87	3.98	1.96	118	1	63.9	
EQACAND1	-115.20	25	-78.40	-1.61	1.37	0.95	75	1	64.4	9/GR5
EQAGAND1	-115.20	25	-90.34	-0.62	0.90	0.81	89	1	61.5	9/GR5
HWA00002	-166.20	25	-165.79	23.42	4.20	0.80	160	1	59.0	9/GR1
HWA00003	-175.20	25	-166.10	23.42	4.25	0.80	159	1	58.9	9/GR2
JMC00002	-92.70	25	-77.30	18.12	0.80	0.80	90	2	60.1	
MEX01NTE	-78.20	25	-105.81	26.01	2.89	2.08	155	1	60.7	1
MEX01SUR	-69.20	25	-94.84	19.82	3.05	2.09	4	1	62.5	1
MEX02NTE	-136.20	25	-107.21	26.31	3.84	1.55	148	1	61.4	1
MEX02SUR	-127.20	25	-96.39	19.88	3.18	1.87	157	1	62.8	1
PAQPAC01	-106.20	25	-109.18	-27.53	0.80	0.80	90	1	56.4	9/GR17
PRG00002	-99.20	25	-58.66	-23.32	1.45	1.04	76	1	60.4	
PRUAND02	-115.20	25	-74.69	-8.39	3.41	1.79	95	1	64.3	9/GR5
PTRVIR01	-101.20	25	-65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20
PTRVIR02	-110.20	25	-65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21
SCN00001	-79.70	25	-62.46	17.44	0.80	0.80	90	1	58.6	
SPMFRAN3	-53.20	25	-67.24	47.51	3.16	0.80	7	1	60.6	2 7
SURINAM2	-84.70	25	-55.69	4.35	1.00	0.80	86	1	63.5	
URG00001	-71.70	25	-56.22	-32.52	1.02	0.89	11	1	60.2	
USAEH001	-61.70	25	-85.19	36.21	5.63	3.33	22	1	62.1	1 5 6

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
USAEH002	-101.20	25	-89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20
USAEH003	-110.20	25	-90.14	36.11	5.55	3.55	161	1	62.3	1 6 9/GR21
USAEH004	-119.20	25	-91.16	36.05	5.38	3.24	152	1	62.9	1 5 6
USAPSA02	-166.20	25	-117.80	40.58	4.03	0.82	135	1	63.5	9/GR1
USAPSA03	-175.20	25	-118.27	40.12	3.62	0.80	136	1	65.3	9/GR2
USAWH101	-148.20	25	-109.65	38.13	5.53	1.95	142	1	62.3	
USAWH102	-157.20	25	-111.41	38.57	5.51	1.54	138	1	63.5	
VENANDC3	-115.20	25	-67.04	6.91	2.37	1.43	111	1	67.6	9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	26	-149.63	58.52	3.81	1.23	171	2	59.9	9/GR1
ALS00003	-174.80	26	-150.95	58.54	3.77	1.11	167	2	60.2	9/GR2
ARGNORT4	-93.80	26	-63.96	-30.01	3.86	1.99	48	2	66.0	
ARGNORT5	-54.80	26	-62.85	-29.80	3.24	2.89	47	2	63.8	
ATNBEAM1	-52.80	26	-66.44	14.87	1.83	0.80	39	2	61.3	
B CE311	-63.80	26	-40.60	-6.07	3.04	2.06	174	2	61.9	8 9/GR7
B CE312	-44.80	26	-40.26	-6.06	3.44	2.09	174	2	61.2	8 9/GR9
B CE411	-63.80	26	-50.97	-15.26	3.86	1.38	49	2	62.9	8 9/GR7
B CE412	-44.80	26	-50.71	-15.30	3.57	1.56	52	2	63.0	8 9/GR9
B CE511	-63.80	26	-53.11	-2.98	2.42	2.15	107	2	63.4	8 9/GR7
B NO611	-73.80	26	-59.60	-11.62	2.86	1.69	165	1	63.1	8 9/GR8
B NO711	-73.80	26	-60.70	-1.78	3.54	1.78	126	1	63.1	8 9/GR8
B NO811	-73.80	26	-68.75	-4.71	2.37	1.65	73	1	63.1	8 9/GR8
B SE911	-101.80	26	-45.99	-19.09	2.22	0.80	62	2	65.7	8
B SU111	-80.80	26	-51.10	-25.64	2.76	1.06	50	2	63.1	8 9/GR6
B SU112	-44.80	26	-50.76	-25.62	2.47	1.48	56	2	62.6	8 9/GR9
B SU211	-80.80	26	-44.51	-16.94	3.22	1.37	60	2	62.8	8 9/GR6
B SU212	-44.80	26	-43.99	-16.97	3.27	1.92	59	2	61.6	8 9/GR9
BLZ00001	-115.80	26	-88.68	17.27	0.80	0.80	90	2	59.2	
CAN01101	-137.80	26	-125.60	57.24	3.45	1.27	157	2	59.7	9/GR10
CAN01201	-137.80	26	-111.92	55.89	3.33	0.98	151	2	59.8	9/GR10
CAN01202	-72.30	26	-107.64	55.62	2.75	1.11	32	2	59.8	9/GR11
CAN01203	-128.80	26	-111.43	55.56	3.07	1.15	151	2	59.7	9/GR12
CAN01303	-128.80	26	-102.39	57.12	3.54	0.92	154	2	60.3	9/GR12
CAN01304	-90.80	26	-99.00	57.33	1.96	1.73	1	2	60.0	9/GR13
CAN01403	-128.80	26	-89.70	52.02	4.67	0.80	148	2	62.1	9/GR12
CAN01404	-90.80	26	-84.78	52.41	3.09	2.06	153	2	60.6	9/GR13
CAN01405	-81.80	26	-84.02	52.34	2.82	2.30	172	2	60.5	9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
CAN01504	-90.80	26	-72.68	53.78	3.57	1.67	157	2	60.4	9/GR13
CAN01505	-81.80	26	-71.76	53.76	3.30	1.89	162	2	60.3	9/GR14
CAN01605	-81.80	26	-61.54	49.50	2.66	1.39	144	2	60.5	9/GR14
CAN01606	-70.30	26	-61.32	49.51	2.41	1.65	148	2	60.4	9/GR15
CHLCONT4	-105.80	26	-69.59	-23.20	2.21	0.80	68	2	59.3	9/GR16
CHLCONT6	-105.80	26	-73.52	-55.52	3.65	1.31	39	2	59.7	9/GR16
CRBBAH01	-92.30	26	-76.09	24.13	1.83	0.80	141	1	61.9	9/GR18
CRBBER01	-92.30	26	-64.76	32.13	0.80	0.80	90	1	56.9	9/GR18
CRBBLZ01	-92.30	26	-88.61	17.26	0.80	0.80	90	1	58.9	9/GR18
CRBECO01	-92.30	26	-60.07	8.26	4.20	0.86	115	1	64.6	9/GR18
CRBJMC01	-92.30	26	-79.45	17.97	0.99	0.80	151	1	61.3	9/GR18
CTR00201	-130.80	26	-84.33	9.67	0.82	0.80	119	2	66.0	
DMAIFR61	-79.30	26	-61.30	15.35	0.80	0.80	90	2	58.7	
EQAC0001	-94.80	26	-78.31	-1.52	1.48	1.15	65	1	63.3	9/GR19
EQAG0001	-94.80	26	-90.36	-0.57	0.94	0.89	99	1	61.2	9/GR19
HWA00002	-165.80	26	-165.79	23.32	4.20	0.80	160	2	59.0	9/GR1
HWA00003	-174.80	26	-166.10	23.42	4.25	0.80	159	2	59.0	9/GR2
MEX01NTE	-77.80	26	-105.80	25.99	2.88	2.07	155	2	60.7	1
MEX02NTE	-135.80	26	-107.36	26.32	3.80	1.57	149	2	61.4	1
MEX02SUR	-126.80	26	-96.39	19.88	3.19	1.87	158	2	62.8	1
NCGU0003	-107.30	26	-84.99	12.90	1.05	1.01	176	1	63.6	
PRU00004	-85.80	26	-74.19	-8.39	3.74	2.45	112	2	63.1	
PTRVIR01	-100.80	26	-65.85	18.12	0.80	0.80	90	2	60.8	1 6 9/GR20
PTRVIR02	-109.80	26	-65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21
USAEH001	-61.30	26	-85.16	36.21	5.63	3.32	22	2	62.1	1 5 6
USAEH002	-100.80	26	-89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20
USAEH003	-109.80	26	-90.12	36.11	5.55	3.56	161	2	62.3	1 6 9/GR21
USAEH004	-118.80	26	-91.16	36.05	5.38	3.24	153	2	62.9	1 5 6

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4	5	6	7	8	9

1	2	3	4		5		6	7	8	9
USAPSA02	-165.80	26	-117.79	40.58	4.04	0.82	135	2	63.5	9/GR1
USAPSA03	-174.80	26	-118.20	40.15	3.63	0.80	136	2	65.3	9/GR2
USAWH101	-147.80	26	-109.70	38.13	5.52	1.96	142	2	62.3	
USAWH102	-156.80	26	-111.40	38.57	5.51	1.55	138	2	63.5	
VEN11VEN	-103.80	26	-66.79	6.90	2.50	1.77	122	2	65.5	

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-166.20	27	-149.66	58.37	3.76	1.24	170	1	60.0	9/GR1
ALS00003	-175.20	27	-150.98	58.53	3.77	1.11	167	1	60.2	9/GR2
ARGINSU4	-94.20	27	-52.98	-59.81	3.40	0.80	19	1	60.1	9/GR3
ARGINSU5	-55.20	27	-44.17	-59.91	3.77	0.80	13	1	59.5	9/GR4
ARGSUR04	-94.20	27	-65.04	-43.33	3.32	1.50	40	1	60.9	9/GR3
ARGSUR05	-55.20	27	-63.68	-43.01	2.54	2.38	152	1	60.3	9/GR4
B CE311	-64.20	27	-40.60	-6.07	3.04	2.06	174	1	61.9	8 9/GR7
B CE312	-45.20	27	-40.27	-6.06	3.44	2.09	174	1	61.3	8 9/GR9
B CE411	-64.20	27	-50.97	-15.27	3.86	1.38	49	1	62.9	8 9/GR7
B CE412	-45.20	27	-50.71	-15.30	3.57	1.56	52	1	63.1	8 9/GR9
B CE511	-64.20	27	-53.10	-2.90	2.44	2.13	104	1	63.4	8 9/GR7
B NO611	-74.20	27	-59.60	-11.62	2.85	1.69	165	2	63.2	8 9/GR8
B NO711	-74.20	27	-60.70	-1.78	3.54	1.78	126	2	63.2	8 9/GR8
B NO811	-74.20	27	-68.76	-4.71	2.37	1.65	73	2	63.1	8 9/GR8
B SU111	-81.20	27	-51.12	-25.63	2.76	1.05	50	1	63.2	8 9/GR6
B SU112	-45.20	27	-50.75	-25.62	2.47	1.48	56	1	62.6	8 9/GR9
B SU211	-81.20	27	-44.51	-16.95	3.22	1.36	60	1	62.8	8 9/GR6
B SU212	-45.20	27	-44.00	-16.87	3.20	1.96	58	1	61.6	8 9/GR9
BERBERMU	-96.20	27	-64.77	32.32	0.80	0.80	90	2	57.0	
BOLAND01	-115.20	27	-65.04	-16.76	2.49	1.27	76	1	68.1	9/GR5
BOL00001	-87.20	27	-64.61	-16.71	2.52	2.19	85	1	64.2	
BRB00001	-92.70	27	-59.85	12.93	0.80	0.80	90	2	59.4	
CAN01101	-138.20	27	-125.63	57.24	3.45	1.27	157	1	59.7	9/GR10
CAN01201	-138.20	27	-112.04	55.95	3.35	0.97	151	1	59.8	9/GR10
CAN01202	-72.70	27	-107.70	55.63	2.74	1.12	32	1	59.8	9/GR11
CAN01203	-129.20	27	-111.48	55.61	3.08	1.15	151	1	59.7	9/GR12
CAN01303	-129.20	27	-102.42	57.12	3.54	0.91	154	1	60.3	9/GR12
CAN01304	-91.20	27	-99.12	57.36	1.98	1.72	2	1	60.1	9/GR13

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
CAN01403	-129.20	27	-89.75	52.02	4.68	0.80	148	1	62.1	9/GR12
CAN01404	-91.20	27	-84.82	52.42	3.10	2.05	152	1	60.6	9/GR13
CAN01405	-82.20	27	-84.00	52.39	2.84	2.29	172	1	60.5	9/GR14
CAN01504	-91.20	27	-72.66	53.77	3.57	1.67	156	1	60.4	9/GR13
CAN01505	-82.20	27	-71.77	53.79	3.30	1.89	162	1	60.4	9/GR14
CAN01605	-82.20	27	-61.50	49.55	2.65	1.40	143	1	60.5	9/GR14
CANU1606	-70.70	27	-61.30	49.55	2.40	1.65	148	1	60.5	9/GR15
CHLCONT5	-106.20	27	-72.23	-35.57	2.60	0.80	55	1	59.6	9/GR17
CHLPAC02	-106.20	27	-80.06	-30.06	1.36	0.80	69	1	59.4	9/GR17
CLMAND01	-115.20	27	-74.72	5.93	3.85	1.63	114	1	65.4	9/GR5
CLMCOC01	-103.20	27	-74.50	5.87	3.98	1.96	118	1	63.9	
CUB00001	-89.20	27	-79.81	21.62	2.24	0.80	168	1	61.3	
EQACAN01	-115.20	27	-78.40	-1.61	1.37	0.95	75	1	64.4	9/GR5
EQAGAND1	-115.20	27	-90.34	-0.62	0.90	0.81	89	1	61.6	9/GR5
GPDC0059	-57.20	27	-61.58	12.29	0.80	0.80	90	1	58.7	
GRLDNK01	-53.20	27	-44.89	66.56	2.70	0.82	173	1	60.2	2
GUY00201	-84.70	27	-59.19	4.78	1.44	0.85	95	1	63.8	
HWA00002	-166.20	27	-165.79	23.42	4.20	0.80	160	1	59.0	9/GR1
HWA00003	-175.20	27	-166.10	23.42	4.25	0.80	159	1	59.0	9/GR2
MEX01NTE	-78.20	27	-105.81	26.01	2.89	2.08	155	1	60.8	1
MEX01SUR	-69.20	27	-94.84	19.82	3.05	2.09	4	1	62.5	1
MEX02NTE	-136.20	27	-107.21	26.31	3.84	1.55	148	1	61.5	1
MEX02SUR	-127.20	27	-96.39	19.88	3.18	1.87	157	1	62.8	1
MSR00001	-79.70	27	-61.73	16.75	0.80	0.80	90	1	58.9	4
PAGPAC01	-106.20	27	-109.18	-27.53	0.80	0.80	90	1	56.4	9/GR17
PRG00002	-99.20	27	-58.66	-23.32	1.45	1.04	76	1	60.5	
PRUAND02	-115.20	27	-74.69	-8.39	3.41	1.79	95	1	64.3	9/GR5
PTRVIR01	-101.20	27	-65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
PTRVIR02	-110.20	27	-65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21
URG00001	-71.70	27	-56.22	-32.52	1.02	0.89	11	1	60.2	
USAEH001	-61.70	27	-85.19	36.21	5.63	3.33	22	1	62.1	1 5 6
USAEH002	-101.20	27	-89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20
USAEH003	-110.20	27	-90.14	36.11	5.55	3.55	161	1	62.4	1 6 9/GR21
USAEH004	-119.20	27	-91.16	36.05	5.38	3.24	152	1	62.9	1 5 6
USAPSA02	-166.20	27	-117.80	40.58	4.03	0.82	135	1	63.6	9/GR1
USAPSA03	-175.20	27	-118.27	40.12	3.62	0.80	136	1	65.4	9/GR2
USAWH101	-148.20	27	-109.65	38.13	5.53	1.95	142	1	62.4	
USAWH102	-157.20	27	-111.41	38.57	5.51	1.54	138	1	63.5	
VENAND03	-115.20	27	-67.04	6.91	2.37	1.43	111	1	67.7	9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	28	-149.63	58.52	3.81	1.23	171	2	59.9	9/GR1
ALS00003	-174.80	28	-150.95	58.54	3.77	1.11	167	2	60.2	9/GR2
ARGNORT4	-93.80	28	-63.96	-30.01	3.86	1.99	48	2	66.1	
ARGNORT5	-54.80	28	-62.85	-29.80	3.24	2.89	47	2	63.9	
B CE311	-63.80	28	-40.60	-6.07	3.04	2.06	174	2	61.9	8 9/GR7
B CE312	-44.80	28	-40.26	-6.06	3.44	2.09	174	2	61.3	8 9/GR9
B CE411	-63.80	28	-50.97	-15.26	3.86	1.38	49	2	62.9	8 9/GR7
B CE412	-44.80	28	-50.71	-15.30	3.57	1.56	52	2	63.1	8 9/GR9
B CE511	-63.80	28	-53.11	-2.98	2.42	2.15	107	2	63.4	8 9/GR7
B NO611	-73.80	28	-59.60	-11.62	2.86	1.69	165	1	63.2	8 9/GR8
B NO711	-73.80	28	-60.70	-1.78	3.54	1.78	126	1	63.2	8 9/GR8
B NO811	-73.80	28	-68.75	-4.71	2.37	1.65	73	1	63.2	8 9/GR8
B SE911	-101.80	28	-45.99	-19.09	2.22	0.80	62	2	65.7	8
B SU111	-80.80	28	-51.10	-25.64	2.76	1.06	50	2	63.2	8 9/GR6
B SU112	-44.80	28	-50.76	-25.62	2.47	1.48	56	2	62.6	8 9/GR9
B SU211	-80.80	28	-44.51	-16.94	3.22	1.37	60	2	62.8	8 9/GR6
B SU212	-44.80	28	-43.99	-16.97	3.27	1.92	59	2	61.6	8 9/GR9
CAN01101	-137.80	28	-125.60	57.24	3.45	1.27	157	2	59.7	9/GR10
CAN01201	-137.80	28	-111.92	55.89	3.33	0.98	151	2	59.8	9/GR10
CAN01202	-72.30	28	-107.64	55.62	2.75	1.11	32	2	59.8	9/GR11
CAN01203	-128.80	28	-111.43	55.56	3.07	1.15	151	2	59.7	9/GR12
CAN01303	-128.80	28	-102.39	57.12	3.54	0.92	154	2	60.3	9/GR12
CAN01304	-90.80	28	-99.00	57.33	1.96	1.73	1	2	60.0	9/GR13
CAN01403	-128.80	28	-89.70	52.02	4.67	0.80	148	2	62.1	9/GR12
CAN01404	-90.80	28	-84.78	52.41	3.09	2.06	153	2	60.6	9/GR13
CAN01405	-81.80	28	-84.02	52.34	2.82	2.30	172	2	60.5	9/GR14
CAN01504	-90.80	28	-72.68	53.78	3.57	1.67	157	2	60.4	9/GR13
CAN01505	-81.80	28	-71.76	53.76	3.30	1.89	162	2	60.4	9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
CAN01605	-81.80	28	-61.54	49.50	2.66	1.39	144	2	60.5	9/GR14
CAN01606	-70.30	28	-61.32	49.51	2.41	1.65	148	2	60.5	9/GR15
CHLCONT4	-105.80	28	-69.59	-23.20	2.21	0.80	68	2	59.3	9/GR16
CHLCONT6	-105.80	28	-73.52	-55.52	3.65	1.31	39	2	59.8	9/GR16
CRBBAH01	-92.30	28	-76.09	24.13	1.83	0.80	141	1	62.0	9/GR18
CRBBER01	-92.30	28	-64.76	32.13	0.80	0.80	90	1	57.0	9/GR18
CRBBLZ01	-92.30	28	-88.61	17.26	0.80	0.80	90	1	58.9	9/GR18
CRBEC001	-92.30	28	-60.07	8.26	4.20	0.86	115	1	64.6	9/GR18
CREJMC01	-92.30	28	-79.45	17.97	0.99	0.80	151	1	61.4	9/GR18
EQAC0001	-94.80	28	-78.31	-1.52	1.48	1.15	65	1	63.3	9/GR19
EQAG0001	-94.80	28	-90.36	-0.57	0.94	0.89	99	1	61.3	9/GR19
GRD00003	-79.30	28	-61.62	12.34	0.80	0.80	90	2	58.9	
GTMIFRB2	-107.30	28	-90.50	15.64	1.03	0.80	84	1	61.4	
GUFMGG02	-52.80	28	-56.42	8.47	4.16	0.81	123	2	63.0	2 7
HWA00002	-165.80	28	-165.79	23.32	4.20	0.80	160	2	59.0	9/GR1
HWA00003	-174.80	28	-166.10	23.42	4.25	0.80	159	2	59.0	9/GR2
MEX01NTE	-77.80	28	-105.80	25.99	2.88	2.07	155	2	60.8	1
MEX02NTE	-135.80	28	-107.36	26.32	3.80	1.57	149	2	61.5	1
MEX02SUR	-126.80	28	-96.39	19.88	3.19	1.87	158	2	62.8	1
PNRIFRB2	-121.00	28	-80.15	8.46	1.01	0.80	170	1	65.1	
PRU00004	-85.80	28	-74.19	-8.39	3.74	2.45	112	2	63.2	
PTRVIR01	-100.80	28	-65.85	18.12	0.80	0.80	90	2	60.9	1 6 9/GR20
PTRVIR02	-109.80	28	-65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21
USAEH001	-61.30	28	-85.16	36.21	5.63	3.32	22	2	62.1	1 5 6
USAEH002	-100.80	28	-89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20
USAEH003	-109.80	28	-90.12	36.11	5.55	3.56	161	2	62.4	1 6 9/GR21
USAEH004	-118.80	28	-91.16	36.05	5.38	3.24	153	2	62.9	1 5 6
USAPSA02	-165.80	28	-117.79	40.58	4.04	0.82	135	2	63.6	9/GR1

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
USAPSAC3	-174.80	28	-118.20	40.15	3.63	0.80	136	2	65.3	9/GR2
USAWh101	-147.80	28	-109.70	38.13	5.52	1.96	142	2	62.4	
USAWH102	-156.80	28	-111.40	38.57	5.51	1.55	138	2	63.5	
VEN02VEN	-103.80	28	-63.50	15.50	0.80	0.80	90	2	60.1	9/GR22
VEN11VEN	-103.80	28	-66.79	6.90	2.50	1.77	122	2	65.6	9/GR22

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
ALS00002	-166.20	29	-149.66	58.37	3.76	1.24	170	1	59.9	9/GR1
ALS00003	-175.20	29	-150.98	58.53	3.77	1.11	167	1	60.2	9/GR2
ARGINSU4	-94.20	29	-52.98	-59.81	3.40	0.80	19	1	60.1	9/GR3
ARGINSU5	-55.20	29	-44.17	-59.91	3.77	0.80	13	1	59.5	9/GR4
ARGSUR04	-94.20	29	-65.04	-43.33	3.32	1.50	40	1	60.9	9/GR3
ARGSUR05	-55.20	29	-63.68	-43.01	2.54	2.38	152	1	60.2	9/GR4
B CE311	-64.20	29	-40.60	-6.07	3.04	2.06	174	1	61.9	8 9/GR7
B CE312	-45.20	29	-40.27	-6.06	3.44	2.09	174	1	61.2	8 9/GR9
B CE411	-64.20	29	-50.97	-15.27	3.86	1.38	49	1	62.9	8 9/GR7
B CE412	-45.20	29	-50.71	-15.30	3.57	1.56	52	1	63.0	8 9/GR9
B CE511	-64.20	29	-53.10	-2.90	2.44	2.13	104	1	63.4	8 9/GR7
B NO611	-74.20	29	-59.60	-11.62	2.85	1.69	165	2	63.1	8 9/GR8
B NO711	-74.20	29	-60.70	-1.78	3.54	1.78	126	2	63.1	8 9/GR8
B NO811	-74.20	29	-68.76	-4.71	2.37	1.65	73	2	63.1	8 9/GR8
B SU111	-81.20	29	-51.12	-25.63	2.76	1.05	50	1	63.2	8 9/GR6
B SU112	-45.20	29	-50.75	-25.62	2.47	1.48	56	1	62.5	8 9/GR9
B SU211	-81.20	29	-44.51	-16.95	3.22	1.36	60	1	62.8	8 9/GR6
B SU212	-45.20	29	-44.00	-16.87	3.20	1.96	58	1	61.6	8 9/GR9
BERBERMU	-96.20	29	-64.77	32.32	0.80	0.80	90	2	57.0	
BOLAND01	-115.20	29	-65.04	-16.76	2.49	1.27	76	1	68.0	9/GR5
CAN01101	-138.20	29	-125.63	57.24	3.45	1.27	157	1	59.7	9/GR10
CAN01201	-138.20	29	-112.04	55.95	3.35	0.97	151	1	59.8	9/GR10
CAN01202	-72.70	29	-107.70	55.63	2.74	1.12	32	1	59.8	9/GR11
CAN01203	-129.20	29	-111.48	55.61	3.08	1.15	151	1	59.7	9/GR12
CAN01303	-129.20	29	-102.42	57.12	3.54	0.91	154	1	60.2	9/GR12
CAN01304	-91.20	29	-99.12	57.36	1.98	1.72	2	1	60.0	9/GR13
CAN01403	-129.20	29	-89.75	52.02	4.68	0.80	148	1	62.1	9/GR12
CAN01404	-91.20	29	-84.82	52.42	3.10	2.05	152	1	60.6	9/GR13

1	2	3	4		5		6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

CANC1405	-82.20	29	-84.00	52.39	2.84	2.29	172	1	60.5	9/GR14
CANC1504	-91.20	29	-72.66	53.77	3.57	1.67	156	1	60.4	9/GR13
CANC1505	-82.20	29	-71.77	53.79	3.30	1.89	162	1	60.3	9/GR14
CANC1605	-82.20	29	-61.50	49.55	2.65	1.40	143	1	60.5	9/GR14
CANC1606	-70.70	29	-61.30	49.55	2.40	1.65	148	1	60.4	9/GR15
CHLCONT5	-106.20	29	-72.23	-35.57	2.60	0.80	55	1	59.6	9/GR17
CHLPAC02	-106.20	29	-80.06	-30.06	1.36	0.80	69	1	59.4	9/GR17
CLMANDC1	-115.20	29	-74.72	5.93	3.85	1.63	114	1	65.3	9/GR5
CLMC0001	-103.20	29	-74.50	5.87	3.98	1.96	118	1	63.9	
EGACAND1	-115.20	29	-78.40	-1.61	1.37	0.95	75	1	64.4	9/GR5
EGAGAND1	-115.20	29	-90.34	-0.62	0.90	0.81	89	1	61.5	9/GR5
HWAC00C2	-166.20	29	-165.79	23.42	4.20	0.80	160	1	59.0	9/GR1
HWAC0003	-175.20	29	-166.10	23.42	4.25	0.80	159	1	58.9	9/GR2
JMC00002	-92.70	29	-77.30	18.12	0.80	0.80	90	2	60.1	
MEX01NTE	-78.20	29	-105.81	26.01	2.89	2.08	155	1	60.7	1
MEX01SUR	-69.20	29	-94.84	19.82	3.05	2.09	4	1	62.5	1
MEX02NTE	-136.20	29	-107.21	26.31	3.84	1.55	148	1	61.4	1
MEX02SUR	-127.20	29	-96.39	19.88	3.18	1.87	157	1	62.8	1
PAGPAC01	-106.20	29	-109.18	-27.53	0.80	0.80	90	1	56.4	9/GR17
PRG00002	-99.20	29	-58.66	-23.32	1.45	1.04	76	1	60.4	
PRUAND02	-115.20	29	-74.69	-8.39	3.41	1.79	95	1	64.3	9/GR5
PTRVIR01	-101.20	29	-65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20
PTRVIR02	-110.20	29	-65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21
SCN00001	-79.70	29	-62.46	17.44	0.80	0.80	90	1	58.6	
SPMFRAN3	-53.20	29	-67.24	47.51	3.16	0.80	7	1	60.6	2 7
SURINAM2	-84.70	29	-55.69	4.35	1.00	0.80	86	1	63.5	
URG00001	-71.70	29	-56.22	-32.52	1.02	0.89	11	1	60.2	
USAEH001	-61.70	29	-85.19	36.21	5.63	3.33	22	1	62.1	1 5 6

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
USAEH002	-101.20	29	-89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20
USAEH003	-110.20	29	-90.14	36.11	5.55	3.55	161	1	62.3	1 6 9/GR21
USAEH004	-119.20	29	-91.16	36.05	5.38	3.24	152	1	62.9	1 5 6
USAPSA02	-166.20	29	-117.80	40.58	4.03	0.82	135	1	63.5	9/GR1
USAPSA03	-175.20	29	-118.27	40.12	3.62	0.80	136	1	65.3	9/GR2
USAWH101	-148.20	29	-109.65	38.13	5.53	1.95	142	1	62.3	
USAWH102	-157.20	29	-111.41	38.57	5.51	1.54	138	1	63.5	
VENAND03	-115.20	29	-67.04	6.91	2.37	1.43	111	1	67.6	9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-165.80	30	-149.63	58.52	3.81	1.23	171	2	59.9	9/GR1
ALS00003	-174.80	30	-150.95	58.54	3.77	1.11	167	2	60.2	9/GR2
ARGNORT4	-93.80	30	-63.96	-30.01	3.86	1.99	48	2	66.0	
ARGNORT5	-54.80	30	-62.85	-29.80	3.24	2.89	47	2	63.8	
ATNBEAM1	-52.80	30	-66.44	14.87	1.83	0.80	39	2	61.3	
B CE311	-63.80	30	-40.60	-6.07	3.04	2.06	174	2	61.9	8 9/GR7
B CE312	-44.80	30	-40.26	-6.06	3.44	2.09	174	2	61.2	8 9/GR9
B CE411	-63.80	30	-50.97	-15.26	3.86	1.38	49	2	62.9	8 9/GR7
B CE412	-44.80	30	-50.71	-15.30	3.57	1.56	52	2	63.0	8 9/GR9
B CE511	-63.80	30	-53.11	-2.98	2.42	2.15	107	2	63.4	8 9/GR7
B NO611	-73.80	30	-59.60	-11.62	2.86	1.69	165	1	63.1	8 9/GR8
B NO711	-73.80	30	-60.70	-1.78	3.54	1.78	126	1	63.1	8 9/GR8
B NO811	-73.80	30	-68.75	-4.71	2.37	1.65	73	1	63.1	8 9/GR8
B SE911	-101.80	30	-45.99	-19.09	2.22	0.80	62	2	65.7	8
B SU111	-80.80	30	-51.10	-25.64	2.76	1.06	50	2	63.1	8 9/GR6
B SU112	-44.80	30	-50.76	-25.62	2.47	1.48	56	2	62.6	8 9/GR9
B SU211	-80.80	30	-44.51	-16.94	3.22	1.37	60	2	62.8	8 9/GR6
B SU212	-44.80	30	-43.99	-16.97	3.27	1.92	59	2	61.6	8 9/GR9
BLZ00001	-115.80	30	-88.68	17.27	0.80	0.80	90	2	59.2	
CAN01101	-137.80	30	-125.60	57.24	3.45	1.27	157	2	59.7	9/GR10
CAN01201	-137.80	30	-111.92	55.89	3.33	0.98	151	2	59.8	9/GR10
CAN01202	-72.30	30	-107.64	55.62	2.75	1.11	32	2	59.8	9/GR11
CAN01203	-128.80	30	-111.43	55.56	3.07	1.15	151	2	59.7	9/GR12
CAN01303	-128.80	30	-102.39	57.12	3.54	0.92	154	2	60.3	9/GR12
CAN01304	-90.80	30	-99.00	57.33	1.96	1.73	1	2	60.0	9/GR13
CAN01403	-128.80	30	-89.70	52.02	4.67	0.80	148	2	62.1	9/GR12
CAN01404	-90.80	30	-84.78	52.41	3.09	2.06	153	2	60.6	9/GR13
CAN01405	-81.80	30	-84.02	52.34	2.82	2.30	172	2	60.5	9/GR14

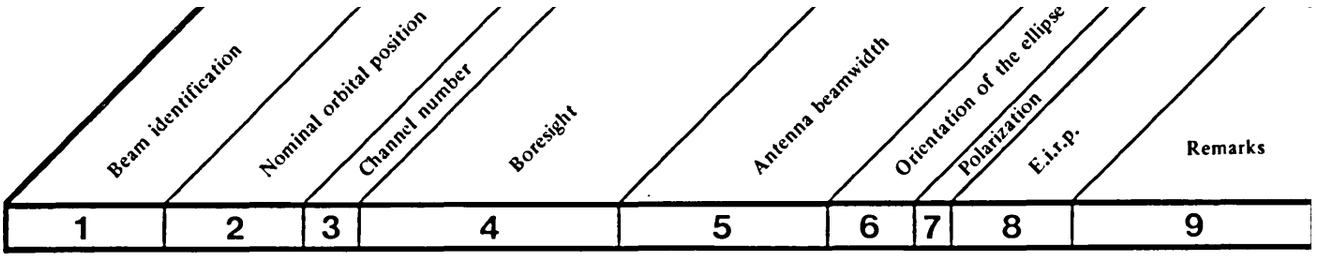
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
CAN01504	-90.80	30	-72.68	53.78	3.57	1.67	157	2	60.4	9/GR13
CAN01505	-81.80	30	-71.76	53.76	3.30	1.89	162	2	60.3	9/GR14
CAN01605	-81.80	30	-61.54	49.50	2.66	1.39	144	2	60.5	9/GR14
CAN01606	-70.30	30	-61.32	49.51	2.41	1.65	148	2	60.4	9/GR15
CHLCONT4	-105.80	30	-69.59	-23.20	2.21	0.80	68	2	59.3	9/GR16
CHLCONT6	-105.80	30	-73.52	-55.52	3.65	1.31	39	2	59.7	9/GR16
CRBBAH01	-92.30	30	-76.09	24.13	1.83	0.80	141	1	61.9	9/GR18
CRBBER01	-92.30	30	-64.76	32.13	0.80	0.80	90	1	56.9	9/GR18
CRBBLZ01	-92.30	30	-88.61	17.26	0.80	0.80	90	1	58.9	9/GR18
CRBEC001	-92.30	30	-60.07	8.26	4.20	0.86	115	1	64.6	9/GR18
CRBJMC01	-92.30	30	-79.45	17.97	0.99	0.80	151	1	61.3	9/GR18
CTR00201	-130.80	30	-84.33	9.67	0.82	0.80	119	2	66.0	
DMAIFRB1	-79.30	30	-61.30	15.35	0.80	0.80	90	2	58.7	
EQAC0001	-94.80	30	-78.31	-1.52	1.48	1.15	65	1	63.3	9/GR19
EQAG0001	-94.80	30	-90.36	-0.57	0.94	0.89	99	1	61.2	9/GR19
HWA00002	-165.80	30	-165.79	23.32	4.20	0.80	160	2	59.0	9/GR1
HWA00003	-174.80	30	-166.10	23.42	4.25	0.80	159	2	59.0	9/GR2
MEXO1NTE	-77.80	30	-105.80	25.99	2.88	2.07	155	2	60.7	1
MEXO2NTE	-135.80	30	-107.36	26.32	3.80	1.57	149	2	61.4	1
MEXO2SUR	-126.80	30	-96.39	19.88	3.19	1.87	158	2	62.8	1
NCG00003	-107.30	30	-84.99	12.90	1.05	1.01	176	1	63.6	
PRU00004	-85.80	30	-74.19	-8.39	3.74	2.45	112	2	63.1	
PTRVIR01	-100.80	30	-65.85	18.12	0.80	0.80	90	2	60.8	1 6 9/GR20
PTRVIR02	-109.80	30	-65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21
USAEH001	-61.30	30	-85.16	36.21	5.63	3.32	22	2	62.1	1 5 6
USAEH002	-100.80	30	-89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20
USAEH003	-109.80	30	-90.12	36.11	5.55	3.56	161	2	62.3	1 6 9/GR21
USAEH004	-118.80	30	-91.16	36.05	5.38	3.24	153	2	62.9	1 5 6

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
USAPSA02	-165.80	30	-117.79	40.58	4.04	0.82	135	2	63.5	9/GR1
USAPSA03	-174.80	30	-118.20	40.15	3.63	0.80	136	2	65.3	9/GR2
USAWH101	-147.80	30	-109.70	38.13	5.52	1.96	142	2	62.3	
USAWH102	-156.80	30	-111.40	38.57	5.51	1.55	138	2	63.5	
VEN11VEN	-103.80	30	-66.79	6.90	2.50	1.77	122	2	65.5	

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
ALS00002	-166.20	31	-149.66	58.37	3.76	1.24	170	1	60.0	9/GR1
ALS00003	-175.20	31	-150.98	58.53	3.77	1.11	167	1	60.2	9/GR2
ARGINSU4	-94.20	31	-52.98	-59.81	3.40	0.80	19	1	60.1	9/GR3
ARGINSU5	-55.20	31	-44.17	-59.91	3.77	0.80	13	1	59.5	9/GR4
ARGSUR04	-94.20	31	-65.04	-43.33	3.32	1.50	40	1	60.9	9/GR3
ARGSUR05	-55.20	31	-63.68	-43.01	2.54	2.38	152	1	60.3	9/GR4
B CE311	-64.20	31	-40.60	-6.07	3.04	2.06	174	1	61.9	8 9/GR7
B CE312	-45.20	31	-40.27	-6.06	3.44	2.09	174	1	61.3	8 9/GR9
B CE411	-64.20	31	-50.97	-15.27	3.86	1.38	49	1	62.9	8 9/GR7
B CE412	-45.20	31	-50.71	-15.30	3.57	1.56	52	1	63.1	8 9/GR9
B CE511	-64.20	31	-53.10	-2.90	2.44	2.13	104	1	63.4	8 9/GR7
B NO611	-74.20	31	-59.60	-11.62	2.85	1.69	165	2	63.2	8 9/GR8
B NO711	-74.20	31	-60.70	-1.78	3.54	1.78	126	2	63.2	8 9/GR8
B NO811	-74.20	31	-68.76	-4.71	2.37	1.65	73	2	63.1	8 9/GR8
B SU111	-81.20	31	-51.12	-25.63	2.76	1.05	50	1	63.2	8 9/GR6
B SU112	-45.20	31	-50.75	-25.62	2.47	1.48	56	1	62.6	8 9/GR9
B SU211	-81.20	31	-44.51	-16.95	3.22	1.36	60	1	62.8	8 9/GR6
B SU212	-45.20	31	-44.00	-16.87	3.20	1.96	58	1	61.6	8 9/GR9
BERBERMU	-96.20	31	-64.77	32.32	0.80	0.80	90	2	57.0	
BOLAND01	-115.20	31	-65.04	-16.76	2.49	1.27	76	1	68.1	9/GR5
BOL00001	-87.20	31	-64.61	-16.71	2.52	2.19	85	1	64.2	
BRB00001	-92.70	31	-59.85	12.93	0.80	0.80	90	2	59.4	
CAN01101	-138.20	31	-125.63	57.24	3.45	1.27	157	1	59.7	9/GR10
CAN01201	-138.20	31	-112.04	55.95	3.35	0.97	151	1	59.8	9/GR10
CAN01202	-72.70	31	-107.70	55.63	2.74	1.12	32	1	59.8	9/GR11
CAN01203	-129.20	31	-111.48	55.61	3.08	1.15	151	1	59.7	9/GR12
CAN01303	-129.20	31	-102.42	57.12	3.54	0.91	154	1	60.3	9/GR12
CAN01304	-91.20	31	-99.12	57.36	1.98	1.72	2	1	60.1	9/GR13



1	2	3	4		5		6	7	8	9
CAN01403	-129.20	31	-89.75	52.02	4.68	0.80	148	1	62.1	9/GR12
CAN01404	-91.20	31	-84.82	52.42	3.10	2.05	152	1	60.6	9/GR13
CAN01405	-82.20	31	-84.00	52.39	2.84	2.29	172	1	60.5	9/GR14
CAN01504	-91.20	31	-72.66	53.77	3.57	1.67	156	1	60.4	9/GR13
CAN01505	-82.20	31	-71.77	53.79	3.30	1.89	162	1	60.4	9/GR14
CAN01605	-82.20	31	-61.50	49.55	2.65	1.40	143	1	60.5	9/GR14
CAN01606	-70.70	31	-61.30	49.55	2.40	1.65	148	1	60.5	9/GR15
CHLCONT5	-106.20	31	-72.23	-35.57	2.60	0.80	55	1	59.6	9/GR17
CHLPAC02	-106.20	31	-80.06	-30.06	1.36	0.80	69	1	59.4	9/GR17
CLMAND01	-115.20	31	-74.72	5.93	3.85	1.63	114	1	65.4	9/GR5
CLM00001	-103.20	31	-74.50	5.87	3.98	1.96	118	1	63.9	
CUB00001	-89.20	31	-79.81	21.62	2.24	0.80	168	1	61.3	
EQACAND1	-115.20	31	-78.40	-1.61	1.37	0.95	75	1	64.4	9/GR5
EQAGAND1	-115.20	31	-90.34	-0.62	0.90	0.81	89	1	61.6	9/GR5
GRD00059	-57.20	31	-61.58	12.29	0.80	0.80	90	1	58.7	
GRLDNK01	-53.20	31	-44.89	66.56	2.70	0.82	173	1	60.2	2
GUYG0201	-84.70	31	-59.19	4.78	1.44	0.85	95	1	63.8	
HWA00002	-166.20	31	-165.79	23.42	4.20	0.80	160	1	59.0	9/GR1
HWA00003	-175.20	31	-166.10	23.42	4.25	0.80	159	1	59.0	9/GR2
MEX01NTE	-78.20	31	-105.81	26.01	2.89	2.08	155	1	60.8	1
MEX01SUR	-69.20	31	-94.84	19.82	3.05	2.09	4	1	62.5	1
MEX02NTE	-136.20	31	-107.21	26.31	3.84	1.55	148	1	61.5	1
MEX02SUR	-127.20	31	-96.39	19.88	3.18	1.87	157	1	62.8	1
MSR00001	-79.70	31	-61.73	16.75	0.80	0.80	90	1	58.9	4
PAQPAC01	-106.20	31	-109.18	-27.53	0.80	0.80	90	1	56.4	9/GR17
PRG00002	-99.20	31	-58.66	-23.32	1.45	1.04	76	1	60.5	
PRUAND02	-115.20	31	-74.69	-8.39	3.41	1.79	95	1	64.3	9/GR5
PTRVIR01	-101.20	31	-65.85	18.12	0.80	0.80	90	1	60.8	1 6 9/GR20

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
PTRVIR02	-110.20	31	-65.86	18.12	0.80	0.80	90	1	61.3	1 6 9/GR21
URG00001	-71.70	31	-56.22	-32.52	1.02	0.89	11	1	60.2	
USAEHC01	-61.70	31	-85.19	36.21	5.63	3.33	22	1	62.1	1 5 6
USAEH002	-101.20	31	-89.24	36.16	5.67	3.76	170	1	62.0	1 6 9/GR20
USAEH003	-110.20	31	-90.14	36.11	5.55	3.55	161	1	62.4	1 6 9/GR21
USAEH004	-119.20	31	-91.16	36.05	5.38	3.24	152	1	62.9	1 5 6
USAPSA02	-166.20	31	-117.80	40.58	4.03	0.82	135	1	63.6	9/GR1
USAPSA03	-175.20	31	-118.27	40.12	3.62	0.80	136	1	65.4	9/GR2
USAWH101	-148.20	31	-109.65	38.13	5.53	1.95	142	1	62.4	
USAWH102	-157.20	31	-111.41	38.57	5.51	1.54	138	1	63.5	
VENAND03	-115.20	31	-67.04	6.91	2.37	1.43	111	1	67.7	9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9
ALS00002	-165.80	32	-149.63	58.52	3.81	1.23	171	2	59.9	9/GR1
ALS00003	-174.80	32	-150.95	58.54	3.77	1.11	167	2	60.2	9/GR2
ARGNORT4	-93.80	32	-63.96	-30.01	3.86	1.99	48	2	66.1	
ARGNORT5	-54.80	32	-62.85	-29.80	3.24	2.89	47	2	63.9	
B CE311	-63.80	32	-40.60	-6.07	3.04	2.06	174	2	61.9	8 9/GR7
B CE312	-44.80	32	-40.26	-6.06	3.44	2.09	174	2	61.3	8 9/GR9
B CE411	-63.80	32	-50.97	-15.26	3.86	1.38	49	2	62.9	8 9/GR7
B CE412	-44.80	32	-50.71	-15.30	3.57	1.56	52	2	63.1	8 9/GR9
B CE511	-63.80	32	-53.11	-2.98	2.42	2.15	107	2	63.4	8 9/GR7
B NO611	-73.80	32	-59.60	-11.62	2.86	1.69	165	1	63.2	8 9/GR8
B NO711	-73.80	32	-60.70	-1.78	3.54	1.78	126	1	63.2	8 9/GR8
B NO811	-73.80	32	-68.75	-4.71	2.37	1.65	73	1	63.2	8 9/GR8
B SE911	-101.80	32	-45.99	-19.09	2.22	0.80	62	2	65.7	8
B SU111	-80.80	32	-51.10	-25.64	2.76	1.06	50	2	63.2	8 9/GR6
B SU112	-44.80	32	-50.76	-25.62	2.47	1.48	56	2	62.6	8 9/GR9
B SU211	-80.80	32	-44.51	-16.94	3.22	1.37	60	2	62.8	8 9/GR6
B SU212	-44.80	32	-43.99	-16.97	3.27	1.92	59	2	61.6	8 9/GR9
CAN01101	-137.80	32	-125.60	57.24	3.45	1.27	157	2	59.7	9/GR10
CAN01201	-137.80	32	-111.92	55.89	3.33	0.98	151	2	59.8	9/GR10
CAN01202	-72.30	32	-107.64	55.62	2.75	1.11	32	2	59.8	9/GR11
CAN01203	-128.80	32	-111.43	55.56	3.07	1.15	151	2	59.7	9/GR12
CAN01303	-128.80	32	-102.39	57.12	3.54	0.92	154	2	60.3	9/GR12
CAN01304	-90.80	32	-99.00	57.33	1.96	1.73	1	2	60.0	9/GR13
CAN01403	-128.80	32	-89.70	52.02	4.67	0.80	148	2	62.1	9/GR12
CAN01404	-90.80	32	-84.78	52.41	3.09	2.06	153	2	60.6	9/GR13
CAN01405	-81.80	32	-84.02	52.34	2.82	2.30	172	2	60.5	9/GR14
CAN01504	-90.80	32	-72.68	53.78	3.57	1.67	157	2	60.4	9/GR13
CAN01505	-81.80	32	-71.76	53.76	3.30	1.89	162	2	60.4	9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Remarks
1	2	3	4		5		6	7	8	9

1	2	3	4		5		6	7	8	9
CAN01605	-81.80	32	-61.54	49.50	2.66	1.39	144	2	60.5	9/GR14
CAN01606	-70.30	32	-61.32	49.51	2.41	1.65	148	2	60.5	9/GR15
CHLCONT4	-105.80	32	-69.59	-23.20	2.21	0.80	68	2	59.3	9/GR16
CHLCONT6	-105.80	32	-73.52	-55.52	3.65	1.31	39	2	59.8	9/GR16
CRBBAH01	-92.30	32	-76.09	24.13	1.83	0.80	141	1	62.0	9/GR18
CRBBER01	-92.30	32	-64.76	32.13	0.80	0.80	90	1	57.0	9/GR18
CRBBLZ01	-92.30	32	-88.61	17.26	0.80	0.80	90	1	58.9	9/GR18
CRBEC001	-92.30	32	-60.07	8.26	4.20	0.86	115	1	64.6	9/GR18
CRBJMC01	-92.30	32	-79.45	17.97	0.99	0.80	151	1	61.4	9/GR18
EQACU001	-94.80	32	-78.31	-1.52	1.48	1.15	65	1	63.3	9/GR19
EQAG0001	-94.80	32	-90.36	-0.57	0.94	0.89	99	1	61.3	9/GR19
GRD00003	-79.30	32	-61.62	12.34	0.80	0.80	90	2	58.9	
GTMIFRB2	-107.30	32	-90.50	15.64	1.03	0.80	84	1	61.4	
GUFMGG02	-52.80	32	-56.42	8.47	4.16	0.81	123	2	63.0	2 7
HWA00002	-165.80	32	-165.79	23.32	4.20	0.80	160	2	59.0	9/GR1
HWA00003	-174.80	32	-166.10	23.42	4.25	0.80	159	2	59.0	9/GR2
MEX01NTE	-77.80	32	-105.80	25.99	2.88	2.07	155	2	60.8	1
MEX02NTE	-135.80	32	-107.36	26.32	3.80	1.57	149	2	61.5	1
MEX02SUR	-126.80	32	-96.39	19.88	3.19	1.87	158	2	62.8	1
PNRIFRB2	-121.00	32	-80.15	8.46	1.01	0.80	170	1	65.1	
PRU00004	-85.80	32	-74.19	-8.39	3.74	2.45	112	2	63.2	
PTRVIR01	-100.80	32	-65.85	18.12	0.80	0.80	90	2	60.9	1 6 9/GR20
PTRVIR02	-109.80	32	-65.85	18.12	0.80	0.80	90	2	61.4	1 6 9/GR21
USAEH001	-61.30	32	-85.16	36.21	5.63	3.32	22	2	62.1	1 5 6
USAEH002	-100.80	32	-89.28	36.16	5.65	3.78	170	2	62.0	1 6 9/GR20
USAEH003	-109.80	32	-90.12	36.11	5.55	3.56	161	2	62.4	1 6 9/GR21
USAEH004	-118.80	32	-91.16	36.05	5.38	3.24	153	2	62.9	1 5 6
USAPSA02	-165.80	32	-117.79	40.58	4.04	0.82	135	2	63.6	9/GR1

1	2	3	4	5	6	7	8	9
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Remarks

1	2	3	4		5		6	7	8	9
USAPSA03	-174.80	32	-118.20	40.15	3.63	0.80	136	2	65.3	9/GR2
USAWH101	-147.80	32	-109.70	38.13	5.52	1.96	142	2	62.4	
USAWH102	-156.80	32	-111.40	38.57	5.51	1.55	138	2	63.5	
VENO2VEN	-103.80	32	-63.50	15.50	0.80	0.80	90	2	60.1	9/GR22
VEN11VEN	-103.80	32	-66.79	6.90	2.50	1.77	122	2	65.6	9/GR22

ARTICLE 11

Interference

11.1 The Members of the Union shall endeavour to agree on the action required to reduce harmful interference which might be caused by the application of these provisions and the associated Plan.

ARTICLE 12

Period of Validity of the Provisions and Associated Plan

12.1 The provisions and associated Plan have been prepared in order to meet the requirements of the broadcasting-satellite service in the bands concerned for a period extending until at least 1 January 1994. [1]

12.2 In any event, the provisions and associated Plan shall remain in force until their revision by a competent administrative radio conference convened in accordance with the relevant provisions of the Convention in force.

[1] See also Resolution No. 1(Sat-R2).

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ANNEX 1

Limits for Determining Whether a Service of an Administration Is Considered to be Affected by a Proposed Modification to the Plan or When It Is Necessary Under This Part of the Final Acts to Seek the Agreement of any other Administration [1, 2]

1. *Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Plan*

With respect to the modification to the Plan and when it is necessary under this Part of the Final Acts to seek the agreement of any other administration, except in cases covered by Resolution No. **2**(Sat-R2), an administration shall be considered as being affected if the overall equivalent protection margin [3] corresponding to a test point of its entry in the Plan, including the cumulative effect of any previous modification to the Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

- the Plan as established by this Conference; *or*
- a modification of the assignment in accordance with this Part; *or*
- a new entry in the Plan under Article 4 of this Part; *or*
- any agreement reached in accordance with this Part of the Final Acts except for Resolution No. **2**(Sat-R2).

2. *Limits to the change in the power flux-density to protect the broadcasting-satellite service in Region 1 in the band 12.2 - 12.5 GHz and in Region 3 in the band 12.5 - 12.7 GHz*

An administration in Region 1 or in Region 3 with an assignment in the Plan (Article 11 of Appendix **30** to the Radio Regulations) shall be considered as being affected if the proposed use would result in the following power flux-densities being exceeded at any point in the service area affected:

-147 dB(W/m^2/27 MHz)	for $0° \leqslant \theta < 0.48°$
$-139 + 25 \log \theta$ dB(W/m^2/27 MHz)	for $0.48° \leqslant \theta < 27.25°$
-103 dB(W/m^2/27 MHz)	for $\theta \geqslant 27.25°$

where θ is the difference in degrees between the longitudes of the broadcasting-satellite space station in Region 2 and the broadcasting-satellite space station affected in Region 1 or in Region 3.

[1] The limits specified in this Annex relate to the power flux-densities which would be obtained assuming clear sky conditions, i.e., including the effects of atmospheric absorption described in paragraph 2.1.1 of Annex 5 to this Part.

[2] See Resolution No. **9**(Sat-R2).

[3] For the definition of the overall equivalent protection margin, see paragraph 1.11 of Annex 5 to this Part.

3. *Limits to the change in the power flux-density to protect the terrestrial services of administrations in Regions 1 and 3* [1]

An administration in Region 1 or 3 shall be considered as being affected if the proposed use would result in the following power flux-density limits being exceeded:

a) in the frequency band 12.2 - 12.7 GHz for all the territories of administrations in Regions 1 [2] and 3 and for all arrival angles:

-125 dB(W/m^2/4 kHz)	for broadcasting-satellite space stations using circular polarization;
-128 dB(W/m^2/4 kHz)	for broadcasting-satellite space stations using linear polarization;

b) in the frequency band 12.2 - 12.5 GHz for territories of administrations in Region 3 and those in the western part of Region 1, west of longitude 30° E:

-132 dB(W/m^2/5 MHz)	for angles of arrival between 0° and 10° above the horizontal plane;
$-132 + 4.2\,(\gamma - 10)$ dB(W/m^2/5 MHz)	for angles of arrival γ (in degrees) between 10° and 15° above the horizontal plane;
-111 dB(W/m^2/5 MHz)	for angles of arrival between 15° and 90° above the horizontal plane.

4. *Limits to the change in power flux-density of assignments in the Region 2 Plan to protect the fixed-satellite service in the band 12.5 - 12.7 GHz in Region 1 and in the band 12.2 - 12.7 GHz in Region 3*

An administration in Region 1 or 3 shall be considered as being affected if the proposed use would result in an increase in the power flux-density on any part of its territory of 0.25 dB or more above that resulting from the frequency assignments in the Region 2 Plan at the time of entry into force of the Final Acts of this Conference.

However, where an assignment in the Region 2 Plan or its subsequent modification gives a power flux-density of less than -150 dB(W/m^2/40 kHz) anywhere in the territory of an administration of Region 1 or 3, that administration shall be considered as not affected.

5. *Limits on the change in the power flux-density to protect the terrestrial services of other administrations*

An administration in Region 2 shall be considered as being affected if the consequence of the proposed use is to increase the power flux-density arriving on any part of the territory of that administration by more than 0.25 dB over that resulting from the frequency assignments in the Plan at the time of entry into force of the Final Acts of this Conference.

The same administration shall be considered as not being affected if the value of the power flux-density anywhere in its territory does not exceed the following limit: -115 dB(W/m^2).

[1] See paragraph 3.18 of Annex 5 to this Part.

[2] In the band 12.5 - 12.7 GHz in Region 1, these limits are applicable only to the territory of administrations mentioned in Nos. **848** and **850** of the Radio Regulations.

ANNEX 2

Basic Characteristics to be Furnished in Notices [1] Relating to Space Stations in the Broadcasting-Satellite Service [2]

1. Country and beam identification.
2. Orbital position (xxx.xx degrees from the Greenwich meridian).
3. Assigned frequency or channel number.
4. Date of bringing into use.
5. Identity of the space station.
6. Service area (if necessary, the service area may be defined by a number of "test points").
7. Geographical coordinates of the intersection of the antenna beam axis with the Earth.
8. Rain-climatic zone(s) [3].
9. Class of station.
10. Class of emission and necessary bandwidth.
11. Power supplied to the antenna (dBW) and the maximum power density per Hz (dB(W/Hz)), averaged over the worst 5 MHz, 40 kHz and 4 kHz, supplied to the antenna.
12. Antenna characteristics:

a) gain of the antenna in the direction of maximum radiation referred to an isotropic radiator (dBi);

b) shape of the beam (elliptical, circular, or other);

c) pointing accuracy;

d) type of polarization;

e) sense of polarization;

f) for circular beams indicate the following:

- half-power beamwidth in degrees;
- co-polar and cross-polar radiation patterns;

g) for elliptical beams indicate the following:

- co-polar and cross-polar radiation patterns;
- rotation accuracy;
- orientation;
- major axis (degrees) at the half-power beamwidth;
- minor axis (degrees) at the half-power beamwidth;

h) for beams of other than circular or elliptical shape, indicate the following:

- co-polar and cross-polar gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite on to a plane perpendicular to the axis from the centre of the Earth to the satellite. The isotropic or absolute gain shall be indicated at each contour which corresponds to a decrease in gain of 2, 4, 6, 10 and 20 dB and thereafter at 10 dB intervals down to a value of 0 dB relative to an isotropic radiator;
- wherever practicable, a numerical equation or table providing the necessary information to allow the gain contours to be plotted.

[1] The Board shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Annex and related decisions of this Conference.

[2] In Region 2, only those notices relating to frequency assignments for space stations used for telemetry and tracking purposes associated with the Plan shall be furnished in accordance with Appendix 3 to the Radio Regulations.

[3] As defined in Annex 5 to this Part.

13. Station-keeping accuracy.

14. Modulation characteristics:

a) type of modulation;

b) pre-emphasis characteristics;

c) TV system;

d) sound-broadcasting characteristics;

e) frequency deviation;

f) composition of the baseband;

g) type of multiplexing of the video and sound signals;

h) energy dispersal characteristics (if used).

15. Regular hours of operation (UTC).

16. Coordination.

17. Agreements.

18. Other information.

19. Operating administration or company.

ANNEX 3

Method for Determining the Limiting Interfering Power Flux-Density at the Edge of a Broadcasting-Satellite Service Area in the Band 12.2 - 12.7 GHz and for Predicting the Power Flux-Density Produced There by a Terrestrial Station

1. *General*

1.1 This Annex describes a method of assessing the interference potential from terrestrial transmitters to broadcasting-satellite receivers.

1.2 The method is in two parts:

a) the calculation of the maximum permissible interfering power flux-density at the edge of the broadcasting-satellite service area concerned;

b) the calculation of the likely power flux-density produced at any point on the edge of the service area by the terrestrial transmitter of another administration.

1.3 The interference potential of the terrestrial transmitters must be considered case by case; the power flux-density produced by each terrestrial transmitter is compared to the limiting power flux-density at any point on the edge of the service area of a broadcasting-satellite station of another administration. If, for a given transmitter, the value of the power flux-density produced is lower than the value of the limiting power flux-density at any point on the edge of the service area, the interference caused to the broadcasting-satellite service by this transmitter is considered to be lower than the permissible value and no coordination is required between administrations before the terrestrial service is brought into use. Where this is not the case, coordination and further, more precise calculations derived from a mutually agreed basis are necessary.

1.4 It is emphasized that, should the calculation described in this Annex indicate that the maximum permissible power flux-density is exceeded, it does not necessarily preclude the introduction of the terrestrial service since the calculations are necessarily based on worst-case assumptions for:

a) the nature of the terrain of the interference path;

b) the off-beam discrimination of the broadcasting-satellite receiving installations;

c) the necessary protection ratios for the broadcasting-satellite service;

d) the type of reception in the broadcasting-satellite service, i.e., assuming individual reception, this being more critical than community reception for the angles of elevation concerned;

e) the value of power flux-density to be protected in the broadcasting-satellite service;

f) the propagation conditions between the terrestrial station and the broadcasting-satellite service area.

2. *Limit of power flux-density*

2.1 *General*

The limiting power flux-density not to be exceeded at the edge of the service area in order to protect the broadcasting-satellite service of an administration is given by the formula:

$$F = F_0 - R + D + P \quad (1)$$

where:

F = the maximum permissible interfering power flux-density (dB(W/m^2)) in the broadcasting-satellite necessary bandwidth;

F_0 = the wanted power flux-density (dB(W/m^2)) at the edge of the service area;

R = the protection ratio (dB) between the wanted and interfering signals;

D = angular discrimination (dB) provided by the radiation pattern of the broadcasting-satellite receiver antenna;

P = polarization discrimination (dB) between the wanted and interfering signals.

2.2 *Wanted power flux-density (F_0)*

The value of F_0 is equal to -107 dB(W/m^2) for 24 MHz, as well as for 27 MHz with respect to the cases mentioned in Note 1 to paragraph 3.8 of Annex 5 to this Part.

2.3 *Protection ratio (R)*

2.3.1 The single entry protection ratio against all types of terrestrial transmissions, with the exception of amplitude-modulation multichannel television systems, is 35 dB for carrier frequency differences between the wanted and interfering signals of up to ± 10 MHz, decreasing linearly from 35 dB to 0 dB for carrier frequency differences between 10 MHz and 35 MHz, and is 0 dB for frequency differences in excess of 35 MHz (see Fig. 1).

2.3.2 The carrier frequency difference should be determined by reference to the frequency assignments in the broadcasting-satellite Plan or, in the case of assignments not contained within a plan, by reference to the description of the characteristics of the proposed or operational system. For amplitude-modulation multichannel television systems which produce peaks of high power flux-density spread over a wide range of their necessary bandwidth, the protection ratio R is 35 dB and is independent of the carrier frequency difference.

2.3.3 A signal from a terrestrial station should be considered only if its necessary bandwidth overlaps the necessary bandwidth of the broadcasting-satellite assignment.

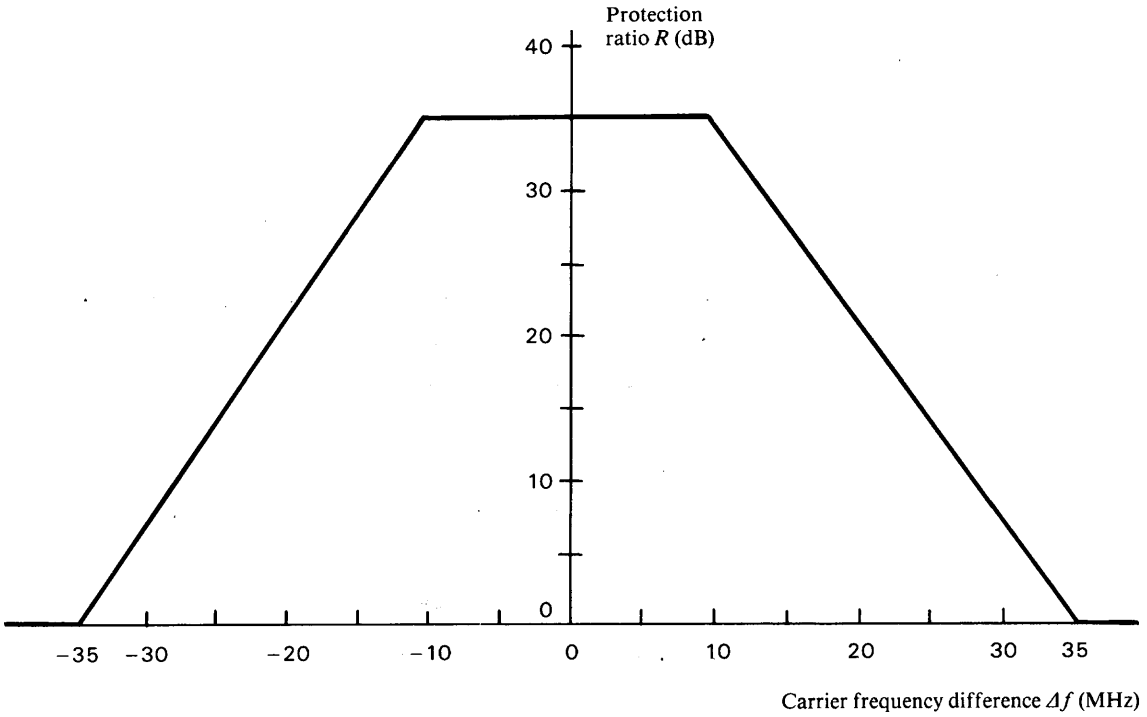


FIGURE 1

Protection ratio R (dB) for a broadcasting-satellite signal against a single entry of interference from a terrestrial service (except for AM multichannel TV systems)

2.4 *Angular discrimination (D)*

D should be derived from the expression (2) below where φ is the elevation angle for the proposed or operational broadcasting-satellite system for the broadcasting-satellite service area concerned.

Note: If more than one value of φ is specified for a particular service area, the appropriate value of φ should be used for each section of the edge of the service area under consideration.

$$\begin{aligned} D &= 0 && \text{for } 0° \leqslant \varphi \leqslant 0.43° \\ D &= 4.15\varphi^2 && \text{for } 0.43° < \varphi \leqslant 1.92° \\ D &= 8.24 + 25 \log_{10} \varphi && \text{for } 1.92° < \varphi \leqslant 25° \\ D &= 43.2 && \text{for } 25° < \varphi \end{aligned} \qquad (2)$$

For the graphical determination of *D* see Figure 2.

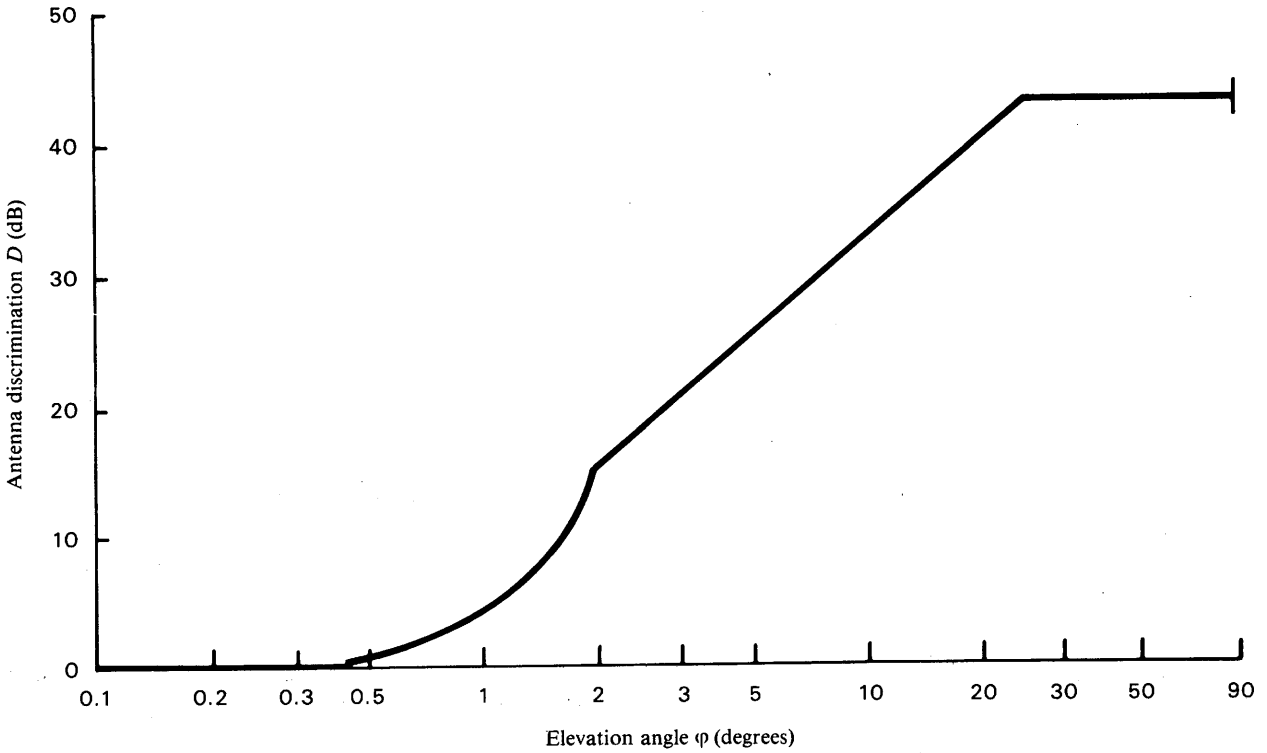


FIGURE 2

Discrimination D (dB) of broadcasting-satellite receiver antenna as a function of satellite elevation angle

2.5 *Polarization discrimination (P)*

The value of P is equal to:

a) 3 dB when the interfering terrestrial service uses linear polarization and the broadcasting-satellite service uses circular polarization or vice versa;

b) 0 dB when the interfering terrestrial service and the broadcasting-satellite service both use circular or both use linear polarization.

3. *Power flux-density produced by a terrestrial station (F_p)*

The power flux-density F_p (in dB(W/m^2)) produced at any point on the edge of the service area by the terrestrial station is determined from the following formula:

$$F_p = E - A + 43 \qquad (3)$$

where:

E = the equivalent isotropically radiated power (dBW) of the terrestrial station in the direction of the point on the edge of the service area concerned;

A = the total path loss in dB.

3.1 *Evaluation of path loss A for a terrestrial station at a distance greater than 100 km from the edge of the service area of the broadcasting satellite*

For path lengths greater than 100 km, A is given by:

$$A = 141.9 + 0.2867\ d_t + 0.1522\ d_m \quad (4)$$

where d_t and d_m are the overland and oversea path lengths respectively, in km.

3.2 *Evaluation of path loss A for a terrestrial station at a distance equal to or less than 100 km from the edge of the service area of the broadcasting satellite*

For path lengths equal to or less than 100 km, A is calculated using equations (4) and (5) and the lower value obtained is substituted in formula (3) to calculate the power flux-density produced at the point on the edge of the service area:

$$A = 114.4 + 20 \log_{10} (d_t + d_m) + 0.01\ (d_t + d_m) \quad (5)$$

The variation in A for different path lengths and percentage of oversea path is shown in Fig. 3.

3.3 *Distance beyond which the method need not be applied*

The method need not be applied and coordination is unnecessary when the distance between the terrestrial station and the service area of the broadcasting satellite is greater than:

a) 400 km in the case of all overland paths; *or*

b) 1200 km in the case of all oversea or mixed paths.

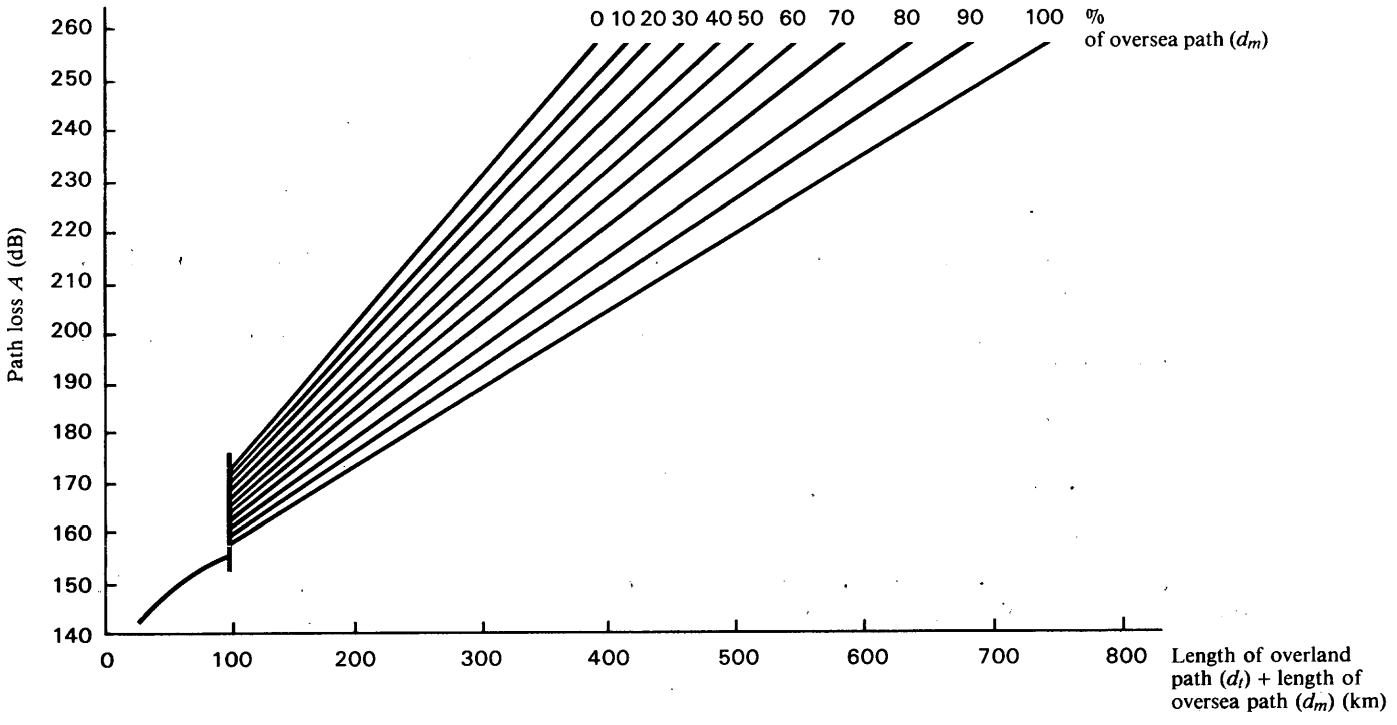


FIGURE 3

Total path loss A (dB) versus total path length ($d_t + d_m$) (km) and percentage of oversea path

ANNEX 4

Need for Coordination of a Fixed-Satellite Space Station in the Frequency Band 12.5 - 12.7 GHz in Region 1 and in the Band 12.2 - 12.7 GHz in Region 3 (Article 7) with Respect to the Region 2 Plan

With respect to paragraph 7.2.1 of Article 7 of this Part, coordination of a space station in the fixed-satellite service in Region 1 or 3 is required when, under assumed clear sky propagation conditions, the power flux-density on the territory of an administration in Region 2 exceeds the value derived from the following expressions:

-147 dB(W/m^2 /27 MHz)	for $0° \leqslant \theta < 0.44°$
$-138 + 25 \log \theta$ dB(W/m^2 /27 MHz)	for $0.44° \leqslant \theta < 19.1°$
-106 dB(W/m^2 /27 MHz)	for $\theta \geqslant 19.1°$

where θ is the difference in degrees between the longitude of the interfering fixed-satellite space station in Region 1 or 3 and the longitude of the affected broadcasting-satellite space station in Region 2.

ANNEX 5

Technical Data Used in Establishing the Provisions and Associated Plan and Which Should Be Used for their Application

1. DEFINITIONS

1.1 *Service area*

The area on the surface of the Earth in which the administration responsible for the service has the right to demand that the agreed protection conditions be provided.

Note: In the definition of service area, it is made clear that within the service area the agreed protection conditions can be demanded. This is the area where there should be at least the wanted power flux-density and protection against interference based on the agreed protection ratio for the agreed percentage of time.

1.2 *Coverage area*

The area on the surface of the Earth delineated by a contour of a constant given value of power flux-density which would permit the wanted quality of reception in the absence of interference.

Note 1: In accordance with the provisions of No. **2674** of the Radio Regulations, the coverage area must be the smallest area which encompasses the service area.

Note 2: The coverage area, which will normally encompass the entire service area, will result from the intersection of the antenna beam (elliptical or circular) with the surface of the Earth, and will be defined by a given value of power flux-density. For example, in the case of a Region 2 country with a service planned for individual reception, it would be the area delineated by the contour corresponding to a level of -107 dB(W/m^2) for 99% of the worst month. There will usually be an area outside the service area but within the coverage area in which the power flux-density will be at least equivalent to the minimum specified value; however, protection against interference will not be provided in this area.

1.3 *Beam area*

The area delineated by the intersection of the half-power beam of the satellite transmitting antenna with the surface of the Earth.

Note: The beam area is simply that area on the Earth's surface corresponding to the −3 dB points on the satellite antenna radiation pattern. In many cases the beam area would almost coincide with the coverage area, the discrepancy being accounted for by the permanent difference in path lengths from the satellite throughout the beam area, and also by the permanent variations, if any, in propagation factors across the area. However, for a service area where the maximum dimension as seen from the satellite position is less than 0.8° (the agreed minimum practicable satellite antenna half-power beamwidth), there could be a significant difference between the beam area and the coverage area.

1.4 *Nominal orbital position*

The longitude of a position in the geostationary-satellite orbit associated with a frequency assignment to a space station in a space radiocommunication service. The position is given in degrees from the Greenwich meridian.

1.5 *Adjacent channel*

The RF channel in the broadcasting-satellite service frequency Plan, or in the associated feeder-link frequency Plan, which is situated immediately higher or lower in frequency with respect to the RF reference channel.

1.6 *Second adjacent channel*

The RF channel in the broadcasting-satellite service frequency Plan, or in the associated feeder-link frequency Plan, which is situated immediately beyond either of the adjacent channels.

1.7 *Overall carrier-to-interference ratio*

The overall carrier-to-interference ratio is the ratio of the wanted carrier power to the sum of all interfering RF powers in a given channel including both feeder links and down-links. The overall carrier-to-interference ratio due to interference from the given channel is calculated as the reciprocal of the sum of the reciprocals of the feeder-link carrier-to-interference ratio and the down-link carrier-to-interference ratio referred to the satellite receiver input and earth station receiver input, respectively [1].

1.8 *Overall co-channel protection margin*

The overall co-channel protection margin in a given channel is the difference in dB between the overall co-channel carrier-to-interference ratio and the co-channel protection ratio.

[1] There are a total of five overall carrier-to-interference ratios used in the analysis of the Plan, namely, co-channel, upper and lower adjacent channels, and upper and lower second adjacent channels.

1.9 *Overall adjacent channel protection margin*

The overall adjacent channel protection margin is the difference, in dB, between the overall adjacent channel carrier-to-interference ratio and the adjacent channel protection ratio.

1.10 *Overall second adjacent channel protection margin*

The overall second adjacent channel protection margin is the difference in dB between the overall second adjacent channel carrier-to-interference ratio and the second adjacent channel protection ratio.

1.11 *Overall equivalent protection margin*

The overall equivalent protection margin M is given in dB by the expression:

$$M = -10 \log \left(\sum_{i=1}^{5} 10^{(-M_i/10)} \right) \qquad \text{(dB)}$$

where:

M_1 = overall co-channel protection margin, in dB (as defined in 1.8),

M_2, M_3 = overall adjacent channel protection margins for the upper and lower adjacent channels respectively, in dB (as defined in 1.9),

M_4, M_5 = overall second adjacent channel protection margins for the upper and lower second adjacent channels respectively, in dB (as defined in 1.10).

The adjective "equivalent" indicates that the protection margins for all interference sources from the adjacent and second adjacent channels as well as co-channel interference sources have been included.

2. RADIO PROPAGATION FACTORS

2.1 The propagation loss on an earth-space path is equal to the free space path loss plus the atmospheric absorption loss plus the rain attenuation exceeded for 1% of the worst month.

2.1.1 *Atmospheric absorption*

The loss due to atmospheric absorption (i.e. clear sky attenuation) is given by:

$$A_a = \frac{0.0584 + 0.0028\,\rho}{\sin\theta} \qquad \text{(dB)} \qquad \text{for } \theta \geqslant 5^\circ$$

where:

θ = the elevation angle (degrees),

ρ = the surface water vapour concentration in g/m^3,
with ρ = 10 g/m^3 for rain climatic zones A to K
and ρ = 20 g/m^3 for rain climatic zones M to P (see Figure 1).

2.1.2 *Rain attenuation*

The rain attenuation A_p of circularly polarized signals exceeded for 1% of the worst month at 12.5 GHz is given by:

$$A_p = 0.21\ \gamma\ L\ r \qquad \text{(dB)} \tag{1}$$

where:

L is the slant path length through rain

$$= \frac{2(h_R - h_0)}{\left[\sin^2\theta + 2\,\frac{(h_R - h_0)}{8500}\right]^{1/2} + \sin\theta} \qquad \text{(km)}$$

r is the rain path length reduction factor

$$= \frac{90}{90 + 4L\cos\theta}$$

h_R is the rain height (km)

$$= c\left\{5.1 - 2.15 \log\left[1 + 10^{(\varphi - 27)/25}\right]\right\} \qquad \text{(km)}$$

$c = 0.6$ for $\varphi \leqslant 20°$

$c = 0.6 + 0.02(\varphi - 20)$ for $20° < \varphi \leqslant 40°$

$c = 1.0$ for $\varphi > 40°$

h_0 = height (km) above mean sea level of the earth station;

φ = earth station latitude (degrees);

θ = elevation angle (degrees);

γ is the specific rain attenuation = $0.0202\ R^{1.198}$ dB/km;

R is the rain intensity (mm/h) obtained from the Table below for the rain climatic zones identified in Figure 1.

(*Note:* The method is based on R exceeded for 0.01% of an average year.)

Zone	A	B	C	D	E	F	G	K	M	N	P
(mm/h)	8	12	15	19	22	28	30	42	63	95	145

Figure 2 presents plots of rain attenuation, as calculated using equation (1), of circularly polarized signals exceeded for 1% of the worst month at 12.5 GHz, as a function of earth station latitude and elevation angle for each of the rain climatic zones shown in Figure 1.

2.1.3 *Rain attenuation limit*

In the analysis of the Plan, a maximum attenuation on the down-link of 9 dB was considered to place a bound on the inhomogeneity of broadcasting satellites in order to facilitate sharing during clear sky conditions.

2.2 *Depolarization*

Rain and ice can cause depolarization of radio frequency signals. The level of the co-polar component relative to the depolarized component is given by the cross-polarization discrimination (XPD) ratio. For circularly polarized emissions, the XPD ratio, in dB, not exceeded for 1% of the worst month is obtained from:

$$\text{XPD} = 30 \log f - 40 \log(\cos\theta) - 20 \log A_p \qquad \text{(dB)} \qquad \text{for } 5° \leqslant \theta \leqslant 60° \tag{2}$$

where A_p (dB) is the co-polar rain attenuation exceeded for 1% of the worst month (calculated in Section 2.1), f is the frequency in GHz and θ is the elevation angle. For angles of θ greater than 60°, use $\theta = 60°$ in equation (2).

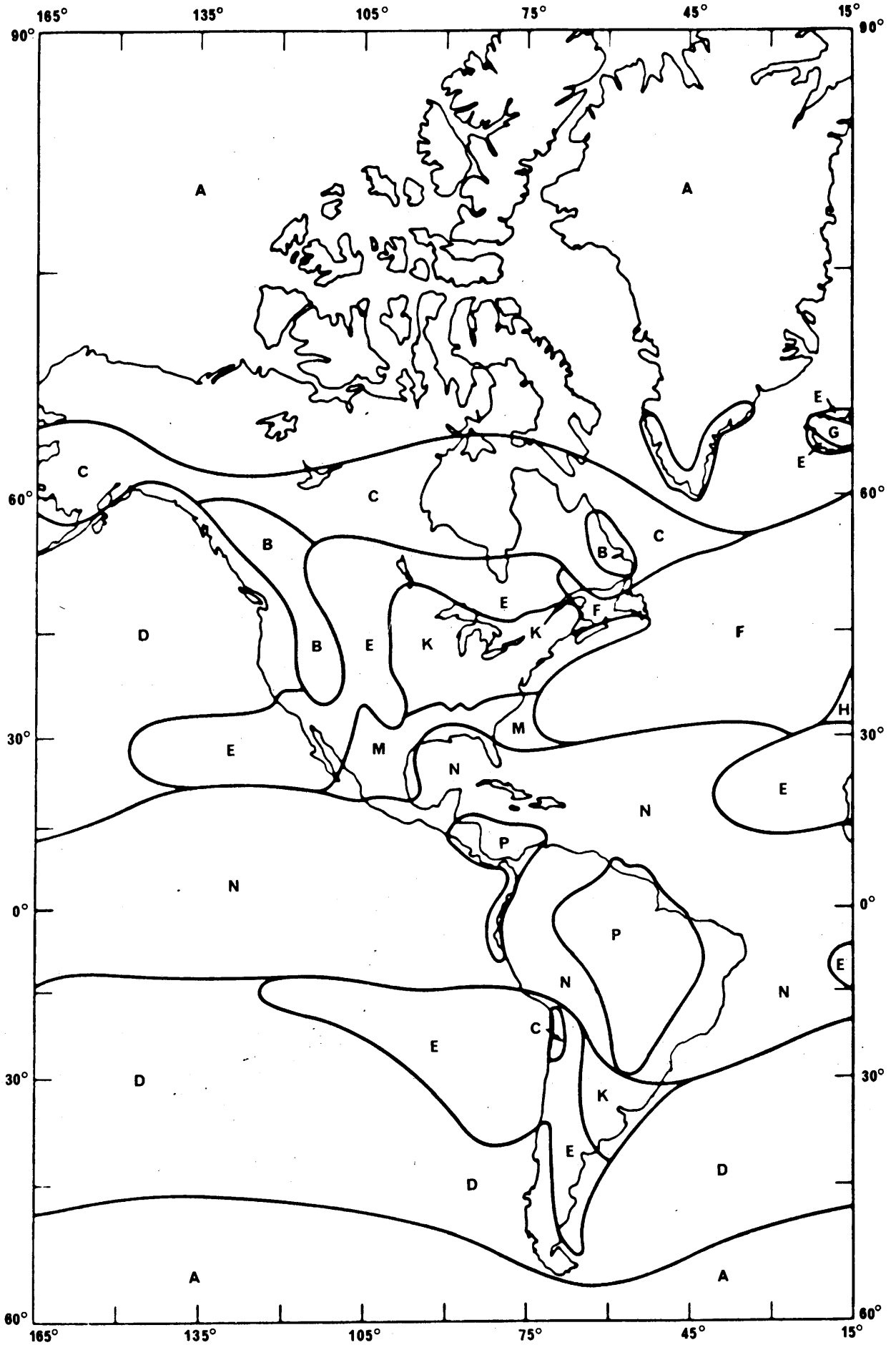
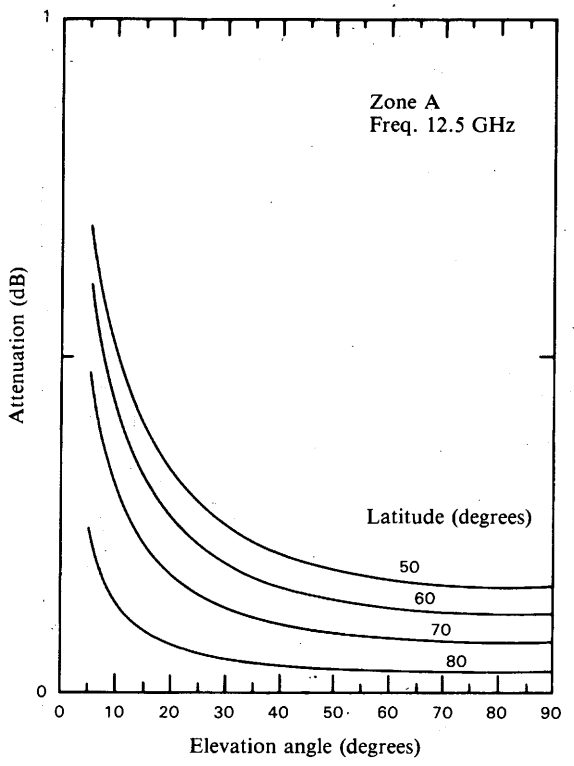
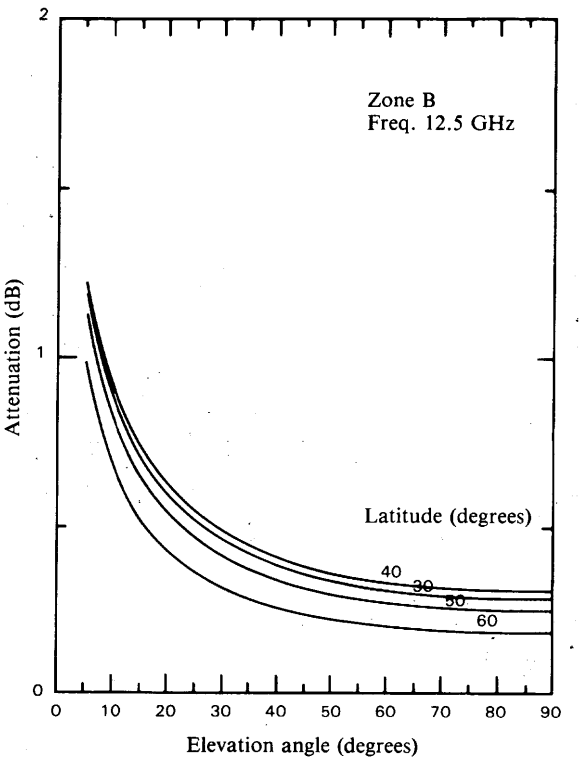


FIGURE 1

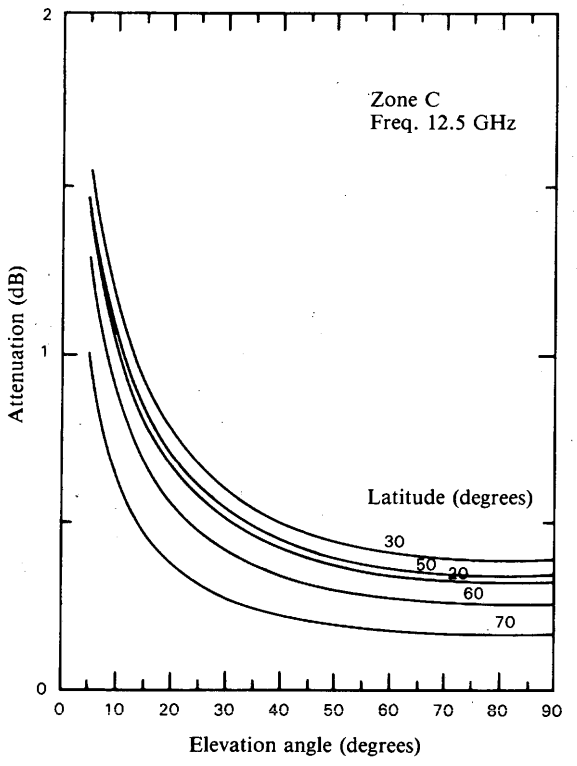
Rain climatic zones (Region 2)



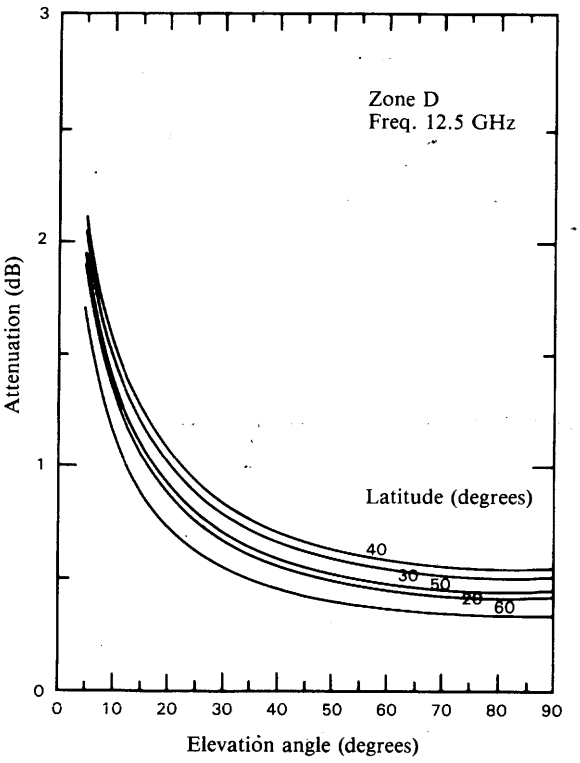
a) Rain climatic zone A



b) Rain climatic zone B



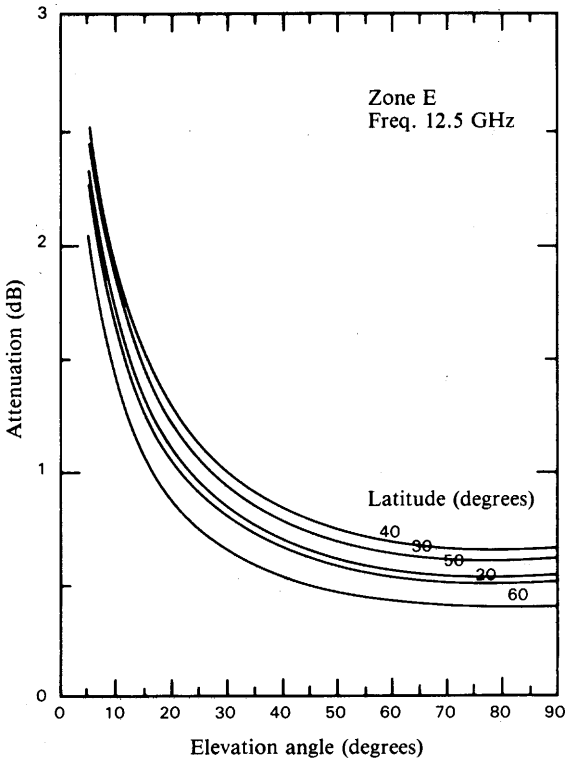
c) Rain climatic zone C



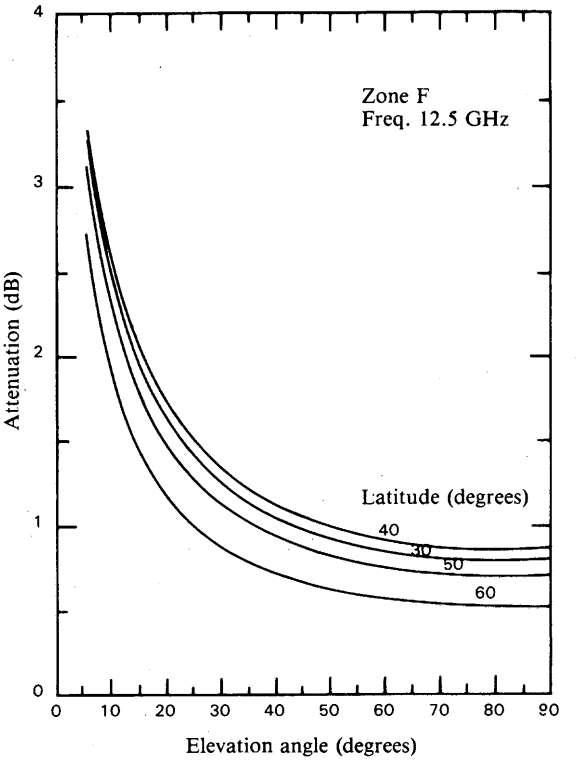
d) Rain climatic zone D

FIGURE 2

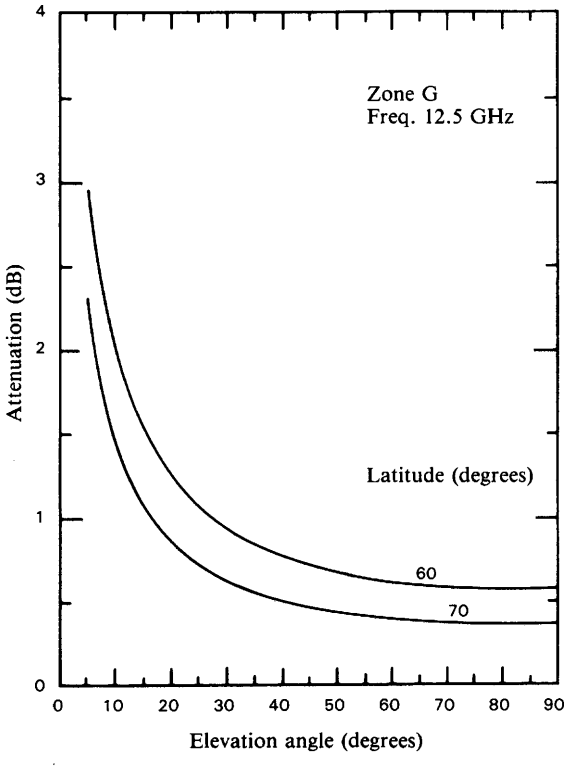
Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain climatic zones



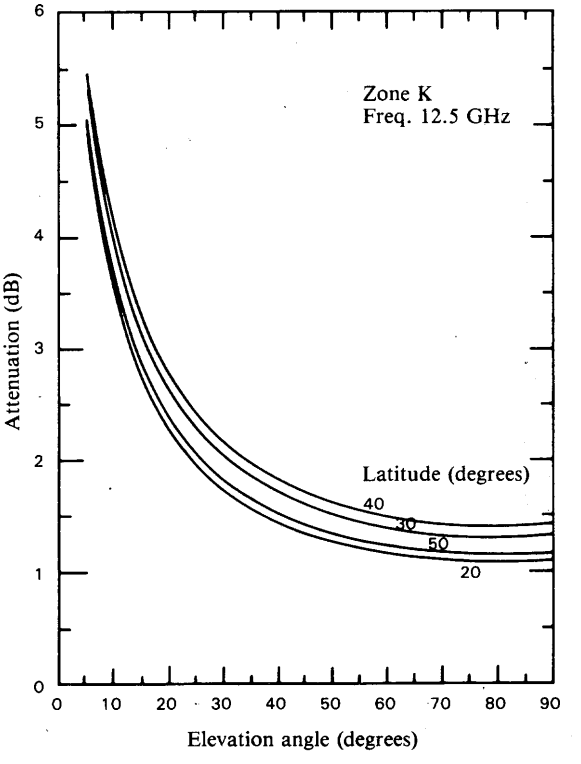
e) Rain climatic zone E



f) Rain climatic zone F



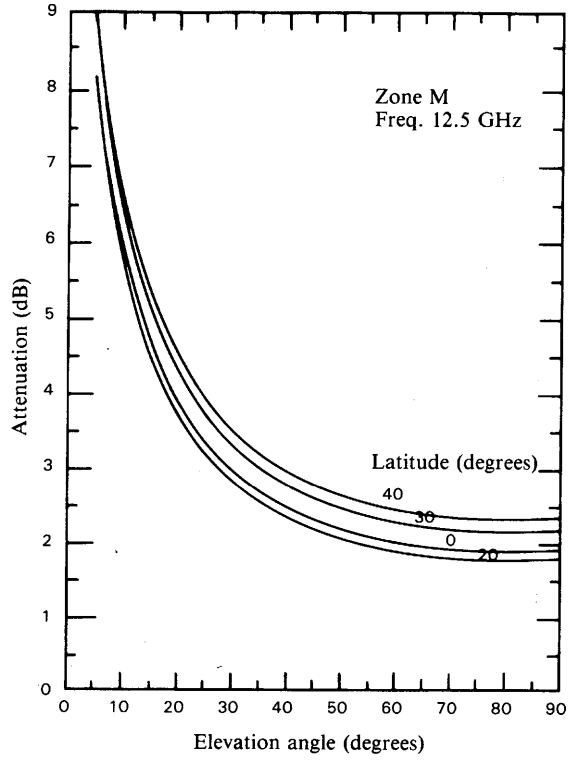
g) Rain climatic zone G



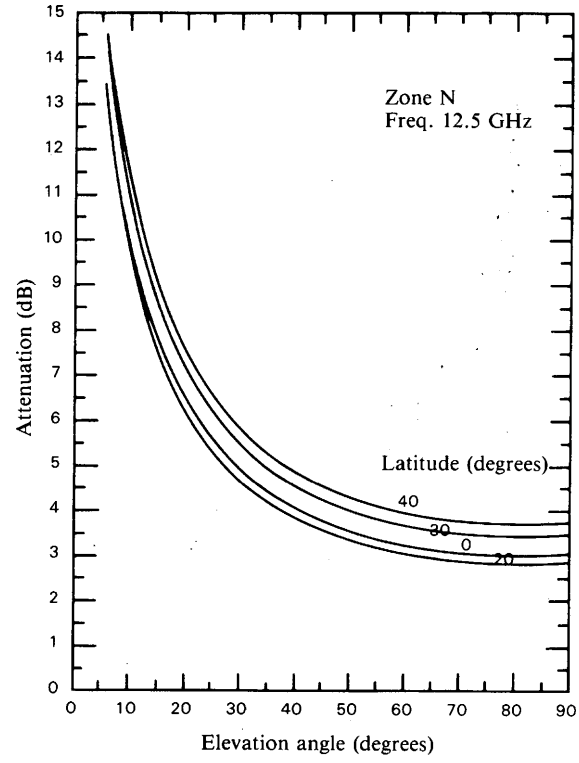
h) Rain climatic zone K

FIGURE 2 *(cont.)*

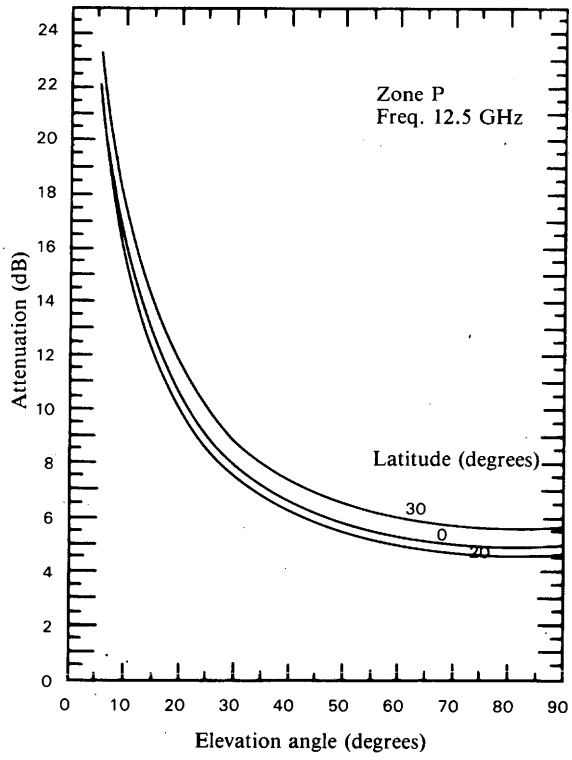
Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain climatic zones



j) Rain climatic zone M



k) Rain climatic zone N



l) Rain climatic zone P

FIGURE 2 *(cont.)*

Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain climatic zones

3. BASIC TECHNICAL CHARACTERISTICS

3.1 *Type of modulation*

Planning of the broadcasting-satellite service is based on the use of a frequency-modulated composite-coded colour television signal with two sound subcarriers. However, recognizing the need to provide for the use of new, enhanced television coding and modulation formats (e.g. time-compressed, multiplexed analogue video component signals and digitally-coded sound and data signals), values of the important technical characteristics have been chosen to take into consideration the implementation of these new formats within the provisions of the Plans.

Nevertheless, this does not preclude the use of other modulating signals having different characteristics (e.g. modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics), provided that the use of such characteristics does not cause greater interference than that caused by the system considered in the Plans or complies with the provisions of paragraph 3.2 of Article 3 of Part I of these Final Acts.

3.2 *Polarization*

3.2.1 For the planning of the broadcasting-satellite service, circular polarization shall be used.

3.2.2 The terms "direct" and "indirect" used in the Plans to indicate the direction of rotation of circularly-polarized waves correspond to right-hand (clockwise) and left-hand (anti-clockwise) polarization respectively according to the following definitions:

Direct polarization (right-hand or clockwise polarization):

An elliptically or circularly-polarized wave, in which the electric field-intensity vector, observed in any *fixed plane*, normal to the direction of propagation, whilst looking in (i.e., not against) the direction of propagation, rotates *with time* in a *right-hand* or clockwise direction.

Note: For circularly-polarized plane waves, the ends of the electric vectors drawn from any points along a straight line normal to the plane of the wave front form, *at any instant*, a *left-hand* helix.

Indirect polarization (left-hand or anti-clockwise polarization):

An elliptically or circularly-polarized wave, in which the electric field-intensity vector, observed in any *fixed plane*, normal to the direction of propagation, whilst looking in (i.e., not against) the direction of propagation, rotates *with time* in a *left-hand* or anti-clockwise direction.

Note: For circularly-polarized plane waves, the ends of the electric vectors drawn from any points along a straight line normal to the plane of the wave front form, *at any instant*, a *right-hand* helix.

3.3 *Carrier-to-noise ratio*

For the purpose of planning the broadcasting-satellite service, the carrier-to-noise ratio is equal to 14 dB for 99% of the worst month.

As a guidance for planning, the reduction in quality in the down-link due to thermal noise in the feeder link is taken as equivalent to a degradation in the down-link carrier-to-noise ratio of approximately 0.5 dB for 99% of the worst month, but the feeder-link and down-link Plans are evaluated on the overall carrier-to-noise ratio of 14 dB for the combined down-link and feeder-link contributions.

3.4 *Protection ratio between FM television signals*

The following protection ratios have been adopted for the purpose of calculating the overall protection margin [1]:

28 dB for co-channel signals;

13.6 dB for adjacent channel signals;

−9.9 dB for second adjacent channel signals.

As a guidance for planning, the contribution of the feeder link co-channel interference to the overall co-channel carrier-to-interference ratio is equivalent to a reduction of the down-link co-channel carrier-to-interference ratio of approximately 0.5 dB for 99% of the worst month but the feeder link and down-link Plans are evaluated on the overall equivalent protection margin, which includes the combined down-link and feeder link contributions.

An overall equivalent protection margin of zero decibels, or greater, indicates that the individual protection ratios have been met for the co-channel, the adjacent channels and the second adjacent channels.

3.4.1 *Adjacent channels protection ratio template for Region 2 (FMTV into FMTV)*

The protection ratios for adjacent channels are derived from the template given in Figure 3. The template is symmetrical and is given in terms of absolute levels for the carrier-to-interference ratios.

The template is obtained by joining the segment for adjacent channels to the horizontal extension of the co-channel protection ratio value. The adjacent channel protection ratio cannot be adjusted relative to the co-channel value.

The template is given by the following expressions:

$$PR = \begin{cases} 28 \text{ dB} & \text{for } |F_0| \leq 8.36 \text{ MHz} \\ -2.762\,|F_0| + 51.09 \text{ dB} & \text{for } 8.36 < |F_0| \leq 12.87 \text{ MHz} \\ -1.154\,|F_0| + 30.4 \text{ dB} & \text{for } 12.87 < |F_0| \leq 21.25 \text{ MHz} \\ -2.00\,|F_0| + 48.38 \text{ dB} & \text{for } |F_0| > 21.25 \text{ MHz} \end{cases}$$

where

PR is the protection ratio in dB and $|F_0|$ is the carrier spacing between the interfering and wanted signals in MHz.

3.5 *Channel spacing in the Plan*

The spacing between the assigned frequencies of two adjacent channels is 14.58 MHz which corresponds to 32 channels in 500 MHz bandwidth for the broadcasting-satellite service. The Plan gives the assigned frequencies for each channel.

3.6 *Figure of merit (G/T) of a receiving station in the broadcasting-satellite service*

In planning the broadcasting-satellite service, the value of the figure of merit G/T used is:

$$10 \text{ dB } (K^{-1})$$

[1] The definitions in paragraphs 1.7, 1.8, 1.9, 1.10 and 1.11 of this Annex apply to these calculations.

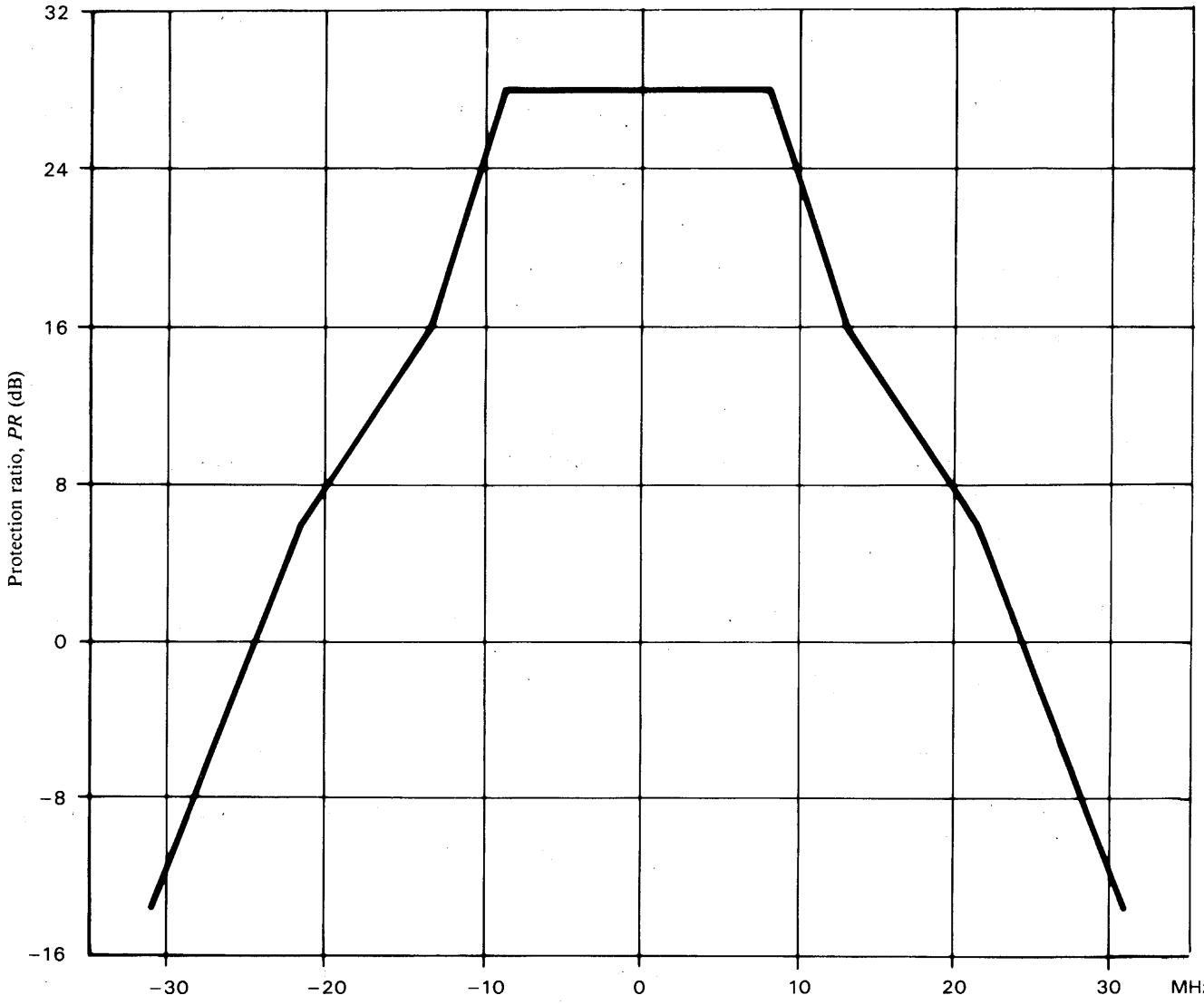


FIGURE 3

Protection ratio template (FMTV/FMTV) for planning between broadcasting-satellite systems in Region 2

The value is calculated from the following formula which allows for pointing error, polarization effects, and ageing:

$$G/T = \frac{\alpha \beta G_r}{\alpha T_a + (1 - \alpha) T_0 + (n - 1) T_0}$$

where:

α = the total coupling losses, expressed as a power ratio;

β = the total losses due to the pointing error, polarization effects and ageing, expressed as a power ratio;

G_r = the effective gain of the receiving antenna, expressed as a power ratio and taking account of the method of feeding and the efficiency;

T_a = the effective temperature of the antenna (K);

T_0 = the reference temperature = 290 K;

n = the overall noise factor of the receiver, expressed as a power ratio.

3.7 *Receiving antennae*

3.7.1 *Minimum diameter of receiving antennae*

For planning the broadcasting-satellite service the minimum diameter of receiving antennae considered is such that the half-power beamwidth φ_0 is 1.7°.

3.7.2 *Receiving antenna reference patterns*

The co-polar and cross-polar reference patterns of receiving antennae are given in Figure 4:

- Curve A for the co-polar component;
- Curve B for the cross-polar component.

3.8 *Necessary bandwidth*

The Plan is based on a channel bandwidth of 24 MHz [1], but different bandwidths may be implemented in accordance with the provisions of these Final Acts.

3.9 *Guardbands*

3.9.1 A guardband is defined as the portion of the frequency spectrum between the edge of the allocated band and the edge of the necessary bandwidth of the emission in the nearest channel.

3.9.2 For the planning of the broadcasting-satellite service, the guardbands necessary to protect the services in adjacent frequency bands are:

Lower edge of band (12.2 GHz): 12 MHz;

Upper edge of band (12.7 GHz): 12 MHz.

3.9.3 The guardbands at both the lower and upper edges may be used for transmissions in the space operation service.

3.10 *Orbital spacing*

The Plan has been based on a non-uniform spacing.

[1] For France, Denmark and some of the United Kingdom requirements which use 625-line standards with greater video bandwidth, the channels shown in the Plan have a necessary bandwidth of 27 MHz. This will be indicated in the Plan by an appropriate symbol.

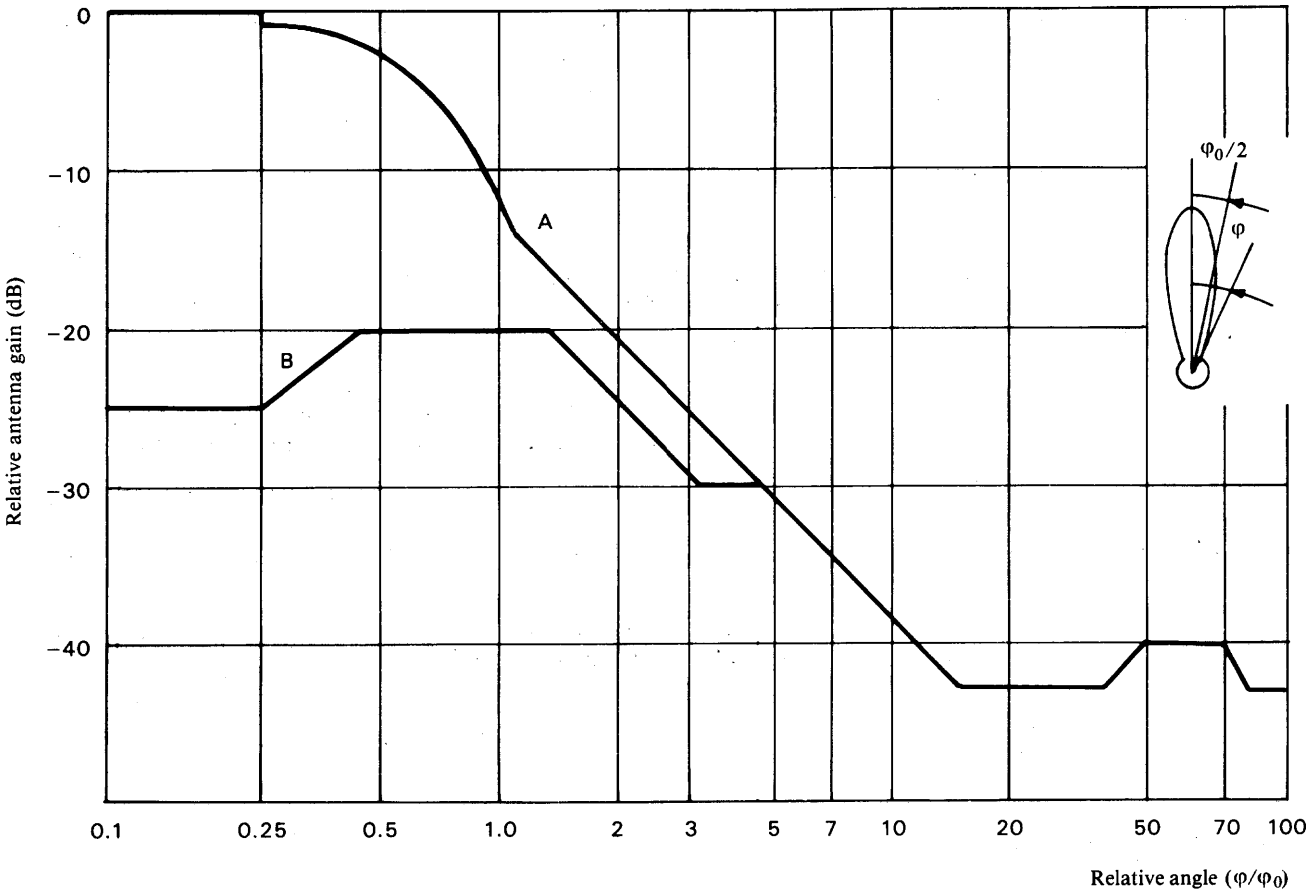


FIGURE 4

Reference patterns for co-polar and cross-polar components for receiving earth station antennae in Region 2

Curve A: Co-polar component without side-lobe suppression (dB relative to main beam gain)

0	for $0 \leqslant \varphi \leqslant 0.25\,\varphi_0$
$-12\,(\varphi/\varphi_0)^2$	for $0.25\,\varphi_0 < \varphi \leqslant 1.13\,\varphi_0$
$-(14+25\log_{10}(\varphi/\varphi_0))$	for $1.13\,\varphi_0 < \varphi \leqslant 14.7\,\varphi_0$
−43.2	for $14.7\,\varphi_0 < \varphi \leqslant 35\,\varphi_0$
$-(85.2-27.2\log_{10}(\varphi/\varphi_0))$	for $35\,\varphi_0 < \varphi \leqslant 45.1\,\varphi_0$
−40.2	for $45.1\,\varphi_0 < \varphi \leqslant 70\,\varphi_0$
$-(-55.2+51.7\log_{10}(\varphi/\varphi_0))$	for $70\,\varphi_0 < \varphi \leqslant 80\,\varphi_0$
−43.2	for $80\,\varphi_0 < \varphi \leqslant 180°$

Curve B: Cross-polar component (dB relative to main beam gain)

−25	for $0 \leqslant \varphi \leqslant 0.25\,\varphi_0$
$-\left(30+40\log_{10}\left\lvert\frac{\varphi}{\varphi_0}-1\right\rvert\right)$	for $0.25\,\varphi_0 < \varphi \leqslant 0.44\,\varphi_0$
−20	for $0.44\,\varphi_0 < \varphi \leqslant 1.28\,\varphi_0$
$-\left(17.3+25\log_{10}\left\lvert\frac{\varphi}{\varphi_0}\right\rvert\right)$	for $1.28\,\varphi_0 < \varphi \leqslant 3.22\,\varphi_0$

– 30 until intersection with co-polar component curve; then as for co-polar component.

Note 1: For values of φ_0 see 3.7.1.

Note 2: In the angular range between 0.1 φ_0 and 1.13 φ_0 the co-polar and cross-polar gains must not exceed the reference patterns.

Note 3: At off-axis angles larger than 1.13 φ_0 and for 90% of all sidelobe peaks in each of the reference angular windows, the gain must not exceed the reference patterns. The reference angular windows are 1.13 φ_0 to 3 φ_0, 3 φ_0 to 6 φ_0, 6 φ_0 to 10 φ_0, 10 φ_0 to 20 φ_0, 20 φ_0 to 40 φ_0, 40 φ_0 to 75 φ_0 and 75 φ_0 to 180°.

3.11 *Satellite station-keeping*

Space stations in the broadcasting-satellite service must be maintained in position with an accuracy of better than ± 0.1° in the E-W direction. The maintenance of this tolerance in the N-S direction is recommended but is not obligatory.

3.12 *Elevation angle of receiving antennae*

The Plan has been based on the consideration of a minimum angle of elevation of 20° to minimize the required e.i.r.p. of the satellite and to reduce the effects of shadowing and the possibility of interference from terrestrial services. However, for areas situated in latitudes above about 60°, the angle of elevation is of necessity less than 20° (see also paragraph 2.1.3).

For mountainous areas where an angle of 20° may not suffice, an angle of at least 30° has been provided where possible to provide an acceptable service. An angle of elevation of at least 40° has been considered for service areas subject to high precipitation (zones M, N and P) but exceptions were made in some cases.

Some dry, non-mountainous areas may be given an acceptable service at angles of elevation less than 20°.

In areas with small angles of elevation, the shadowing effect of tall buildings may have to be taken into account.

In choosing a satellite position designed to give the maximum angle of elevation at the ground, the influence of such a position on the eclipse period has been borne in mind.

3.13 *Transmitting antennae*

3.13.1 *Cross-section of transmitted beam*

Planning has been based on beams of elliptical or circular cross-section. When the assignments are implemented, or when the Plan is modified, administrations may use non-elliptical or shaped beams.

If the cross-section of the transmitted beam is elliptical, the effective beamwidth φ_0 is a function of the angle of rotation q between the plane containing the satellite and the major axis of the beam cross-section and the plane in which the beamwidth is required.

The relationship between the maximum gain of an antenna and the half-power beamwidth can be derived from the expression:

$$G_m = 27\,843/ab$$

or

$$G_m\,(\text{dB}) = 44.44 - 10\log_{10} a - 10\log_{10} b$$

where:

a and b are the angles (in degrees) subtended at the satellite by the major and minor axes of the elliptical cross-section of the beam.

An antenna efficiency of 55% is assumed.

3.13.2 *Minimum beamwidth of transmitting antenna*

A minimum value of 0.8° for the half-power beamwidth of a transmitting antenna has been used for planning.

3.13.3 *Transmitting antenna reference patterns*

The reference patterns for the co-polar and cross-polar components of satellite transmitting antennae used in preparing the Plan are given in Figure 5.

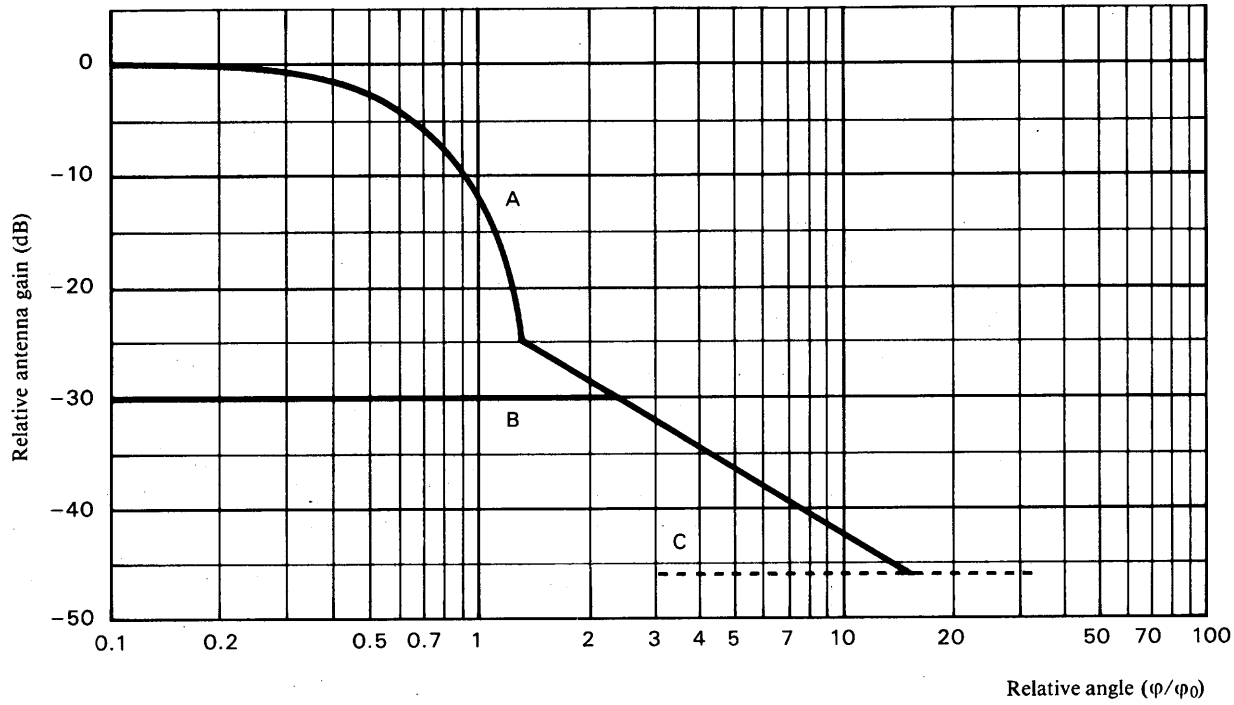


FIGURE 5

Reference patterns for co-polar and cross-polar components for satellite transmitting antennae in Region 2

Curve A: Co-polar component (dB relative to main beam gain)

$-12\ (\varphi/\varphi_0)^2$ for $0 \leqslant (\varphi/\varphi_0) \leqslant 1.45$

$-(22 + 20 \log_{10} (\varphi/\varphi_0))$ for $1.45 < (\varphi/\varphi_0)$

after intersection with curve C: as curve C

Curve B: Cross-polar component (dB relative to main beam gain)

-30 for $0 \leqslant (\varphi/\varphi_0) \leqslant 2.51$

after intersection with co-polar pattern: as co-polar pattern

Curve C: Minus the on-axis gain.

Where it was necessary to reduce interference, the pattern shown in Figure 6 was used; this use will be indicated in the Plan by an appropriate symbol. This pattern is derived from an antenna producing an elliptical beam with fast roll-off in the main lobe. Three curves for different values of φ_0 are shown as examples.

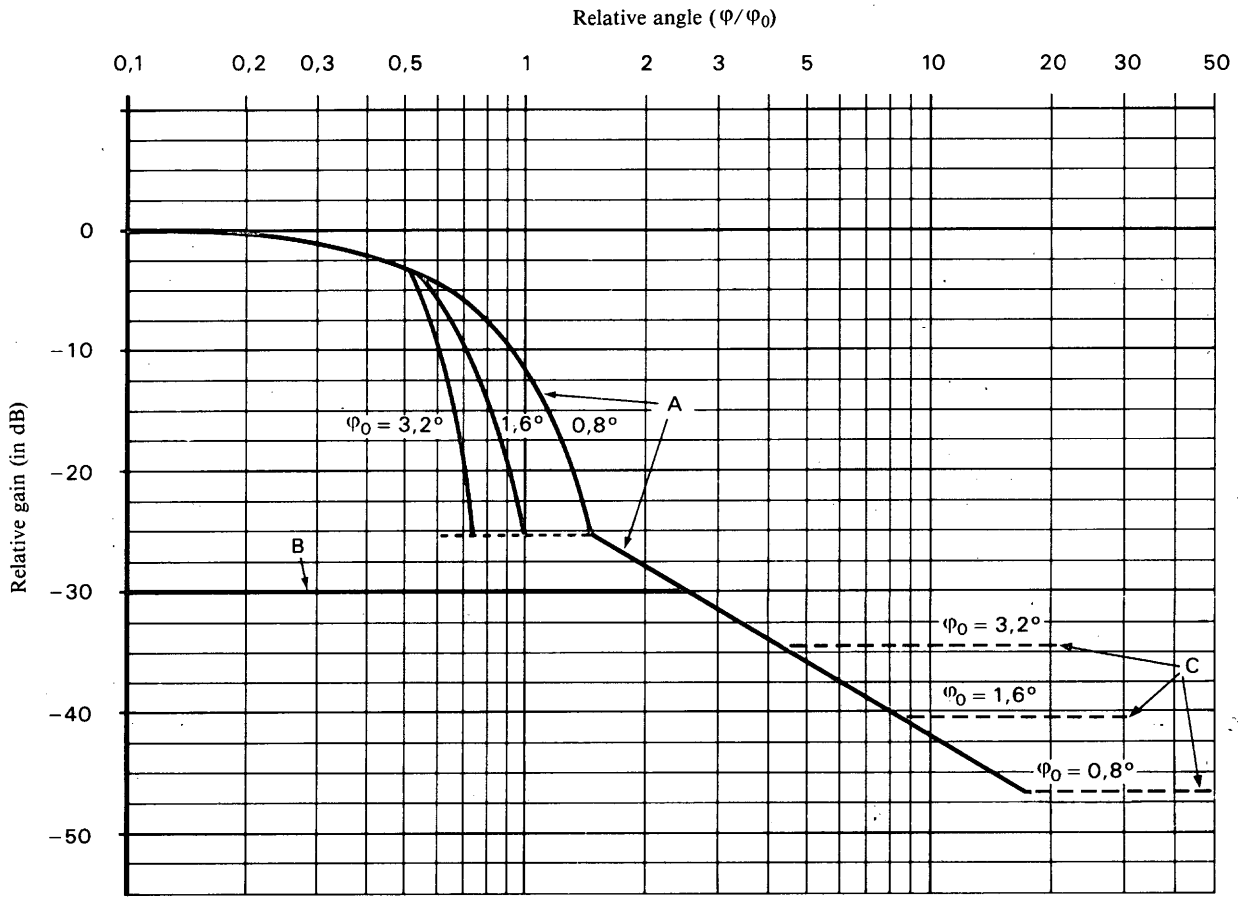


FIGURE 6

Reference patterns for co-polar and cross-polar components for satellite transmitting antennae with fast roll-off in the main beam, for Region 2

Curve A: Co-polar component (dB relative to main beam gain)

$-12\ (\varphi/\varphi_0)^2$ for $0 \leqslant \varphi/\varphi_0 \leqslant 0.5$

$-18.75\ \varphi_0^2\left(\varphi/\varphi_0 - x\right)^2$ for $0.5 < \varphi/\varphi_0 \leqslant \frac{1.16}{\varphi_0} + x$

-25.23 for $\frac{1.16}{\varphi_0} + x < \varphi/\varphi_0 \leqslant 1.45$

$-\left(22 + 20\ \log_{10}\ (\varphi/\varphi_0)\right)$ for $1.45 < \varphi/\varphi_0$

after intersection with curve C: as curve C

Curve B: Cross-polar component (dB relative to main beam gain)

-30 for $0 \leqslant \varphi/\varphi_0 < 2.51$

after intersection with co-polar pattern: as co-polar pattern

Curve C: Minus the on-axis gain

where:

φ = off-axis angle (degrees)

φ_0 = dimension of the minimum ellipse fitted around the downlink service area in the direction of interest (degrees)

$x = 0.5\left(1 - \frac{0.8}{\varphi_0}\right)$

3.14 *Pointing accuracy of satellite antennae*

3.14.1 The deviation of the antenna beam from its nominal pointing direction must not exceed 0.1° in any direction. Moreover, the angular rotation of a transmitting beam about its axis must not exceed ± 1°; this latter limit is not necessary for beams of circular cross-section using circular polarization.

3.14.2 The following factors contribute to the total variation in the area on the surface of the Earth illuminated by the satellite beam:

- variations in satellite station-keeping;
- the variations caused by the pointing tolerances, which become more significant for coverage areas with low angles of elevation;
- the effect of the yaw error increases as the beam ellipse lengthens.

3.14.3 The effect of these possible variations should be assessed on a case-by-case basis, since their total effect on the area covered will vary as the geometry of the satellite beam varies, and it would not be reasonable to indicate a single value of shift in the area covered for all situations.

3.14.4 If linear polarization is used for an emission, yaw error makes a significant contribution to increasing the transmitted cross-polarized component; this increases the interference with other carriers which were originally cross-polarized with the emission in question.

3.15 *Limitation of output power in the satellite transmitter*

The output power of a space station in the broadcasting-satellite service must not rise by more than 0.25 dB relative to its nominal value throughout the life of the satellite.

3.16 *Power flux-density at edge of coverage area*

The value of the power flux-density at the edge of the coverage area for 99% of the worst month is -107 dB(W/m^2) for 24 MHz, as well as for 27 MHz with respect to the cases mentioned in Note 1 to paragraph 3.8 of this Annex.

3.17 *Difference between the e.i.r.p. directed towards the edge of the coverage area and that on the axis of the beam*

For planning, the absolute value of the difference between the e.i.r.p. directed towards the edge of the coverage area and that on the axis of the beam should preferably be 3 dB.

If the beam area is larger than the coverage area, the value will be less than 3 dB.

3.18 *Use of energy dispersal*

In Region 2, for interregional sharing purposes, spectral densities equivalent to those realized in Regions 1 and 3 have to be maintained as specified below, but only as required and by whatever means administrations elect to utilize.

When the emission from a broadcasting satellite of Region 2 produces a power flux-density equal to or greater than -138 dB(W/m^2/24 MHz) within the territory of an administration of Region 1 or 3, the administration responsible shall maintain an energy dispersal of such an emission which produces a spectral power flux-density in any 40 kHz band 12 dB below the unmodulated carrier power. Where such an emission produces a power flux-density of less than -138 dB (W/m^2/24 MHz), energy dispersal need only be maintained to the extent that a spectral power flux-density of -150 dB(W/m^2/40 kHz) is not exceeded.

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ANNEX 6

Method of Calculating the Power Flux-Density Produced in the Territories of Regions 1 and 3 by Space Stations in the Broadcasting-Satellite Service in Region 2

1. The power-flux density produced, under conditions of clear sky propagation, at a given point P on the surface of the Earth, by a satellite in the geostationary orbit can be calculated from the following data:

1.1 nominal orbital position;

1.2 e.i.r.p. (dBW);

1.3 characteristics of the antenna beam at half-power points (i.e. the major and minor axes together with the orientation of the corresponding ellipse);

1.4 geographical coordinates of the boresight (B);

1.5 geographical coordinates of the point P;

1.6 elevation angle from point P to the satellite (θ).

2. To obtain the power flux-density (dB(W/m^2)) produced at P, calculate:

- the distance, d (m), between the satellite and the point P;
- the spreading attenuation A for the distance d:

$$A = 10 \log \frac{1}{4\pi d^2} \qquad (dB(m^{-2}))$$

- the elevation angle θ from point P to the satellite;
- the atmospheric absorption [1] A_a at elevation angle θ:

$$A_a = \frac{0.1168}{(\sin^2 \theta + 0.0018)^{1/2} + \sin \theta} \qquad (dB)$$

- the angle φ, as seen from the satellite, between points B and P;
- φ_0, the half-power beamwidth, in the direction of P (in the case of a circular beam φ_0 will be independent of direction);
- the relative antenna gain, δG, in dB, for the calculated values of φ and φ_0 using the reference pattern for the co-polar component of the satellite transmitting antenna.

Then apply the expression:

$$pfd\ [dB(W/m^2)] = \text{e.i.r.p.} + \delta G + A - A_a$$

to obtain the power flux-density produced at P.

Note: In this expression, e.i.r.p. refers to boresight. The relative antenna gain δG is with respect to boresight antenna gain, therefore δG is negative.

[1] See Resolution No. 9(Sat-R2).

PART II

Provisions and Associated Plan for the Feeder Links for the Broadcasting-Satellite Service (12.2 - 12.7 GHz) in the Frequency Band 17.3 - 17.8 GHz

ARTICLE 1

Definitions

1.1 *Region 2 feeder link Plan:* The Plan for the feeder links for the broadcasting-satellite service in the frequency band 17.3 - 17.8 GHz in Region 2 contained in this Part of the Final Acts together with any modifications resulting from the successful application of the procedure of Article 4 of this Part herein referred to as the Plan.

1.2 *Frequency assignment in conformity with the Region 2 feeder link Plan:* Any frequency assignment for a receiving space station which appears in the Plan or for which the procedure of Article 4 of this Part has been successfully applied.

ARTICLE 2

Frequency Band

2.1 The provisions of this Part apply to the feeder links in the fixed-satellite service (Earth-to-space) in the frequency band 17.3 - 17.8 GHz, for the broadcasting-satellite service in Region 2, and to other services to which this band is allocated in Region 2 so far as their relationship to the fixed-satellite service (Earth-to-space) in this band is concerned.

ARTICLE 3

Execution of the Provisions and Associated Plan

3.1 The Members of the Union in Region 2 shall adopt for their feeder link space and earth stations in the fixed-satellite service (Earth-to-space) in the frequency band referred to in this Part, the characteristics specified in the Plan.

3.2 Administrations shall not bring into use assignments to feeder link stations which are not in conformity with the Plan, except in those cases where Resolution No. **2**(Sat-R2) is applicable or those cases where notification under Article 5 of this Part is appropriate.

3.3 The Plan is based on the grouping of the space stations in nominal orbital positions of $+0.2°$ and $-0.2°$ on both sides of the cluster of satellites and on the use of a feeder-link earth station antenna diameter of five metres.

3.3.1 An administration may use a greater antenna diameter provided that the feeder link e.i.r.p. is not greater than the Plan value. An administration may use a feeder link antenna diameter greater than five metres resulting in a greater on-axis e.i.r.p. (but a constant off-axis e.i.r.p.) provided that it obtains the agreement of administrations having assignments to space stations in the same cluster which may be affected and of any other administrations having a space station separated by less than 0.5° (see section 3.4.1 of Annex 3 to this Part).

3.3.2 Administrations may locate satellites within a cluster at any orbital position within the cluster, provided they obtain the agreement of administrations having assignments to space stations in the same cluster (see section 3.13.1 of Annex 3 to this Part).

3.4 The feeder link Plan is based on circular polarization. Administrations may use a polarization other than circular, provided it obtains the agreement of administrations having assignments to space stations in the same cluster which may be affected and of any other administration having assignments to space stations which may be affected (see section 3.8.2 of Annex 3 to this Part).

3.5 An administration is considered to be affected if the limits specified in Annex 1 to this Part are exceeded.

ARTICLE 4

Procedure for Modifications to the Region 2 Plan (17.3 - 17.8 GHz)

4.1 When an administration intends to make a modification to the Plan, i.e. either:

a) to modify the characteristics of any of its frequency assignments in the fixed-satellite service which are shown in the Plan, or for which the procedure in this Article has has been successfully applied, whether or not the station has been brought into use; *or*

b) to include in the Plan a new frequency assignment in the fixed-satellite service; *or*

c) to cancel a frequency assignment in the fixed-satellite service,

the following procedure shall be applied before any notification of the frequency assignment is made to the International Frequency Registration Board (see Article 5 of this Part and Resolution No. **2**(Sat-R2)).

4.1.1 Before an administration proposes to include in the Plan under the provisions of 4.1 *b)* a new frequency assignment for reception at a space station [1] or to include in the Plan a new frequency assignment for reception at a space station whose orbital position is not designated in the Plan to this administration, all of the assignments to the service areas involved should normally have been brought into service or have been notified to the Board in accordance with Article 5 of this Part. Should this not be the case, the administration concerned shall inform the Board of the reasons thereof.

4.2 *Proposed modifications to a frequency assignment in conformity with the Plan or the inclusion in the Plan of a new frequency assignment*

4.2.1 An administration proposing a modification to the characteristics of a frequency assignment in conformity with the Plan or the inclusion of a new frequency assignment in the Plan shall seek the agreement of those administrations:

4.2.1.1 having a feeder link frequency assignment in the fixed-satellite service (Earth-to-space) in the same channel or an adjacent channel, which appears in the Plan or in respect of which modifications to the Plan have been published by the Board in accordance with the provisions of this Article; *or*

4.2.1.2 having a frequency assignment in the band 17.7 - 17.8 GHz to an earth station in the fixed-satellite service (space-to-Earth) which is recorded in the Master Register or which has been coordinated in or is being coordinated under the provisions of No. **1060** of the Radio Regulations and which is located within the coordination area of the feeder link fixed-satellite earth station;

[1] The expression "frequency assignment for reception to a space station", wherever it appears in this Article, shall be understood to refer to a frequency assignment associated with a given orbital position.

4.2.1.3 having a frequency assignment in the band 17.7 - 17.8 GHz to a terrestrial station in use or intended to be brought into use within three years of the projected date of bringing the feeder link modification into use, and which is located within the coordination area of the feeder link fixed-satellite earth station;

4.2.1.4 having an assignment in the fixed-satellite service (Earth-to-space) in Regions 1 or 3 which

a) is recorded in the Master Register; *or*

b) has been coordinated or is being coordinated or has been notified under Articles **11** and **13** of the Radio Regulations,

4.2.1.5 which are considered affected.

4.2.1.6 A frequency assignment is considered to be affected when the limits shown in Annex 1 to this Part are exceeded.

4.2.2 The agreement referred to in 4.2.1 is not required when an administration proposes to bring into use, with characteristics appearing in the Plan, a fixed earth station in the band 17.3 - 17.8 GHz or a transportable earth station in the band 17.3 - 17.7 GHz. Administrations may communicate to the Board the characteristics of such earth stations in order to include them in the Plan.

4.2.3 An administration intending to modify characteristics in the Plan shall send to the Board, not earlier than five years but preferably not later than eighteen months before the date on which the assignment is to be brought into use, the relevant information listed in Annex 2 to this Part.

4.2.3.1 Where as a result of the intended modification the limits defined in Annex 1 to this Part are not exceeded, this fact shall be indicated when submitting to the Board the information required by 4.2.3. The Board shall then publish this information in a special section of its weekly circular.

4.2.3.2 In all other cases the administration shall notify the Board of the names of the administrations whose agreement it considers should be sought in order to arrive at the agreement referred to in 4.2.1 as well as of those with which agreement has already been reached.

4.2.4 The Board shall determine on the basis of Annex 1 to this Part the administrations whose frequency assignments are considered to be affected within the meaning of 4.2.1. The Board shall include the names of those administrations with the information received under 4.2.3.2 and shall publish the complete information in a special section of its weekly circular. The Board shall immediately send the results of its calculations to the administration proposing the modification to the Plan.

4.2.5 The Board shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

4.2.6 An administration which feels that it should have been included in the list of administrations whose services are considered to be affected may, giving the technical reasons for so doing, request the Board to include its name. The Board shall study this request on the basis of Annex 1 to this Part and shall send a copy of the request with an appropriate recommendation to the administration proposing the modification to the Plan.

4.2.7 Any modification to a frequency assignment which is in conformity with the Plan or any inclusion in the Plan of a new frequency assignment which would have the effect of exceeding the limits specified in Annex 1 to this Part shall be subject to the agreement of all affected administrations.

4.2.8 The administration seeking agreement or the administration with which agreement is sought may request any additional technical information it considers necessary. The administrations shall inform the Board of such requests.

4.2.9 Comments from administrations on the information published pursuant to 4.2.4 should be sent either directly to the administration proposing the modification or through the Board. In any event the Board shall be informed that comments have been made.

4.2.10 An administration which has not notified its comments either to the administration seeking agreement or to the Board, within a period of four months following the date of the weekly circular referred to in 4.2.3.1 or 4.2.4 shall be understood to have agreed to the proposed modification. This time-limit may be extended by up to three months for an administration which has requested additional information under 4.2.8 or for an administration which has requested the assistance of the Board under 4.2.18. In the latter case the Board shall inform the administrations concerned of this request.

4.2.11 If, in seeking agreement, an administration modifies its initial proposal, it shall again apply the provisions of 4.2.3 and the consequent procedure with respect to any other administration whose services might be affected as a result of modifications to the initial proposal.

4.2.12 If no comments have been received on the expiry of the periods specified in 4.2.10, or if agreement has been reached with the administrations which have made comments and with which agreement is necessary, the administration proposing the modification may continue with the appropriate procedure in Article 5 of this Part and shall inform the Board, indicating the final characteristics of the frequency assignment together with the names of the administrations with which agreement has been reached.

4.2.13 The agreement of the administrations affected may also be obtained in accordance with this Article, for a specified period.

4.2.14 When the proposed modification to the Plan involves developing countries, administrations shall seek all practicable solutions conducive to the economical development of the broadcasting-satellite systems of these countries.

4.2.15 The Board shall publish in a special section of its weekly circular the information received under 4.2.12 together with the names of any administrations with which the provisions of this Article have been successfully applied. The frequency assignment concerned shall enjoy the same status as those appearing in the Plan and will be considered as a frequency assignment in conformity with the Plan.

4.2.16 When an administration proposing to modify the characteristics of a frequency assignment or to make a new frequency assignment receives notice of disagreement from an administration whose agreement it has sought, it should first endeavour to solve the problem by exploring all possible means of meeting its requirement. If the problem still cannot be solved by such means, the administration whose agreement has been sought should endeavour to overcome the difficulties as far as possible, and shall state the technical reasons for any disagreement if the administration seeking the agreement requests it to do so.

4.2.17 If no agreement is reached between the administrations concerned, the Board shall carry out any study that may be requested by these administrations; the Board shall inform them of the result of the study and shall make such recommendations as it may be able to offer for the solution of the problem.

4.2.18 An administration may at any stage in the procedure described, or before applying it, request the assistance of the Board, particularly in seeking the agreement of another administration.

4.2.19 The relevant provisions of Article 5 of this Part shall be applied when frequency assignments are notified to the Board.

4.3 *Cancellation of frequency assignments*

When a frequency assignment in conformity with the Plan is released, whether or not as a result of a modification, the administration concerned shall immediately so inform the Board. The Board shall publish this information in a special section of its weekly circular.

4.4 *Master copy of the Plan*

4.4.1 The Board shall maintain an up-to-date master copy of the Plan, including the overall equivalent protection margins of each assignment, taking account of the application of the procedure specified in this Article. This master copy shall contain the overall equivalent protection margins derived from the Plan as established by the Conference and those derived from all modifications to the Plan as a result of the successful completion of the modification procedure of this Article. The Board shall prepare a document listing the amendments to be made to the Plan as a result of modifications made in accordance with the procedure in this Article.

4.4.2 The Secretary-General shall be informed by the Board of modifications made to the Plan and shall publish an up-to-date version of the Plan in an appropriate form when justified by the circumstances.

ARTICLE 5

Notification, Examination and Recording in the Master Register of Frequency Assignments to Feeder Link Transmitting Earth Stations and Receiving Space Stations in the Fixed-Satellite Service in the Band Between 17.3 and 17.8 GHz in Region 2

5.1 *Notification*

5.1.1 Whenever an administration intends to bring into use a frequency assignment to a transmitting earth station or receiving space station in the fixed-satellite service in the band between 17.3 and 17.8 GHz, it shall notify this frequency assignment to the Board. For this purpose, the notifying administration shall apply the following provisions.

5.1.2 For any notification under 5.1.1, an individual notice for each frequency assignment shall be drawn up as prescribed in Annex 2 to this Part, the various sections of which specify the basic characteristics to be provided as appropriate. It is recommended that the notifying administration should also apply any other data it may consider useful.

5.1.3 Each notice must reach the Board not earlier than three years before the date on which the frequency assignment is to be brought into use. In any case, the notice must reach the Board not later than three months before that date [1].

5.1.4 Any frequency assignment the notice of which reaches the Board after the applicable period specified in 5.1.3 shall, where it is to be recorded, bear a remark in the Master Register to indicate that it is not in conformity with 5.1.3.

5.1.5 Any notice made under 5.1.1 which does not contain the characteristics specified in Annex 2 to this Part shall be returned by the Board immediately by airmail to the notifying administration with the relevant reasons.

5.1.6 Upon receipt of a complete notice, the Board shall include its particulars, with the date of receipt, in its weekly circular which shall contain the particulars of all such notices received since the publication of the previous circular.

5.1.7 The circular shall constitute the acknowledgement to the notifying administration of the receipt of a complete notice.

5.1.8 Complete notices shall be considered by the Board in order of receipt. The Board shall not postpone its finding unless it lacks sufficient data to reach a decision; moreover, the Board shall not act upon any notice which has a technical bearing on an earlier notice still under consideration by the Board until it has reached a finding with respect to such earlier notice.

5.2 *Examination and recording*

5.2.1 The Board shall examine each notice:

a) with respect to its conformity with the Convention and the relevant provisions of the Radio Regulations and Annex 1 to this Part (with the exception of those relating to conformity with the Region 2 Plan and the provisions of Resolution No. **2**(Sat-R2));

b) with respect to its conformity with the Region 2 Plan;

c) with respect to its conformity with the provisions of Resolution No. **2**(Sat-R2).

[1] Where appropriate, the notifying administration shall initiate the procedure of Article 4 of this Part for modifying the Plan in sufficient time to ensure that this limit is observed.

5.2.2 Where the Board reaches a favourable finding with respect to 5.2.1 *a)* and 5.2.1 *b)*, the frequency assignment of an administration shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations, all frequency assignments brought into use in conformity with the Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

5.2.3 Where the Board reaches a favourable finding with respect to 5.2.1 *a)* and finds that the difference between the notified characteristics and those appearing in the Plan is:

a) an earth station with reduced e.i.r.p.; *or*

b) a reduced coverage area entirely situated within the coverage area appearing in the Plan; *or*

c) different modulation characteristics [1]; *or*

d) use of an antenna diameter greater than 5 metres without increasing the on-axis e.i.r.p.;

e) a use of an antenna diameter greater than 5 metres resulting in a greater on-axis e.i.r.p. if the orbital separation with any other space station is greater than 0.5°,

the frequency assignment shall be recorded in the Master Register. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations all frequency assignments brought into use in conformity with the Plan and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments. When recording these assignments the Board shall indicate by an appropriate symbol the characteristics having a value different from that appearing in the Plan.

5.2.4 Where the Board reaches a favourable finding with respect to 5.2.1 *a)*, but an unfavourable finding with respect to 5.2.1. *b)*, it shall examine the notice with respect to its conformity with the provisions of Resolution No. **2**(Sat-R2). A frequency assignment which is in conformity with the provisions of Resolution No. **2**(Sat-R2) shall be recorded in the Master Register with an appropriate symbol to indicate its interim status. The date of receipt of the notice by the Board shall be entered in Column 2d. In relations between administrations all frequency assignments brought into use in conformity with the provisions of Resolution No. **2**(Sat-R2) and recorded in the Master Register shall be considered to have the same status irrespective of the dates entered in Column 2d for such frequency assignments.

5.2.5 Whenever a frequency assignment is recorded in the Master Register, the finding reached by the Board shall be indicated by a symbol in Column 13a.

5.2.6 Where the Board reaches an unfavourable finding with respect to 5.2.1 *a)* or 5.2.1 *b)* and *c)*, the notice shall be returned immediately by airmail to the notifying administration with the reasons of the Board for this finding and with such suggestions as the Board may be able to offer with a view to a satisfactory solution of the problem.

5.2.7 Where the notifying administration resubmits the notice and the finding of the Board becomes favourable with respect to the appropriate parts of 5.2.1, the notice shall be treated as in 5.2.2, 5.2.3 or 5.2.4, as appropriate.

5.2.8 If the notifying administration resubmits the notice without modification and insists on its reconsideration, and if the Board's finding with respect to 5.2.1 remains unfavourable, the notice is returned to the notifying administration in accordance with 5.2.6. In this case, the notifying administration undertakes not to bring into use the frequency assignment until the condition specified in 5.2.7 is fulfilled.

5.2.9 If a frequency assignment notified in advance of bringing into use in conformity with 5.1.3 has received a favourable finding by the Board with respect to the provisions of paragraph 5.2.1, it shall be entered provisionally in the Master Register with a special symbol in the Remarks Column indicating the provisional nature of that entry.

[1] The use of other modulating signals having different characteristics (e.g. modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics), is authorized only on condition that the use of such characteristics does not cause greater interference than that caused by the system considered in the Plan.

5.2.10 When the Board has received confirmation that the frequency assignment has been brought into use, the Board shall remove the symbol in the Master Register.

5.2.11 The date in Column 2c shall be the date of bringing into use notified by the administration concerned. It is given for information only.

5.3 *Cancellation of entries in the Master Register*

5.3.1 If an administration has not confirmed the bringing into use of a frequency assignment under 5.2.10, the Board will make inquiries of the administration not earlier than six months after the expiry of the period specified in 5.1.3. On receipt of the relevant information, the Board will either modify the date of coming into use or cancel the entry.

5.3.2 If the use of any recorded frequency assignment is permanently discontinued, the notifying administration shall so inform the Board within three months, whereupon the entry shall be removed from the Master Register.

ARTICLE 6

Preliminary Procedure Concerning Notification and Recording in the Master Register of Frequency Assignments to Terrestrial Stations in Region 2 in the Band 17.7 - 17.8 GHz, when Frequency Assignments to Feeder-Link Earth Stations for Broadcasting-Satellite Service in Conformity with the Region 2 Plan are Involved

6.1 Administrations planning to implement assignments for terrestrial stations in the 17.7 - 17.8 GHz band should evaluate the level of interference which might be caused by the closest feeder-link earth station located on the border of the territory of another administration. In cases where the entry in the Plan contains information on specific earth stations, the level of interference shall be assessed on the basis of coordination contours calculated in accordance with Appendix **28** to the Radio Regulations. Should the administration concerned find that interference may be caused by the feeder-link earth stations to its planned terrestrial station, it may request the administration responsible for the feeder-link earth station to indicate the planned actual locations of the feeder-link earth stations.

6.2 An administration which receives a request under 6.1 shall, within a period of three months, indicate the actual locations of its feeder-link earth stations and communicate them to the Board in order to update the Plan.

6.3 If, at the end of a period of three months, the administration responsible for the terrestrial station does not receive a reply, it may request the assistance of the Board.

6.4 If the administration responsible for the feeder-link earth stations does not communicate to the Board, within a period of three months, the actual locations of its feeder-link earth stations, this administration may implement its feeder-link earth station provided it does not cause harmful interference to the terrestrial station under consideration.

ARTICLE 7

Preliminary Procedure, Notification and Recording in the Master Register of Frequency Assignments to Stations in the Fixed-Satellite Service (Space-to-Earth) in Region 2 in the Band 17.7 - 17.8 GHz, when Frequency Assignments to Feeder Link for Broadcasting-Satellite Stations Appearing in the Region 2 Plan are Involved [1]

7.1 The provisions of Articles **11** and **13** and Appendix **29** of the Radio Regulations are applicable to transmitting space stations in the fixed-satellite service of Region 2 in the band 17.7 - 17.8 GHz together with the provisions of Annex 4 to this Part, except that in relationship with feeder-link stations in Region 2, the threshold value mentioned in Appendix **29** to the Radio Regulations is replaced by those given in Annex 4 to this Part.

7.2 Administrations planning to implement assignments for receiving earth stations in the 17.7 - 17.8 GHz band in the fixed-satellite service (space-to-Earth) should evaluate the level of interference that might be caused by the closest feeder-link earth station located on the border of the territory of another administration. In cases where the entry in the Plan or the Master Register contains information on specific earth stations, the level of interference shall be assessed on the basis of coordination contours calculated in accordance with Annex 4 to this Part. Should this administration find that interference may be caused by the feeder-link earth stations to its planned fixed-satellite earth station, it may request the administration responsible for the feeder-link earth station to indicate the planned actual locations of the feeder-link earth stations.

7.3 An administration which receives a request under 7.2 shall, within a period of three months, indicate the actual locations of its earth stations and communicate it to the Board in order to update the Plan.

7.4 If, at the end of the period of three months, the administration responsible for the fixed-satellite receiving earth station does not receive a reply, it may request the assistance of the Board in this matter.

7.5 If the administration responsible for the feeder-link earth stations does not communicate to the Board, within a period of three months, the actual locations of its feeder-link earth stations, this administration may implement its feeder-link earth station provided it does not cause harmful interference to the fixed-satellite earth station under consideration.

ARTICLE 8

Miscellaneous Provisions Relating to the Procedures

Section I. Studies and Recommendations

8.1.1 If it is requested by any administration, the Board, using such means at its disposal as are appropriate in the circumstances, shall conduct a study of cases of alleged contravention or non-observance of these provisions or of harmful interference.

8.1.2 The Board shall thereupon prepare and forward to the administrations concerned a report containing its findings and recommendations for the solution of the problem.

8.1.3 On receiving the Board's recommendations for the solution of the problem, an administration shall promptly acknowledge the receipt by telegram and shall subsequently indicate the action it intends to take. In cases when the Board's suggestions or recommendations are unacceptable to the administrations concerned, further efforts should be made by the Board to find an acceptable solution to the problem.

[1] See Resolution No. 7(Sat-R2).

8.1.4 In a case where, as a result of a study, the Board submits to one or more administrations suggestions or recommendations for the solution of a problem, and where no answer has been received from one or more of these administrations within a period of four months, the Board shall consider that the suggestions or recommendations concerned are unacceptable to the administrations which did not answer. If it was the requesting administration which failed to answer within this period, the Board shall close the study.

Section II. Miscellaneous Provisions

8.2.1 If it is requested by any administration, particularly by an administration of a country in need of special assistance, the Board, using such means at its disposal as are appropriate in the circumstances, shall render the following assistance:

a) computation necessary in the application of Annexes 1, 3 and 4 to this Part;

b) any other assistance of a technical nature for completion of the procedures in this Part.

8.2.2 In making a request to the Board under paragraph 8.2.1, the administration shall furnish the Board with the necessary information.

ARTICLE 9

The Plan for the Feeder Links in the Fixed-Satellite Service in the Frequency Band 17.3 - 17.8 GHz in Region 2

9.1 COLUMN HEADINGS OF THE PLAN

Col. 1 *Beam identification* (Column 1 contains the symbol designating the country or the geographical area taken from Table No. 1 of the Preface to the International Frequency List followed by the symbol designating the service area).

Col. 2 *Nominal orbital position,* in degrees and hundredths of a degree.

Col. 3 *Channel number* (see Table showing channel numbers and corresponding assigned frequencies).

Col. 4 *Boresight* geographical coordinates, in degrees and hundredths of a degree.

Col. 5 *Antenna beamwidth.* This column contains two figures corresponding to the major axis and the minor axis respectively of the elliptical cross-section half-power beam, in degrees and hundredths of a degree.

Col. 6 *Orientation of the ellipse* determined as follows: in a plane normal to the beam axis, the direction of a major axis of the ellipse is specified as the angle measured anti-clockwise from a line parallel to the equatorial plane to the major axis of the ellipse to the nearest degree.

Col. 7 *Polarization* (1 = direct, 2 = indirect). [1]

Col. 8 Earth station *e.i.r.p.* in the direction of maximum radiation, in dBW.

Col. 9 *Location of earth station(s)* in the band 17.7 - 17.8 GHz.

9.1 Geographical coordinates

9.2 Antenna characteristics

9.3 Elevation angle of the horizon around the earth station using the band 17.7 - 17.8 GHz

Col. 10 *Remarks*

9.2 TEXT FOR SYMBOLS IN REMARKS COLUMN OF THE PLAN

1. Fast roll-off space station receiving antenna as defined in Annex 3 (item 3.6.3) to this Part.

2. Television standard with 625 lines using greater video bandwidth and necessary bandwidth of 27 MHz.

3. This assignment will be implemented only if it does not hinder the development and subsequent introduction of a feeder-link Plan for Region 1.

4. This assignment may be utilized in the geographical area of Anguilla (AIA) (which is in the beam area).

5. Feeder-link earth stations for this assignment may also be located in the territories of Puerto Rico and the United States Virgin Islands. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

6. Feeder-link earth stations for this assignment may also be located in the States of Alaska and Hawaii. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

7. The feeder-link earth station for this assignment may also be located at the point with geographical coordinates 3°31′ West, 48°46′ North. Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

[1] See Annex 3 (paragraph 3.8) to this Part.

8. Feeder-link earth stations for this assignment may also be located at the points with the following geographical coordinates:

47°55′ West	15°47′ South	34°53′ West	08°04′ South
43°13′ West	22°55′ South	60°02′ West	03°06′ South
46°38′ West	23°33′ South	38°31′ West	12°56′ South
51°13′ West	30°02′ South	49°15′ West	16°40′ South

Such operation shall not cause more interference nor require more protection than the assignment under the Plan.

* 9/GR . . . : This assignment is part of a group, the number of which follows the symbol. The group consists of the beams and has the number of channels assigned to it as indicated in the Table below. Each of the assigned channels can be used by only one of the beams in the group.

Group	*Beams in the group*	*Number of channels assigned to the group*
GR1	ALS00002 HWA00002 USAPSA02	32 channels
GR2	ALS00003 HWA00003 USAPSA03	32 channels
GR3	ARGINSU4 ARGSUR04	16 channels
GR4	ARGINSU5 ARGSUR05	12 channels
GR5	BOLAND01 CLMAND01 EQACAND1 EQAGAND1 PRUAND02 VENAND03	16 channels
GR6	B SU111 B SU211	32 channels
GR7	B CE311 B CE411 B CE511	32 channels
GR8	B NO611 B NO711 B NO811	32 channels
GR9	B SU112 B SU212 B CE312 B CE412	32 channels
GR10	CAN01101 CAN01201	32 channels
GR11	CAN01202 CAN01302	32 channels
GR12	CAN01203 CAN01303 CAN01403	32 channels
GR13	CAN01304 CAN01404 CAN01504	32 channels
GR14	CAN01405 CAN01505 CAN01605	32 channels
GR15	CAN01506 CAN01606	32 channels
GR16	CHLCONT4 CHLCONT6	16 channels
GR17	CHLCONT5 PAQPAC01 CHLPAC02	16 channels
GR18	CRBBER01 CRBBLZ01 CRBJMC01 CRBBAH01 CRBECO01	16 channels
GR19	EQACOO01 EQAGOO01	16 channels
GR20	PTRVIR01 USAEHO02	32 channels
GR21	PTRVIR02 USAEHO03	32 channels
GR22	VEN02VEN VEN11VEN	4 channels

* *Note by the General Secretariat:* This new symbol for the Remarks column has been included at the request of the IFRB.

The Plan for the Feeder Links in the Fixed-Satellite Service in the Frequency Band 17.3 - 17.8 GHz in Region 2

Country symbols

1. For the explanation of symbols designating countries or geographical areas in Region 2, see the Preface to the International Frequency List.

2. One additional symbol, CRB, has been created for the purposes of the present Conference only, to designate a geographical area in the Caribbean Area. The five Caribbean beams are identified as follows:

CRBBAH01, CRBBER01, CRBBLZ01, CRBEC001 and CRBJMC01

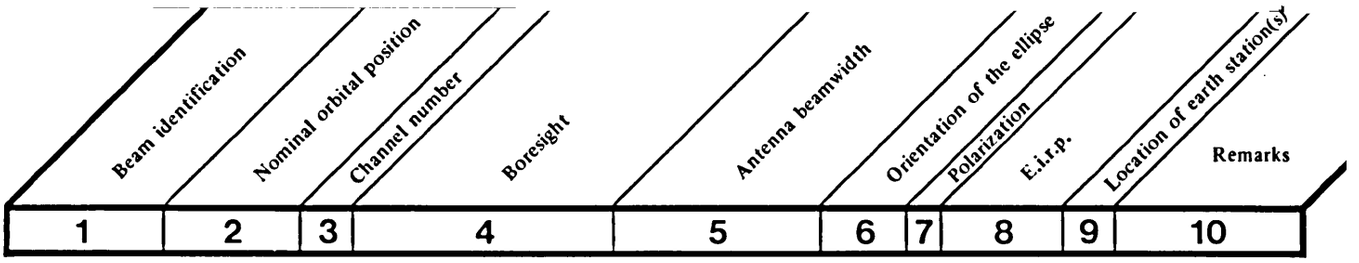
and are intended collectively to provide coverage for the following countries or geographical areas: AIA, ATG, BAH, BER, BLZ, BRB, CYM, DMA, GRD, GUY, JMC, LCA, MSR, SCN, SUR, TCA, TRD, VCT and VRG to be so used if approved by them.

TABLE SHOWING CORRESPONDENCE BETWEEN CHANNEL NUMBERS AND ASSIGNED FREQUENCIES

Channel No.	Assigned frequency (MHz)	Channel No.	Assigned frequency (MHz)
1	17324.00	17	17557.28
2	17338.58	18	17571.86
3	17353.16	19	17586.44
4	17367.74	20	17601.02
5	17382.32	21	17615.60
6	17396.90	22	17630.18
7	17411.48	23	17644.76
8	17426.06	24	17659.34
9	17440.64	25	17673.92
10	17455.22	26	17688.50
11	17469.80	27	17703.08
12	17484.38	28	17717.66
13	17498.96	29	17732.24
14	17513.54	30	17746.82
15	17528.12	31	17761.40
16	17542.70	32	17775.98

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	1	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	1	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	1	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGSUR04	-94.20	1	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
B CE311	-64.20	1	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	1	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	1	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	1	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	1	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	1	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	1	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	1	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	1	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	1	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	1	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	1	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BAHIFRB1	-87.20	1	-76.06	24.16	1.81	0.70	142	1	87.4		
BERBERMU	-96.20	1	-64.77	32.32	0.60	0.60	90	2	87.4		
BERBER02	-31.00	1	-64.77	32.32	0.60	0.60	90	1	87.4		2 3
BOLAND01	-115.20	1	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CAN01101	-138.20	1	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01201	-138.20	1	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01202	-72.70	1	-81.34	50.02	7.96	2.55	5	1	87.4		9/GR11
CAN01203	-129.20	1	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01303	-129.20	1	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01304	-91.20	1	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01403	-129.20	1	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01404	-91.20	1	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13



1	2	3	4		5		6	7	8	9	10
CAN01405	-82.20	1	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01504	-91.20	1	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01505	-82.20	1	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01605	-82.20	1	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01606	-70.70	1	-80.77	50.03	7.88	2.53	6	1	87.4		9/GR15
CHLCONT5	-106.20	1	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	1	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	1	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM000C1	-103.20	1	-74.50	5.87	3.98	1.96	118	1	87.4		
EQACAND1	-115.20	1	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	1	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
FLKANT01	-57.20	1	-44.54	-60.13	3.54	0.68	12	1	87.4		2
FLKFALKS	-31.00	1	-59.90	-51.64	0.60	0.60	90	1	87.4		2 3
GRD00002	-42.20	1	-61.58	12.29	0.60	0.60	90	1	87.4		
HWA00002	-166.20	1	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
HWA00003	-175.20	1	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
MEX01NTE	-78.20	1	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	1	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	1	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	1	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	1	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	1	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	1	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	1	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
PTRVIR02	-110.20	1	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
SPMFRAN3	-53.20	1	-67.24	47.51	3.16	0.79	7	1	87.4		2 7
TRD00001	-84.70	1	-61.23	10.70	0.60	0.60	90	1	87.4		
URG00001	-71.70	1	-56.22	-32.52	1.02	0.89	11	1	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAEH001	-61.70	1	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	1	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	1	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	1	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	1	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	1	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	1	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	1	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	1	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
VRG00001	-79.70	1	-64.37	18.48	0.60	0.60	90	1	87.4		4

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	2	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	2	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	2	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	2	-62.85	-29.80	3.24	2.89	47	2	87.4		
ATNBEAM1	-52.80	2	-66.44	14.87	1.83	0.68	39	2	87.4		
B CE311	-63.80	2	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	2	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	2	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	2	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	2	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	2	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	2	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	2	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	2	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	2	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	2	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	2	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	2	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	2	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01201	-137.80	2	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01202	-72.30	2	-81.23	50.12	7.99	2.53	5	2	87.4		9/GR11
CAN01203	-128.80	2	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01303	-128.80	2	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01304	-90.80	2	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01403	-128.80	2	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01404	-90.80	2	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01405	-81.80	2	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01504	-90.80	2	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13

1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
CAN01505	-81.80	2	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01605	-81.80	2	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01606	-70.30	2	-80.64	50.02	7.88	2.52	6	2	87.4		9/GR15
CHLCONT4	-105.80	2	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	2	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	2	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	2	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	2	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	2	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	2	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CTR00201	-130.80	2	-84.33	9.67	0.82	0.68	119	2	87.4		
FQAC0001	-94.80	2	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	2	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GUY00302	-33.80	2	-59.07	4.77	1.43	0.85	91	2	87.4		
HNDIFRB2	-107.30	2	-86.23	15.16	1.14	0.85	8	1	87.4		
HTI00002	-83.30	2	-73.28	18.96	0.82	0.68	11	2	87.4		
HWA00002	-165.80	2	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
HWA00003	-174.80	2	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
MEX01NTE	-77.80	2	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	2	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	2	-96.39	19.88	3.19	1.87	158	2	87.4		1
PRU00004	-85.80	2	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	2	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	2	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
TCA00001	-115.80	2	-71.79	21.53	0.60	0.60	90	2	87.4		
USAEH001	-61.30	2	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	2	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	2	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAEH004	-118.80	2	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	2	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	2	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	2	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	2	-113.01	40.71	3.74	1.79	149	2	87.4		
VCT00001	-79.30	2	-61.18	13.23	0.60	0.60	90	2	87.4		
VEN11VEN	-103.80	2	-66.79	6.90	2.50	1.77	122	2	87.4		

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	3	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	3	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	3	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	3	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	3	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	3	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
ATGSJN01	-79.70	3	-61.79	17.07	0.60	0.60	90	1	87.4		
B CE311	-64.20	3	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	3	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	3	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	3	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	3	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	3	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	3	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	3	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	3	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	3	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	3	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	3	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	3	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	3	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
BOL00001	-87.20	3	-64.61	-16.71	2.52	2.19	85	1	87.4		
BRB00001	-92.70	3	-59.85	12.93	0.60	0.60	90	2	87.4		
CAN01101	-138.20	3	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01201	-138.20	3	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01202	-72.70	3	-81.34	50.02	7.96	2.55	5	1	87.4		9/GR11
CAN01203	-129.20	3	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01303	-129.20	3	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12

1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
CAN01304	-91.20	3	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01403	-129.20	3	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01404	-91.20	3	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01405	-82.20	3	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01504	-91.20	3	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01505	-82.20	3	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01605	-82.20	3	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01606	-70.70	3	-80.77	50.03	7.88	2.53	6	1	87.4		9/GR15
CHLCONT5	-106.20	3	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	3	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	3	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	3	-74.50	5.87	3.98	1.96	118	1	87.4		
CUB00001	-89.20	3	-79.81	21.62	2.24	0.68	168	1	87.4		
EQACAND1	-115.20	3	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	3	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
GRD00002	-42.20	3	-61.58	12.29	0.60	0.60	90	1	87.4		
GRD00059	-57.20	3	-61.58	12.29	0.60	0.60	90	1	87.4		
GRLDNK01	-53.20	3	-44.89	66.56	2.70	0.82	173	1	87.4		2
HWA00002	-166.20	3	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
HWA00003	-175.20	3	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
MEX01NTE	-78.20	3	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	3	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	3	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	3	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	3	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	3	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	3	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	3	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
PTRVIR02	-110.20	3	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
SURINAM2	-84.70	3	-55.69	4.35	1.00	0.69	86	1	87.4		
URG00001	-71.70	3	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	3	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	3	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	3	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	3	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	3	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	3	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	3	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	3	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	3	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	4	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	4	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	4	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	4	-62.85	-29.80	3.24	2.89	47	2	87.4		
B CE311	-63.80	4	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	4	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	4	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	4	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	4	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	4	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	4	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	4	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	4	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	4	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	4	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	4	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	4	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	4	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01201	-137.80	4	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01202	-72.30	4	-81.23	50.12	7.99	2.53	5	2	87.4		9/GR11
CAN01203	-128.80	4	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01303	-128.80	4	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01304	-90.80	4	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01403	-128.80	4	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01404	-90.80	4	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01405	-81.80	4	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01504	-90.80	4	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01505	-81.80	4	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01605	-81.80	4	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01606	-70.30	4	-80.64	50.02	7.88	2.52	6	2	87.4		9/GR15
CHLCONT4	-105.80	4	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	4	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	4	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	4	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	4	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	4	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	4	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CYM00001	-115.80	4	-80.58	19.57	0.60	0.60	90	2	87.4		
DOMIFRB2	-83.30	4	-70.51	18.79	0.98	0.69	167	2	87.4		
EQAC0001	-94.80	4	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	4	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GUFMGG02	-52.80	4	-56.42	8.47	4.16	0.81	123	2	87.4		2 7
HWA00002	-165.80	4	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
HWA00003	-174.80	4	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
JMC00005	-33.80	4	-77.27	18.12	0.60	0.60	90	2	87.4		
LCAIFRB1	-79.30	4	-61.15	13.90	0.60	0.60	90	2	87.4		
MEXC1NTE	-77.80	4	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEXO2NTE	-135.80	4	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEXO2SUR	-126.80	4	-96.39	19.88	3.19	1.87	158	2	87.4		1
PRU00004	-85.80	4	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	4	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	4	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
SLVIFRB2	-107.30	4	-88.91	13.59	0.60	0.60	90	1	87.4		
USAEH001	-61.30	4	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	4	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	4	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAEH004	-118.80	4	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	4	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	4	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	4	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	4	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN11VEN	-103.80	4	-66.79	6.90	2.50	1.77	122	2	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	5	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	5	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	5	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGSUR04	-94.20	5	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
B CE311	-64.20	5	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	5	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	5	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	5	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	5	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	5	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	5	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	5	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	5	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	5	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	5	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	5	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BAHIFRB1	-87.20	5	-76.06	24.16	1.81	0.70	142	1	87.4		
BERBERMU	-96.20	5	-64.77	32.32	0.60	0.60	90	2	87.4		
BERBER02	-31.00	5	-64.77	32.32	0.60	0.60	90	1	87.4		2 3
BOLAND01	-115.20	5	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CAN01101	-138.20	5	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01201	-138.20	5	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01202	-72.70	5	-81.34	50.02	7.96	2.55	5	1	87.4		9/GR11
CAN01203	-129.20	5	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01303	-129.20	5	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01304	-91.20	5	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01403	-129.20	5	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01404	-91.20	5	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01405	-82.20	5	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01504	-91.20	5	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01505	-82.20	5	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01605	-82.20	5	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01606	-70.70	5	-80.77	50.03	7.88	2.53	6	1	87.4		9/GR15
CHLCONT5	-106.20	5	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	5	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	5	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	5	-74.50	5.87	3.98	1.96	118	1	87.4		
EQACAND1	-115.20	5	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	5	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
FLKANT01	-57.20	5	-44.54	-60.13	3.54	0.68	12	1	87.4		2
FLKFALKS	-31.00	5	-59.90	-51.64	0.60	0.60	90	1	87.4		2 3
GRD00002	-42.20	5	-61.58	12.29	0.60	0.60	90	1	87.4		
HWA00002	-166.20	5	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
HWA00003	-175.20	5	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
MEX01NTE	-78.20	5	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	5	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	5	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	5	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	5	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	5	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	5	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	5	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
PTRVIR02	-110.20	5	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
SPMFRAN3	-53.20	5	-67.24	47.51	3.16	0.79	7	1	87.4		2 7
TRD00001	-84.70	5	-61.23	10.70	0.60	0.60	90	1	87.4		
URG00001	-71.70	5	-56.22	-32.52	1.02	0.89	11	1	87.4		

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
USAEH001	-61.70	5	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	5	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	5	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	5	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	5	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	5	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	5	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	5	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	5	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
VRG00001	-79.70	5	-64.37	18.48	0.60	0.60	90	1	87.4		4

1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.		Location of earth station(s) Remarks
ALS00002	-165.80	6	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	6	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	6	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	6	-62.85	-29.80	3.24	2.89	47	2	87.4		
ATNBEAM1	-52.80	6	-66.44	14.87	1.83	0.68	39	2	87.4		
B CE311	-63.80	6	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	6	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	6	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	6	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	6	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	6	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	6	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	6	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	6	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	6	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	6	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	6	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	6	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	6	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01201	-137.80	6	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01202	-72.30	6	-81.23	50.12	7.99	2.53	5	2	87.4		9/GR11
CAN01203	-128.80	6	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01303	-128.80	6	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01304	-90.80	6	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01403	-128.80	6	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01404	-90.80	6	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01405	-81.80	6	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01504	-90.80	6	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01505	-81.80	6	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01605	-81.80	6	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01606	-70.30	6	-80.64	50.02	7.88	2.52	6	2	87.4		9/GR15
CHLCONT4	-105.80	6	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	6	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	6	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	6	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	6	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	6	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	6	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CTR00201	-130.80	6	-84.33	9.67	0.82	0.68	119	2	87.4		
EQAC0001	-94.80	6	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	6	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GUY00302	-33.80	6	-59.07	4.77	1.43	0.85	91	2	87.4		
HNDIFRB2	-107.30	6	-86.23	15.16	1.14	0.85	8	1	87.4		
HTI00002	-83.30	6	-73.28	18.96	0.82	0.68	11	2	87.4		
HWA00002	-165.80	6	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
HWA00003	-174.80	6	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
MEX01NTE	-77.80	6	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	6	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	6	-96.39	19.88	3.19	1.87	158	2	87.4		1
PRU00004	-85.80	6	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	6	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	6	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
TCA00001	-115.80	6	-71.79	21.53	0.60	0.60	90	2	87.4		
USAEH001	-61.30	6	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	6	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	6	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAEH004	-118.80	6	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	6	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	6	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	6	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	6	-113.01	40.71	3.74	1.79	149	2	87.4		
VCT00001	-79.30	6	-61.18	13.23	0.60	0.60	90	2	87.4		
VEN11VEN	-103.80	6	-66.79	6.90	2.50	1.77	122	2	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	7	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	7	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	7	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	7	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	7	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	7	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
ATGSJN01	-79.70	7	-61.79	17.07	0.60	0.60	90	1	87.4		
B CE311	-64.20	7	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	7	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	7	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	7	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	7	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	7	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	7	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	7	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	7	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	7	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	7	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	7	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	7	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	7	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
BOL00001	-87.20	7	-64.61	-16.71	2.52	2.19	85	1	87.4		
BRB00001	-92.70	7	-59.85	12.93	0.60	0.60	90	2	87.4		
CAN01101	-138.20	7	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01201	-138.20	7	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01202	-72.70	7	-81.34	50.02	7.96	2.55	5	1	87.4		9/GR11
CAN01203	-129.20	7	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01303	-129.20	7	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01304	-91.20	7	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01403	-129.20	7	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01404	-91.20	7	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01405	-82.20	7	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01504	-91.20	7	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01505	-82.20	7	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01605	-82.20	7	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01606	-70.70	7	-80.77	50.03	7.88	2.53	6	1	87.4		9/GR15
CHLCONT5	-106.20	7	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	7	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	7	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	7	-74.50	5.87	3.98	1.96	118	1	87.4		
CUB00001	-89.20	7	-79.81	21.62	2.24	0.68	168	1	87.4		
EQACAND1	-115.20	7	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	7	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
GRD00002	-42.20	7	-61.58	12.29	0.60	0.60	90	1	87.4		
GRD00059	-57.20	7	-61.58	12.29	0.60	0.60	90	1	87.4		
GRLDNK01	-53.20	7	-44.89	66.56	2.70	0.82	173	1	87.4		2
HWA00002	-166.20	7	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
HWA00003	-175.20	7	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
MEX01NTE	-78.20	7	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	7	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	7	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	7	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	7	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	7	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	7	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	7	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20

1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
PTRVIR02	-110.20	7	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
SURINAM2	-84.70	7	-55.69	4.35	1.00	0.69	86	1	87.4		
URG00001	-71.70	7	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	7	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	7	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	7	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	7	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	7	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	7	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	7	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	7	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	7	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	8	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	8	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	8	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	8	-62.85	-29.80	3.24	2.89	47	2	87.4		
B CE311	-63.80	8	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	8	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	8	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	8	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	8	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	8	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	8	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	8	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	8	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	8	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	8	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	8	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	8	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	8	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01201	-137.80	8	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01202	-72.30	8	-81.23	50.12	7.99	2.53	5	2	87.4		9/GR11
CAN01203	-128.80	8	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01303	-128.80	8	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01304	-90.80	8	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01403	-128.80	8	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01404	-90.80	8	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01405	-81.80	8	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01504	-90.80	8	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01505	-81.80	8	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
CAN01605	-81.80	8	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01606	-70.30	8	-80.64	50.02	7.88	2.52	6	2	87.4		9/GR15
CHLCONT4	-105.80	8	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	8	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	8	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	8	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	8	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	8	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	8	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CYM00001	-115.80	8	-80.58	19.57	0.60	0.60	90	2	87.4		
DOMIFRB2	-83.30	8	-70.51	18.79	0.98	0.69	167	2	87.4		
EQAC0001	-94.80	8	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	8	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GUFMGG02	-52.80	8	-56.42	8.47	4.16	0.81	123	2	87.4		2 7
HWA00002	-165.80	8	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
HWA00003	-174.80	8	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
JMC00005	-33.80	8	-77.27	18.12	0.60	0.60	90	2	87.4		
LCAIFRB1	-79.30	8	-61.15	13.90	0.60	0.60	90	2	87.4		
MEX01NTE	-77.80	8	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	8	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	8	-96.39	19.88	3.19	1.87	158	2	87.4		1
PRU00004	-85.80	8	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	8	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	8	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
SLVIFRB2	-107.30	8	-88.91	13.59	0.60	0.60	90	1	87.4		
USAEH001	-61.30	8	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	8	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	8	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAEH004	-118.80	8	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	8	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	8	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	8	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	8	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN11VEN	-103.80	8	-66.79	6.90	2.50	1.77	122	2	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	9	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	9	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	9	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGSUR04	-94.20	9	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
B CE311	-64.20	9	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	9	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	9	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	9	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	9	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	9	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	9	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	9	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	9	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	9	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	9	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	9	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BAHIFRB1	-87.20	9	-76.06	24.16	1.81	0.70	142	1	87.4		
BERBERMU	-96.20	9	-64.77	32.32	0.60	0.60	90	2	87.4		
BERBER02	-31.00	9	-64.77	32.32	0.60	0.60	90	1	87.4		2 3
BOLAND01	-115.20	9	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CAN01101	-138.20	9	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01201	-138.20	9	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01202	-72.70	9	-81.34	50.02	7.96	2.55	5	1	87.4		9/GR11
CAN01203	-129.20	9	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01303	-129.20	9	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01304	-91.20	9	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01403	-129.20	9	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01404	-91.20	9	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13

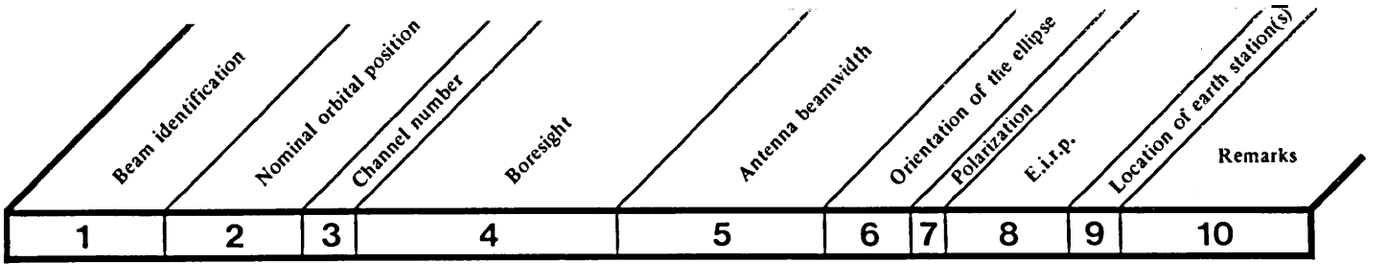
1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

CAN01405	-82.20	9	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01504	-91.20	9	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01505	-82.20	9	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01605	-82.20	9	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01606	-70.70	9	-80.77	50.03	7.88	2.53	6	1	87.4		9/GR15
CHLCONT5	-106.20	9	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	9	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	9	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLMG0001	-103.20	9	-74.50	5.87	3.98	1.96	118	1	87.4		
EQACAND1	-115.20	9	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	9	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
FLKANT01	-57.20	9	-44.54	-60.13	3.54	0.68	12	1	87.4		2
FLKFALKS	-31.00	9	-59.90	-51.64	0.60	0.60	90	1	87.4		2 3
GRD00002	-42.20	9	-61.58	12.29	0.60	0.60	90	1	87.4		
HWA00002	-166.20	9	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
HWA00003	-175.20	9	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
MEX01NTE	-78.20	9	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	9	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	9	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	9	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	9	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	9	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	9	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	9	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
PTRVIR02	-110.20	9	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
SPMFRAN3	-53.20	9	-67.24	47.51	3.16	0.79	7	1	87.4		2 7
TRD00001	-84.70	9	-61.23	10.70	0.60	0.60	90	1	87.4		
URG00001	-71.70	9	-56.22	-32.52	1.02	0.89	11	1	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10
USAEH001	-61.70	9	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	9	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	9	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	9	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	9	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	9	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	9	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	9	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	9	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
VRG00001	-79.70	9	-64.37	18.48	0.60	0.60	90	1	87.4		4

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	10	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	10	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	10	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	10	-62.85	-29.80	3.24	2.89	47	2	87.4		
ATNBEAM1	-52.80	10	-66.44	14.87	1.83	0.68	39	2	87.4		
B CE311	-63.80	10	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	10	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	10	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	10	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	10	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	10	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	10	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	10	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	10	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	10	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	10	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	10	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	10	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	10	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01201	-137.80	10	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01202	-72.30	10	-81.23	50.12	7.99	2.53	5	2	87.4		9/GR11
CAN01203	-128.80	10	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01303	-128.80	10	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01304	-90.80	10	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01403	-128.80	10	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01404	-90.80	10	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01405	-81.80	10	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01504	-90.80	10	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13



1	2	3	4		5		6	7	8	9	10
CAN01505	-81.80	10	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01605	-81.80	10	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01606	-70.30	10	-80.64	50.02	7.88	2.52	6	2	87.4		9/GR15
CHLCONT4	-105.80	10	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	10	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	10	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	10	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	10	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	10	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	10	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CTR00201	-130.80	10	-84.33	9.67	0.82	0.68	119	2	87.4		
EQAC0001	-94.80	10	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	10	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GUY00302	-33.80	10	-59.07	4.77	1.43	0.85	91	2	87.4		
HNDIFRB2	-107.30	10	-86.23	15.16	1.14	0.85	8	1	87.4		
HTI00002	-83.30	10	-73.28	18.96	0.82	0.68	11	2	87.4		
HWA00002	-165.80	10	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
HWA00003	-174.80	10	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
MEX01NTE	-77.80	10	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	10	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	10	-96.39	19.88	3.19	1.87	158	2	87.4		1
PRU00004	-85.80	10	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	10	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	10	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
TCA00001	-115.80	10	-71.79	21.53	0.60	0.60	90	2	87.4		
USAEH001	-61.30	10	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	10	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	10	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21

1	Beam identification	2	Nominal orbital position	3	Channel number	4	Boresight	5	Antenna beamwidth	6	Orientation of the ellipse	7	Polarization	8	E.i.r.p.	9	Location of earth station(s)	10	Remarks

1	2	3	4		5		6	7	8	9	10
USAEH004	-118.80	10	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	10	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	10	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	10	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	10	-113.01	40.71	3.74	1.79	149	2	87.4		
VCT00001	-79.30	10	-61.18	13.23	0.60	0.60	90	2	87.4		
VEN11VEN	-103.80	10	-66.79	6.90	2.50	1.77	122	2	87.4		

1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
ALS00002	-166.20	11	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	11	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	11	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	11	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	11	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	11	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
ATGSJN01	-79.70	11	-61.79	17.07	0.60	0.60	90	1	87.4		
B CE311	-64.20	11	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	11	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	11	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	11	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	11	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	11	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	11	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	11	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	11	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	11	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	11	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	11	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	11	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	11	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
BOL00001	-87.20	11	-64.61	-16.71	2.52	2.19	85	1	87.4		
BRB00001	-92.70	11	-59.85	12.93	0.60	0.60	90	2	87.4		
CAN01101	-138.20	11	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01201	-138.20	11	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01202	-72.70	11	-81.34	50.02	7.96	2.55	5	1	87.4		9/GR11
CAN01203	-129.20	11	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01303	-129.20	11	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12

1	Beam identification	2	Nominal orbital position	3	Channel number	4	Boresight	5	Antenna beamwidth	6	Orientation of the ellipse	7	Polarization	8	E.i.r.p.	9	Location of earth station(s)	10	Remarks

1	2	3	4		5		6	7	8	9	10
CAN01304	-91.20	11	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01403	-129.20	11	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01404	-91.20	11	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01405	-82.20	11	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01504	-91.20	11	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01505	-82.20	11	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01605	-82.20	11	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01606	-70.70	11	-80.77	50.03	7.88	2.53	6	1	87.4		9/GR15
CHLCONT5	-106.20	11	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	11	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	11	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	11	-74.50	5.87	3.98	1.96	118	1	87.4		
CUB00001	-89.20	11	-79.81	21.62	2.24	0.68	168	1	87.4		
EQACAND1	-115.20	11	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	11	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
GRD00002	-42.20	11	-61.58	12.29	0.60	0.60	90	1	87.4		
GRD00059	-57.20	11	-61.58	12.29	0.60	0.60	90	1	87.4		
GRLDNK01	-53.20	11	-44.89	66.56	2.70	0.82	173	1	87.4		2
GUY00201	-84.70	11	-59.19	4.78	1.44	0.85	95	1	87.4		
HWA00002	-166.20	11	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
HWA00003	-175.20	11	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
MEX01NTE	-78.20	11	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	11	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	11	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	11	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	11	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	11	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	11	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
PTRVIR01	-101.20	11	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
PTRVIR02	-110.20	11	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
URG00001	-71.70	11	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	11	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	11	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	11	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	11	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	11	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	11	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	11	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	11	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	11	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	12	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	12	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	12	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	12	-62.85	-29.80	3.24	2.89	47	2	87.4		
B CE311	-63.80	12	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	12	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	12	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	12	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	12	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	12	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	12	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	12	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	12	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	12	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	12	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	12	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	12	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	12	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01201	-137.80	12	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01202	-72.30	12	-81.23	50.12	7.99	2.53	5	2	87.4		9/GR11
CAN01203	-128.80	12	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01303	-128.80	12	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01304	-90.80	12	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01403	-128.80	12	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01404	-90.80	12	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01405	-81.80	12	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01504	-90.80	12	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01505	-81.80	12	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01605	-81.80	12	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01606	-70.30	12	-80.64	50.02	7.88	2.52	6	2	87.4		9/GR15
CHLCONT4	-105.80	12	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	12	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	12	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	12	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	12	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	12	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	12	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CYM00001	-115.80	12	-80.58	19.57	0.60	0.60	90	2	87.4		
DOMIFRB2	-83.30	12	-70.51	18.79	0.98	0.69	167	2	87.4		
EQAC0001	-94.80	12	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	12	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GUFMGG02	-52.80	12	-56.42	8.47	4.16	0.81	123	2	87.4		2 7
HWA00002	-165.80	12	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
HWA00003	-174.80	12	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
JMC00005	-33.80	12	-77.27	18.12	0.60	0.60	90	2	87.4		
LCAIFRB1	-79.30	12	-61.15	13.90	0.60	0.60	90	2	87.4		
MEX01NTE	-77.80	12	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	12	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	12	-96.39	19.88	3.19	1.87	158	2	87.4		1
PRU00004	-85.80	12	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	12	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	12	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
SLVIFRB2	-107.30	12	-88.91	13.59	0.60	0.60	90	1	87.4		
USAEH001	-61.30	12	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	12	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	12	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAEH004	-118.80	12	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	12	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	12	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	12	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	12	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN11VEN	-103.80	12	-66.79	6.90	2.50	1.77	122	2	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	13	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	13	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	13	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGSUR04	-94.20	13	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
B CE311	-64.20	13	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	13	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	13	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	13	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	13	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	13	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	13	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	13	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	13	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	13	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	13	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	13	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BAHIFRB1	-87.20	13	-76.06	24.16	1.81	0.70	142	1	87.4		
BERBERMU	-96.20	13	-64.77	32.32	0.60	0.60	90	2	87.4		
BERBER02	-31.00	13	-64.77	32.32	0.60	0.60	90	1	87.4		2 3
BOLAND01	-115.20	13	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CAN01101	-138.20	13	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01201	-138.20	13	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01202	-72.70	13	-81.34	50.02	7.96	2.55	5	1	87.4		9/GR11
CAN01203	-129.20	13	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01303	-129.20	13	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01304	-91.20	13	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01403	-129.20	13	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01404	-91.20	13	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13

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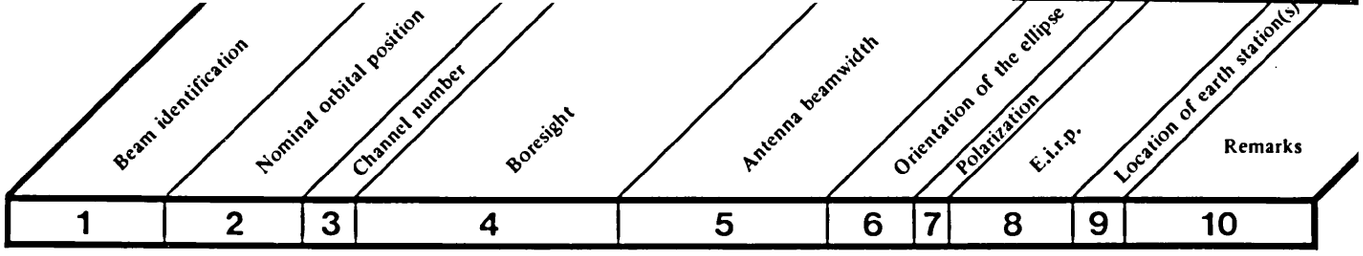

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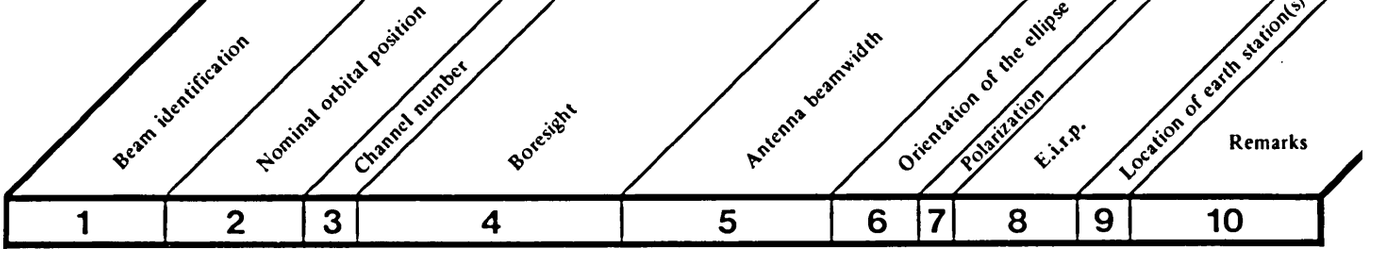
CAN01405	-82.20	13	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01504	-91.20	13	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01505	-82.20	13	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01605	-82.20	13	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01606	-70.70	13	-80.77	50.03	7.88	2.53	6	1	87.4		9/GR15
CHLCONT5	-106.20	13	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	13	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	13	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	13	-74.50	5.87	3.98	1.96	118	1	87.4		
EQACAND1	-115.20	13	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	13	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
FLKANT01	-57.20	13	-44.54	-60.13	3.54	0.68	12	1	87.4		2
FLKFALKS	-31.00	13	-59.90	-51.64	0.60	0.60	90	1	87.4		2 3
GRD00002	-42.20	13	-61.58	12.29	0.60	0.60	90	1	87.4		
HWA00002	-166.20	13	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
HWA00003	-175.20	13	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
MEX01NTE	-78.20	13	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	13	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	13	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	13	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	13	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	13	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	13	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	13	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
PTRVIR02	-110.20	13	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
SPMFRAN3	-53.20	13	-67.24	47.51	3.16	0.79	7	1	87.4		2 7
TRD00001	-84.70	13	-61.23	10.70	0.60	0.60	90	1	87.4		
URG00001	-71.70	13	-56.22	-32.52	1.02	0.89	11	1	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAEH001	-61.70	13	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	13	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	13	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	13	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	13	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	13	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	13	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	13	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	13	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
VRG00001	-79.70	13	-64.37	18.48	0.60	0.60	90	1	87.4		4



1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	14	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	14	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	14	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	14	-62.85	-29.80	3.24	2.89	47	2	87.4		
ATNBEAM1	-52.80	14	-66.44	14.87	1.83	0.68	39	2	87.4		
B CE311	-63.80	14	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	14	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	14	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	14	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	14	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	14	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	14	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	14	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	14	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	14	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	14	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	14	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	14	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	14	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01201	-137.80	14	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01202	-72.30	14	-81.23	50.12	7.99	2.53	5	2	87.4		9/GR11
CAN01203	-128.80	14	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01303	-128.80	14	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01304	-90.80	14	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01403	-128.80	14	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01404	-90.80	14	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01405	-81.80	14	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01504	-90.80	14	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13

1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
CAN01505	-81.80	14	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01605	-81.80	14	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01606	-70.30	14	-80.64	50.02	7.88	2.52	6	2	87.4		9/GR15
CHLCONT4	-105.80	14	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	14	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	14	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	14	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	14	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	14	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	14	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CTR00201	-130.80	14	-84.33	9.67	0.82	0.68	119	2	87.4		
EQAC0001	-94.80	14	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	14	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GUY00302	-33.80	14	-59.07	4.77	1.43	0.85	91	2	87.4		
HNDIFRB2	-107.30	14	-86.23	15.16	1.14	0.85	8	1	87.4		
HTI00002	-83.30	14	-73.28	18.96	0.82	0.68	11	2	87.4		
HWA00002	-165.80	14	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
HWA00003	-174.80	14	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
MEX01NTE	-77.80	14	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	14	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	14	-96.39	19.88	3.19	1.87	158	2	87.4		1
PRU00004	-85.80	14	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	14	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	14	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
TCA00001	-115.80	14	-71.79	21.53	0.60	0.60	90	2	87.4		
USAEH001	-61.30	14	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	14	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	14	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
USAEH004	-118.80	14	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	14	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	14	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	14	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	14	-113.01	40.71	3.74	1.79	149	2	87.4		
VCT00001	-79.30	14	-61.18	13.23	0.60	0.60	90	2	87.4		
VEN11VEN	-103.80	14	-66.79	6.90	2.50	1.77	122	2	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	15	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	15	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	15	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	15	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	15	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	15	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
ATGSJN01	-79.70	15	-61.79	17.07	0.60	0.60	90	1	87.4		
B CE311	-64.20	15	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	15	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	15	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	15	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	15	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	15	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	15	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	15	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	15	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	15	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	15	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	15	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	15	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	15	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
BOL00001	-87.20	15	-64.61	-16.71	2.52	2.19	85	1	87.4		
BRB00001	-92.70	15	-59.85	12.93	0.60	0.60	90	2	87.4		
CAN01101	-138.20	15	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01201	-138.20	15	-114.60	51.08	7.28	1.10	160	1	87.4		9/GR10
CAN01202	-72.70	15	-81.34	50.02	7.96	2.55	5	1	87.4		9/GR11
CAN01203	-129.20	15	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01303	-129.20	15	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01304	-91.20	15	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01403	-129.20	15	-113.02	51.08	7.47	1.26	162	1	87.4		9/GR12
CAN01404	-91.20	15	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01405	-82.20	15	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01504	-91.20	15	-86.71	50.48	8.58	2.54	178	1	87.4		9/GR13
CAN01505	-82.20	15	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01605	-82.20	15	-84.11	50.20	8.31	2.58	1	1	87.4		9/GR14
CAN01606	-70.70	15	-80.77	50.03	7.88	2.53	6	1	87.4		9/GR15
CHLCONT5	-106.20	15	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	15	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	15	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	15	-74.50	5.87	3.98	1.96	118	1	87.4		
CUB00001	-89.20	15	-79.81	21.62	2.24	0.68	168	1	87.4		
EQACAND1	-115.20	15	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	15	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
GRD00002	-42.20	15	-61.58	12.29	0.60	0.60	90	1	87.4		
GRD00059	-57.20	15	-61.58	12.29	0.60	0.60	90	1	87.4		
GRLDNK01	-53.20	15	-44.89	66.56	2.70	0.82	173	1	87.4		2
GUY00201	-84.70	15	-59.19	4.78	1.44	0.85	95	1	87.4		
HWA00002	-166.20	15	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
HWA00003	-175.20	15	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
MEX01NTE	-78.20	15	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	15	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	15	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	15	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	15	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	15	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	15	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
PTRVIR01	-101.20	15	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
PTRVIR02	-110.20	15	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
URG00001	-71.70	15	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	15	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	15	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	15	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	15	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	15	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	15	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	15	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	15	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	15	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	16	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	16	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	16	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	16	-62.85	-29.80	3.24	2.89	47	2	87.4		
B CE311	-63.80	16	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	16	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	16	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	16	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	16	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	16	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	16	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	16	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	16	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	16	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	16	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	16	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	16	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	16	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01201	-137.80	16	-114.10	50.92	7.22	1.11	160	2	87.4		9/GR10
CAN01202	-72.30	16	-81.23	50.12	7.99	2.53	5	2	87.4		9/GR11
CAN01203	-128.80	16	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01303	-128.80	16	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01304	-90.80	16	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01403	-128.80	16	-113.04	51.04	7.53	1.26	162	2	87.4		9/GR12
CAN01404	-90.80	16	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01405	-81.80	16	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01504	-90.80	16	-86.57	50.48	8.59	2.54	178	2	87.4		9/GR13
CAN01505	-81.80	16	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01605	-81.80	16	-83.80	50.22	8.35	2.57	2	2	87.4		9/GR14
CAN01606	-70.30	16	-80.64	50.02	7.88	2.52	6	2	87.4		9/GR15
CHLCONT4	-105.80	16	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	16	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	16	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	16	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	16	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	16	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	16	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CYM00001	-115.80	16	-80.58	19.57	0.60	0.60	90	2	87.4		
DOMIFRB2	-83.30	16	-70.51	18.79	0.98	0.69	167	2	87.4		
EQAC0001	-94.80	16	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	16	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GUFMGG02	-52.80	16	-56.42	8.47	4.16	0.81	123	2	87.4		2 7
HWA00002	-165.80	16	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
HWA00003	-174.80	16	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
JMC00005	-33.80	16	-77.27	18.12	0.60	0.60	90	2	87.4		
LCAIFRB1	-79.30	16	-61.15	13.90	0.60	0.60	90	2	87.4		
MEX01NTE	-77.80	16	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	16	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	16	-96.39	19.88	3.19	1.87	158	2	87.4		1
PRU00004	-85.80	16	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	16	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	16	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
SLVIFRB2	-107.30	16	-88.91	13.59	0.60	0.60	90	1	87.4		
USAEH001	-61.30	16	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	16	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	16	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAEH0U4	-118.80	16	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	16	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	16	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	16	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	16	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN11VEN	-103.80	16	-66.79	6.90	2.50	1.77	122	2	87.4		

1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
ALS00002	-166.20	17	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	17	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	17	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	17	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	17	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	17	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
B CE311	-64.20	17	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	17	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	17	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	17	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	17	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	17	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	17	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	17	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	17	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	17	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	17	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	17	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	17	-64.77	32.32	0.60	0.60	90	2	87.4		
BERBER02	-31.00	17	-64.77	32.32	0.60	0.60	90	1	87.4		2 3
BOLAND01	-115.20	17	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CAN01101	-138.20	17	-125.63	57.24	3.45	1.27	157	1	87.4		9/GR10
CAN01201	-138.20	17	-112.04	55.95	3.35	0.97	151	1	87.4		9/GR10
CAN01202	-72.70	17	-107.70	55.63	2.74	1.12	32	1	87.4		9/GR11
CAN01203	-129.20	17	-111.48	55.61	3.08	1.15	151	1	87.4		9/GR12
CAN01303	-129.20	17	-102.42	57.12	3.54	0.91	154	1	87.4		9/GR12
CAN01304	-91.20	17	-99.12	57.36	1.98	1.72	2	1	87.4		9/GR13
CAN01403	-129.20	17	-89.75	52.02	4.68	0.78	148	1	87.4		9/GR12

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

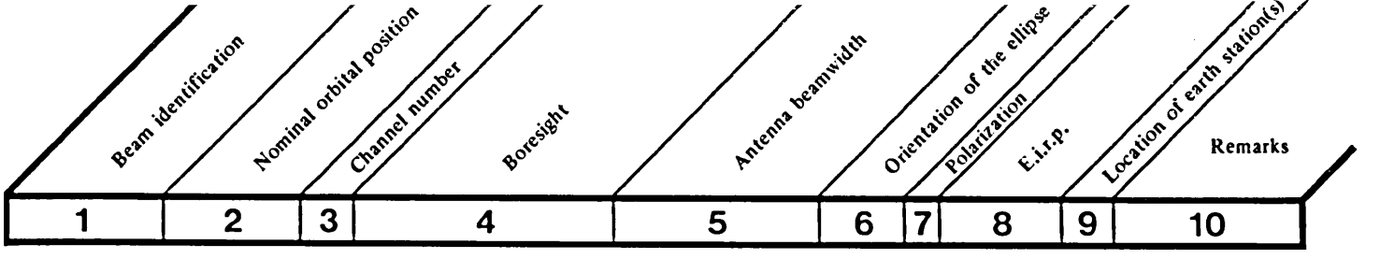
1	2	3	4		5		6	7	8	9	10
CAN01404	-91.20	17	-84.82	52.42	3.10	2.05	152	1	87.4		9/GR13
CAN01405	-82.20	17	-84.00	52.39	2.84	2.29	172	1	87.4		9/GR14
CAN01504	-91.20	17	-72.66	53.77	3.57	1.67	156	1	87.4		9/GR13
CAN01505	-82.20	17	-71.77	53.79	3.30	1.89	162	1	87.4		9/GR14
CAN01605	-82.20	17	-61.50	49.55	2.65	1.40	143	1	87.4		9/GR14
CAN01606	-70.70	17	-61.30	49.55	2.40	1.65	148	1	87.4		9/GR15
CHLCONT5	-106.20	17	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	17	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	17	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	17	-74.50	5.87	3.98	1.96	118	1	87.4		
EQACAND1	-115.20	17	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	17	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
FLKFALKS	-31.00	17	-59.90	-51.64	0.60	0.60	90	1	87.4		2 3
HWA00002	-166.20	17	-165.79	23.42	4.20	0.68	160	1	87.4		9/GR1
HWA00003	-175.20	17	-166.10	23.42	4.25	0.68	159	1	87.4		9/GR2
JMC00002	-92.70	17	-77.30	18.12	0.62	0.62	90	2	87.4		
MEX01NTE	-78.20	17	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	17	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	17	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	17	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	17	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	17	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	17	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	17	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
PTRVIR02	-110.20	17	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
SCN00001	-79.70	17	-62.46	17.44	0.60	0.60	90	1	87.4		
SPMFRAN3	-53.20	17	-67.24	47.51	3.16	0.79	7	1	87.4		2 7
SURINAM2	-84.70	17	-55.69	4.35	1.00	0.69	86	1	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
URGU0001	-71.70	17	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	17	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	17	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	17	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	17	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	17	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	17	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	17	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	17	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	17	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	18	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	18	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	18	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	18	-62.85	-29.80	3.24	2.89	47	2	87.4		
ATNBEAM1	-52.80	18	-66.44	14.87	1.83	0.68	39	2	87.4		
B CE311	-63.80	18	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	18	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	18	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	18	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	18	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	18	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	18	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	18	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	18	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	18	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	18	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	18	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	18	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
BLZ00001	-115.80	18	-88.68	17.27	0.62	0.62	90	2	87.4		
CAN01101	-137.80	18	-125.60	57.24	3.45	1.27	157	2	87.4		9/GR10
CAN01201	-137.80	18	-111.92	55.89	3.33	0.98	151	2	87.4		9/GR10
CAN01202	-72.30	18	-107.64	55.62	2.75	1.11	32	2	87.4		9/GR11
CAN01203	-128.80	18	-111.43	55.56	3.07	1.15	151	2	87.4		9/GR12
CAN01303	-128.80	18	-102.39	57.12	3.54	0.92	154	2	87.4		9/GR12
CAN01304	-90.80	18	-99.00	57.33	1.96	1.73	1	2	87.4		9/GR13
CAN01403	-128.80	18	-89.70	52.02	4.67	0.79	148	2	87.4		9/GR12
CAN01404	-90.80	18	-84.78	52.41	3.09	2.06	153	2	87.4		9/GR13
CAN01405	-81.80	18	-84.02	52.34	2.82	2.30	172	2	87.4		9/GR14



1	2	3	4		5		6	7	8	9	10
CAN01504	-90.80	18	-72.68	53.78	3.57	1.67	157	2	87.4		9/GR13
CAN01505	-81.80	18	-71.76	53.76	3.30	1.89	162	2	87.4		9/GR14
CAN01605	-81.80	18	-61.54	49.50	2.66	1.39	144	2	87.4		9/GR14
CAN01606	-70.30	18	-61.32	49.51	2.41	1.65	148	2	87.4		9/GR15
CHLCONT4	-105.80	18	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	18	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	18	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	18	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	18	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	18	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	18	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CTRU02U1	-130.80	18	-84.33	9.67	0.82	0.68	119	2	87.4		
DMAIFRB1	-79.30	18	-61.30	15.35	0.60	0.60	90	2	87.4		
EQAC0001	-94.80	18	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	18	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
HWA00002	-165.80	18	-165.79	23.32	4.20	0.68	160	2	87.4		9/GR1
HWA00003	-174.80	18	-166.10	23.42	4.25	0.68	159	2	87.4		9/GR2
MEX01NTE	-77.80	18	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	18	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	18	-96.39	19.88	3.19	1.87	158	2	87.4		1
NCG00003	-107.30	18	-84.99	12.90	1.05	1.01	176	1	87.4		
PRU00004	-85.80	18	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	18	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	18	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH001	-61.30	18	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	18	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	18	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH004	-118.80	18	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAPSA02	-165.80	18	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	18	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	18	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	18	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN11VEN	-103.80	18	-66.79	6.90	2.50	1.77	122	2	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	19	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	19	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	19	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	19	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	19	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	19	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
B CE311	-64.20	19	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	19	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	19	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	19	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	19	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	19	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	19	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	19	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	19	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	19	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	19	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	19	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	19	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	19	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
BOL00001	-87.20	19	-64.61	-16.71	2.52	2.19	85	1	87.4		
BRB00001	-92.70	19	-59.85	12.93	0.60	0.60	90	2	87.4		
CAN01101	-138.20	19	-125.63	57.24	3.45	1.27	157	1	87.4		9/GR10
CAN01201	-138.20	19	-112.04	55.95	3.35	0.97	151	1	87.4		9/GR10
CAN01202	-72.70	19	-107.70	55.63	2.74	1.12	32	1	87.4		9/GR11
CAN01203	-129.20	19	-111.48	55.61	3.08	1.15	151	1	87.4		9/GR12
CAN01303	-129.20	19	-102.42	57.12	3.54	0.91	154	1	87.4		9/GR12
CAN01304	-91.20	19	-99.12	57.36	1.98	1.72	2	1	87.4		9/GR13

1	Beam identification	2	Nominal orbital position	3	Channel number	4	Boresight	5	Antenna beamwidth	6	Orientation of the ellipse	7	Polarization	8	E.i.r.p.	9	Location of earth station(s)	10	Remarks

1	2	3	4		5		6	7	8	9	10
CAND1403	-129.20	19	-89.75	52.02	4.68	0.78	148	1	87.4		9/GR12
CAND1404	-91.20	19	-84.82	52.42	3.10	2.05	152	1	87.4		9/GR13
CAND1405	-82.20	19	-84.00	52.39	2.84	2.29	172	1	87.4		9/GR14
CAND1504	-91.20	19	-72.66	53.77	3.57	1.67	156	1	87.4		9/GR13
CAND1505	-82.20	19	-71.77	53.79	3.30	1.89	162	1	87.4		9/GR14
CAND1605	-82.20	19	-61.50	49.55	2.65	1.40	143	1	87.4		9/GR14
CAND1606	-70.70	19	-61.30	49.55	2.40	1.65	148	1	87.4		9/GR15
CHLCONT5	-106.20	19	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	19	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	19	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	19	-74.50	5.87	3.98	1.96	118	1	87.4		
CUB00001	-89.20	19	-79.81	21.62	2.24	0.68	168	1	87.4		
EQACAND1	-115.20	19	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	19	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
GRD00059	-57.20	19	-61.58	12.29	0.60	0.60	90	1	87.4		
GRLDNK01	-53.20	19	-44.89	66.56	2.70	0.82	173	1	87.4		2
GUY00201	-84.70	19	-59.19	4.78	1.44	0.85	95	1	87.4		
HWA00002	-166.20	19	-165.79	23.42	4.20	0.68	160	1	87.4		9/GR1
HWA00003	-175.20	19	-166.10	23.42	4.25	0.68	159	1	87.4		9/GR2
MEX01NTE	-78.20	19	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	19	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	19	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	19	-96.39	19.88	3.18	1.87	157	1	87.4		1
MSR00001	-79.70	19	-61.73	16.75	0.60	0.60	90	1	87.4		4
PAQPAC01	-106.20	19	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	19	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	19	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	19	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
PTRVIR02	-110.20	19	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
URG00001	-71.70	19	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	19	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	19	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	19	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	19	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	19	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	19	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	19	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	19	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	19	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

1	Beam identification	2	Nominal orbital position	3	Channel number	4	Boresight	5	Antenna beamwidth	6	Orientation of the ellipse	7	Polarization	8	E.i.r.p.	9	Location of earth station(s)	10	Remarks

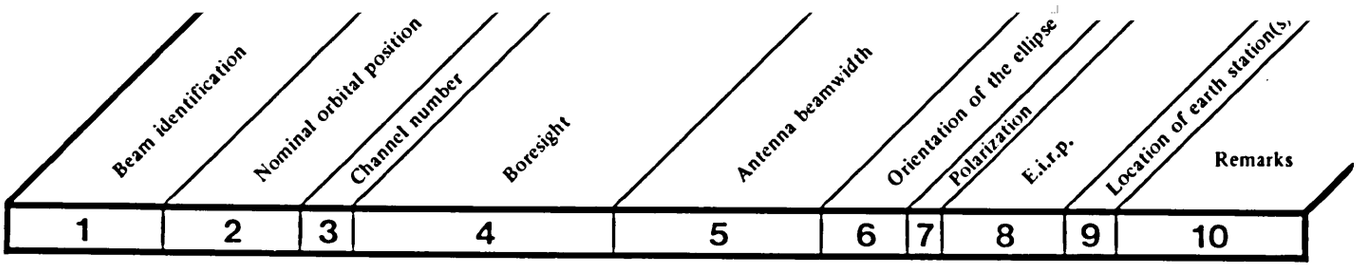
1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	20	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	20	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	20	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	20	-62.85	-29.80	3.24	2.89	47	2	87.4		
B CE311	-63.80	20	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	20	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	20	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	20	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	20	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	20	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	20	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	20	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	20	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	20	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	20	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	20	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	20	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	20	-125.60	57.24	3.45	1.27	157	2	87.4		9/GR10
CANJ1201	-137.80	20	-111.92	55.89	3.33	0.98	151	2	87.4		9/GR10
CAN01202	-72.30	20	-107.64	55.62	2.75	1.11	32	2	87.4		9/GR11
CAN01203	-128.80	20	-111.43	55.56	3.07	1.15	151	2	87.4		9/GR12
CAN01303	-128.80	20	-102.39	57.12	3.54	0.92	154	2	87.4		9/GR12
CAN01304	-90.80	20	-99.00	57.33	1.96	1.73	1	2	87.4		9/GR13
CANJ1403	-128.80	20	-89.70	52.02	4.67	0.79	148	2	87.4		9/GR12
CAN01404	-90.80	20	-84.78	52.41	3.09	2.06	153	2	87.4		9/GR13
CAN01405	-81.80	20	-84.02	52.34	2.82	2.30	172	2	87.4		9/GR14
CAN01504	-90.80	20	-72.68	53.78	3.57	1.67	157	2	87.4		9/GR13
CAN01505	-81.80	20	-71.76	53.76	3.30	1.89	162	2	87.4		9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10
CAN01605	-81.80	20	-61.54	49.50	2.66	1.39	144	2	87.4		9/GR14
CAN01606	-70.30	20	-61.32	49.51	2.41	1.65	148	2	87.4		9/GR15
CHLCONT4	-105.80	20	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	20	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	20	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	20	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	20	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	20	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	20	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
EQACO001	-94.80	20	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	20	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GRD00003	-79.30	20	-61.62	12.34	0.60	0.60	90	2	87.4		
GTMIFRB2	-107.30	20	-90.50	15.64	1.03	0.74	84	1	87.4		
GUFMGG02	-52.80	20	-56.42	8.47	4.16	0.81	123	2	87.4		2 7
HWA00002	-165.80	20	-165.79	23.32	4.20	0.68	160	2	87.4		9/GR1
HWA00003	-174.80	20	-166.10	23.42	4.25	0.68	159	2	87.4		9/GR2
MEX01NTE	-77.80	20	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	20	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	20	-96.39	19.88	3.19	1.87	158	2	87.4		1
PNRIFRB2	-121.00	20	-80.15	8.46	1.01	0.73	170	1	87.4		
PRU00004	-85.80	20	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	20	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	20	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH001	-61.30	20	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	20	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	20	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH004	-118.80	20	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	20	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
USAPSA03	-174.80	20	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	20	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	20	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN02VEN	-103.80	20	-66.79	6.90	2.50	1.77	122	2	87.4		9/GR22
VEN11VEN	-103.80	20	-66.79	6.90	2.50	1.77	122	2	87.4		9/GR22

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	21	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	21	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	21	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	21	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	21	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	21	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
B CE311	-64.20	21	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	21	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	21	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	21	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	21	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	21	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	21	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	21	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	21	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	21	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	21	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	21	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	21	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	21	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CAN01101	-138.20	21	-125.63	57.24	3.45	1.27	157	1	87.4		9/GR10
CAN01201	-138.20	21	-112.04	55.95	3.35	0.97	151	1	87.4		9/GR10
CAN01202	-72.70	21	-107.70	55.63	2.74	1.12	32	1	87.4		9/GR11
CAN01203	-129.20	21	-111.48	55.61	3.08	1.15	151	1	87.4		9/GR12
CAN01303	-129.20	21	-102.42	57.12	3.54	0.91	154	1	87.4		9/GR12
CAN01304	-91.20	21	-99.12	57.36	1.98	1.72	2	1	87.4		9/GR13
CAN01403	-129.20	21	-89.75	52.02	4.68	0.78	148	1	87.4		9/GR12
CAN01404	-91.20	21	-84.82	52.42	3.10	2.05	152	1	87.4		9/GR13

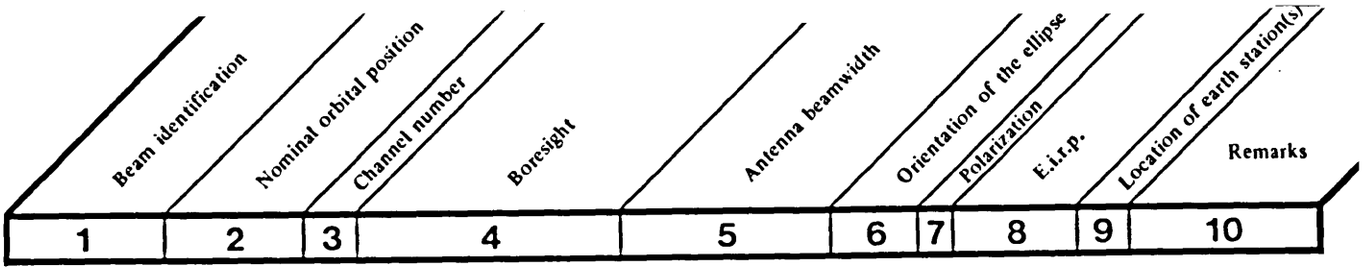


1	2	3	4		5		6	7	8	9	10
CAN01405	-82.20	21	-84.00	52.39	2.84	2.29	172	1	87.4		9/GR14
CAN01504	-91.20	21	-72.66	53.77	3.57	1.67	156	1	87.4		9/GR13
CAN01505	-82.20	21	-71.77	53.79	3.30	1.89	162	1	87.4		9/GR14
CAN01605	-82.20	21	-61.50	49.55	2.65	1.40	143	1	87.4		9/GR14
CAN01606	-70.70	21	-61.30	49.55	2.40	1.65	148	1	87.4		9/GR15
CHLCONT5	-106.20	21	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	21	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	21	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	21	-74.50	5.87	3.98	1.96	118	1	87.4		
EQACAND1	-115.20	21	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	21	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
HWA00002	-166.20	21	-165.79	23.42	4.20	0.68	160	1	87.4		9/GR1
HWA00003	-175.20	21	-166.10	23.42	4.25	0.68	159	1	87.4		9/GR2
JMC00002	-92.70	21	-77.30	18.12	0.62	0.62	90	2	87.4		
MEX01NTE	-78.20	21	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	21	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	21	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	21	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	21	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	21	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	21	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	21	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
PTRVIR02	-110.20	21	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
SCN00001	-79.70	21	-62.46	17.44	0.60	0.60	90	1	87.4		
SPMFRAN3	-53.20	21	-67.24	47.51	3.16	0.79	7	1	87.4		2 7
SURINAM2	-84.70	21	-55.69	4.35	1.00	0.69	86	1	87.4		
URG00001	-71.70	21	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	21	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAEH002	-101.20	21	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	21	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	21	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	21	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	21	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	21	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	21	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	21	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10



1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	22	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	22	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	22	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	22	-62.85	-29.80	3.24	2.89	47	2	87.4		
ATNBEAM1	-52.80	22	-66.44	14.87	1.83	0.68	39	2	87.4		
B CE311	-63.80	22	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	22	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	22	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	22	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	22	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	22	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	22	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	22	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	22	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	22	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	22	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	22	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	22	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
BLZ00001	-115.80	22	-88.68	17.27	0.62	0.62	90	2	87.4		
CAN01101	-137.80	22	-125.60	57.24	3.45	1.27	157	2	87.4		9/GR10
CAN01201	-137.80	22	-111.92	55.89	3.33	0.98	151	2	87.4		9/GR10
CAN01202	-72.30	22	-107.64	55.62	2.75	1.11	32	2	87.4		9/GR11
CAN01203	-128.80	22	-111.43	55.56	3.07	1.15	151	2	87.4		9/GR12
CAN01303	-128.80	22	-102.39	57.12	3.54	0.92	154	2	87.4		9/GR12
CAN01304	-90.80	22	-99.00	57.33	1.96	1.73	1	2	87.4		9/GR13
CAN01403	-128.80	22	-89.70	52.02	4.67	0.79	148	2	87.4		9/GR12
CAN01404	-90.80	22	-84.78	52.41	3.09	2.06	153	2	87.4		9/GR13
CAN01405	-81.80	22	-84.02	52.34	2.82	2.30	172	2	87.4		9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01504	-90.80	22	-72.68	53.78	3.57	1.67	157	2	87.4		9/GR13
CAN01505	-81.80	22	-71.76	53.76	3.30	1.89	162	2	87.4		9/GR14
CAN01605	-81.80	22	-61.54	49.50	2.66	1.39	144	2	87.4		9/GR14
CAN01606	-70.30	22	-61.32	49.51	2.41	1.65	148	2	87.4		9/GR15
CHLCONT4	-105.80	22	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	22	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	22	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	22	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	22	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	22	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	22	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CTR00201	-130.80	22	-84.33	9.67	0.82	0.68	119	2	87.4		
DMAIFRB1	-79.30	22	-61.30	15.35	0.60	0.60	90	2	87.4		
EQAC0001	-94.80	22	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	22	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
HWA00002	-165.80	22	-165.79	23.32	4.20	0.68	160	2	87.4		9/GR1
HWA00003	-174.80	22	-166.10	23.42	4.25	0.68	159	2	87.4		9/GR2
MEX01NTE	-77.80	22	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	22	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	22	-96.39	19.88	3.19	1.87	158	2	87.4		1
NCG00003	-107.30	22	-84.99	12.90	1.05	1.01	176	1	87.4		
PRU00004	-85.80	22	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	22	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	22	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH001	-61.30	22	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	22	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	22	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH004	-118.80	22	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
USAPSA02	-165.80	22	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	22	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	22	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	22	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN11VEN	-103.80	22	-66.79	6.90	2.50	1.77	122	2	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	23	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	23	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	23	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	23	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	23	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	23	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
B CE311	-64.20	23	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	23	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	23	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	23	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	23	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	23	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	23	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	23	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	23	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	23	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	23	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	23	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	23	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	23	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
BOL00001	-87.20	23	-64.61	-16.71	2.52	2.19	85	1	87.4		
BRB00001	-92.70	23	-59.85	12.93	0.60	0.60	90	2	87.4		
CAN01101	-138.20	23	-125.63	57.24	3.45	1.27	157	1	87.4		9/GR10
CAN01201	-138.20	23	-112.04	55.95	3.35	0.97	151	1	87.4		9/GR10
CAN01202	-72.70	23	-107.70	55.63	2.74	1.12	32	1	87.4		9/GR11
CAN01203	-129.20	23	-111.48	55.61	3.08	1.15	151	1	87.4		9/GR12
CAN01303	-129.20	23	-102.42	57.12	3.54	0.91	154	1	87.4		9/GR12
CAN01304	-91.20	23	-99.12	57.36	1.98	1.72	2	1	87.4		9/GR13

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAND1403	-129.20	23	-89.75	52.02	4.68	0.78	148	1	87.4		9/GR12
CAND1404	-91.20	23	-84.82	52.42	3.10	2.05	152	1	87.4		9/GR13
CAND1405	-82.20	23	-84.00	52.39	2.84	2.29	172	1	87.4		9/GR14
CAND1504	-91.20	23	-72.66	53.77	3.57	1.67	156	1	87.4		9/GR13
CAND1505	-82.20	23	-71.77	53.79	3.30	1.89	162	1	87.4		9/GR14
CAND1605	-82.20	23	-61.50	49.55	2.65	1.40	143	1	87.4		9/GR14
CAND1606	-70.70	23	-61.30	49.55	2.40	1.65	148	1	87.4		9/GR15
CHLCONT5	-106.20	23	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	23	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	23	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	23	-74.50	5.87	3.98	1.96	118	1	87.4		
CUB00001	-89.20	23	-79.81	21.62	2.24	0.68	168	1	87.4		
EQACAND1	-115.20	23	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	23	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
GRD00059	-57.20	23	-61.58	12.29	0.60	0.60	90	1	87.4		
GRLDNK01	-53.20	23	-44.89	66.56	2.70	0.82	173	1	87.4		2
GUY00201	-84.70	23	-59.19	4.78	1.44	0.85	95	1	87.4		
HWA00002	-166.20	23	-165.79	23.42	4.20	0.68	160	1	87.4		9/GR1
HWA00003	-175.20	23	-166.10	23.42	4.25	0.68	159	1	87.4		9/GR2
MEX01NTE	-78.20	23	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	23	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	23	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	23	-96.39	19.88	3.18	1.87	157	1	87.4		1
MSR00001	-79.70	23	-61.73	16.75	0.60	0.60	90	1	87.4		4
PAQPAC01	-106.20	23	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	23	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	23	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	23	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
PTRVIR02	-110.20	23	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
URG00001	-71.70	23	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	23	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	23	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	23	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	23	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	23	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	23	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	23	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	23	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	23	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	24	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	24	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	24	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	24	-62.85	-29.80	3.24	2.89	47	2	87.4		
B CE311	-63.80	24	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	24	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	24	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	24	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	24	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	24	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	24	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	24	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	24	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	24	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	24	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	24	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	24	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	24	-125.60	57.24	3.45	1.27	157	2	87.4		9/GR10
CAN01201	-137.80	24	-111.92	55.89	3.33	0.98	151	2	87.4		9/GR10
CAN01202	-72.30	24	-107.64	55.62	2.75	1.11	32	2	87.4		9/GR11
CAN01203	-128.80	24	-111.43	55.56	3.07	1.15	151	2	87.4		9/GR12
CAN01303	-128.80	24	-102.39	57.12	3.54	0.92	154	2	87.4		9/GR12
CAN01304	-90.80	24	-99.00	57.33	1.96	1.73	1	2	87.4		9/GR13
CAN01403	-128.80	24	-89.70	52.02	4.67	0.79	148	2	87.4		9/GR12
CAN01404	-90.80	24	-84.78	52.41	3.09	2.06	153	2	87.4		9/GR13
CAN01405	-81.80	24	-84.02	52.34	2.82	2.30	172	2	87.4		9/GR14
CAN01504	-90.80	24	-72.68	53.78	3.57	1.67	157	2	87.4		9/GR13
CAN01505	-81.80	24	-71.76	53.76	3.30	1.89	162	2	87.4		9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01605	-81.80	24	-61.54	49.50	2.66	1.39	144	2	87.4		9/GR14
CAN01606	-70.30	24	-61.32	49.51	2.41	1.65	148	2	87.4		9/GR15
CHLCONT4	-105.80	24	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	24	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	24	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	24	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	24	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	24	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	24	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
EQACQ001	-94.80	24	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAGU001	-94.80	24	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GRDJ0003	-79.30	24	-61.62	12.34	0.60	0.60	90	2	87.4		
GTMIFRB2	-107.30	24	-90.50	15.64	1.03	0.74	84	1	87.4		
GUFMGG02	-52.80	24	-56.42	8.47	4.16	0.81	123	2	87.4		2 7
HWA00002	-165.80	24	-165.79	23.32	4.20	0.68	160	2	87.4		9/GR1
HWA00003	-174.80	24	-166.10	23.42	4.25	0.68	159	2	87.4		9/GR2
MEX01NTE	-77.80	24	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	24	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	24	-96.39	19.88	3.19	1.87	158	2	87.4		1
PNRIFRB2	-121.00	24	-80.15	8.46	1.01	0.73	170	1	87.4		
PRU00004	-85.80	24	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	24	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	24	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH001	-61.30	24	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	24	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	24	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH004	-118.80	24	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	24	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10
USAPSA03	-174.80	24	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	24	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	24	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN02VEN	-103.80	24	-66.79	6.90	2.50	1.77	122	2	87.4		9/GR22
VEN11VEN	-103.80	24	-66.79	6.90	2.50	1.77	122	2	87.4		9/GR22

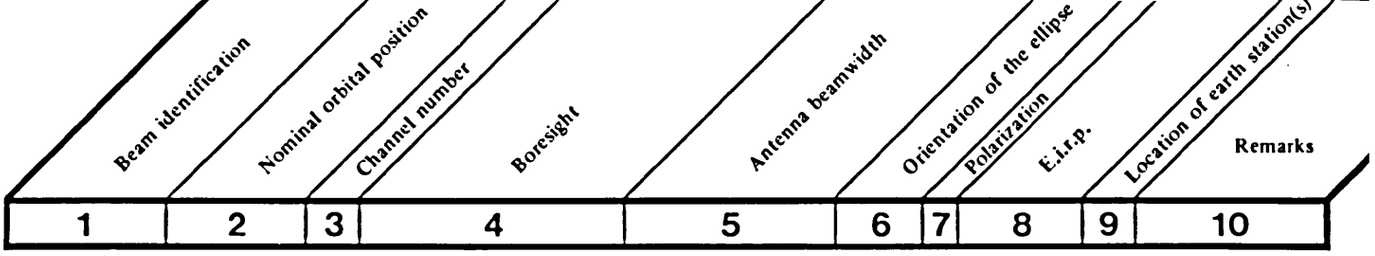
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	25	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	25	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	25	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	25	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	25	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	25	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
B CE311	-64.20	25	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	25	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	25	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	25	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	25	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	25	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	25	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	25	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	25	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	25	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	25	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	25	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	25	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	25	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CAN01101	-138.20	25	-125.63	57.24	3.45	1.27	157	1	87.4		9/GR10
CAN01201	-138.20	25	-112.04	55.95	3.35	0.97	151	1	87.4		9/GR10
CAN01202	-72.70	25	-107.70	55.63	2.74	1.12	32	1	87.4		9/GR11
CAN01203	-129.20	25	-111.48	55.61	3.08	1.15	151	1	87.4		9/GR12
CAN01303	-129.20	25	-102.42	57.12	3.54	0.91	154	1	87.4		9/GR12
CAN01304	-91.20	25	-99.12	57.36	1.98	1.72	2	1	87.4		9/GR13
CAN01403	-129.20	25	-89.75	52.02	4.68	0.78	148	1	87.4		9/GR12
CAN01404	-91.20	25	-84.82	52.42	3.10	2.05	152	1	87.4		9/GR13

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

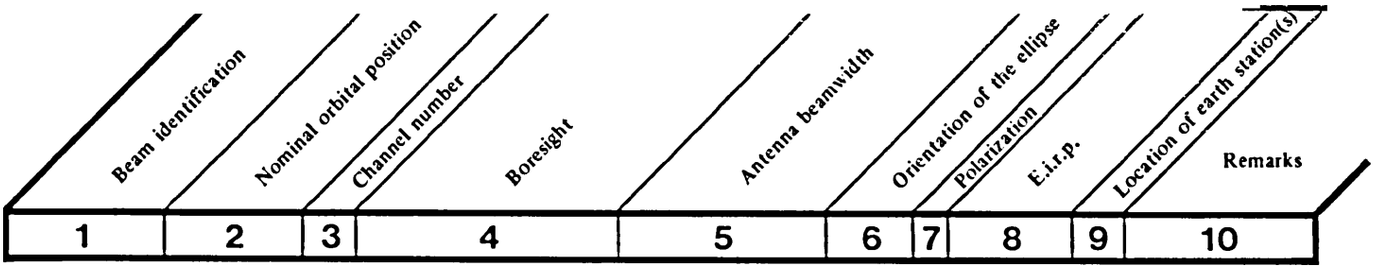
1	2	3	4		5		6	7	8	9	10
CAN01405	-82.20	25	-84.00	52.39	2.84	2.29	172	1	87.4		9/GR14
CAN01504	-91.20	25	-72.66	53.77	3.57	1.67	156	1	87.4		9/GR13
CAN01505	-82.20	25	-71.77	53.79	3.30	1.89	162	1	87.4		9/GR14
CAN01605	-82.20	25	-61.50	49.55	2.65	1.40	143	1	87.4		9/GR14
CAN01606	-70.70	25	-61.30	49.55	2.40	1.65	148	1	87.4		9/GR15
CHLCONT5	-106.20	25	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	25	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	25	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	25	-74.50	5.87	3.98	1.96	118	1	87.4		
EQACAND1	-115.20	25	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	25	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
HWA00002	-166.20	25	-165.79	23.42	4.20	0.68	160	1	87.4		9/GR1
HWA00J03	-175.20	25	-166.10	23.42	4.25	0.68	159	1	87.4		9/GR2
JMC00002	-92.70	25	-77.30	18.12	0.62	0.62	90	2	87.4		
MEX01NTE	-78.20	25	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	25	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	25	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	25	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	25	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	25	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	25	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	25	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
PTRVIR02	-110.20	25	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
SCN00001	-79.70	25	-62.46	17.44	0.60	0.60	90	1	87.4		
SPMFRAN3	-53.20	25	-67.24	47.51	3.16	0.79	7	1	87.4		2 7
SURINAM2	-84.70	25	-55.69	4.35	1.00	0.69	86	1	87.4		
URG00001	-71.70	25	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	25	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6

1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
USAEH002	-101.20	25	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	25	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	25	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	25	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	25	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	25	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	25	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	25	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5



1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	26	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	26	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	26	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	26	-62.85	-29.80	3.24	2.89	47	2	87.4		
ATNBEAM1	-52.80	26	-66.44	14.87	1.83	0.68	39	2	87.4		
B CE311	-63.80	26	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	26	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	26	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	26	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	26	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	26	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	26	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	26	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	26	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	26	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	26	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	26	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	26	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
BLZ00001	-115.80	26	-88.68	17.27	0.62	0.62	90	2	87.4		
CAN01101	-137.80	26	-125.60	57.24	3.45	1.27	157	2	87.4		9/GR10
CAN01201	-137.80	26	-111.92	55.89	3.33	0.98	151	2	87.4		9/GR10
CAN01202	-72.30	26	-107.64	55.62	2.75	1.11	32	2	87.4		9/GR11
CAN01203	-128.80	26	-111.43	55.56	3.07	1.15	151	2	87.4		9/GR12
CAN01303	-128.80	26	-102.39	57.12	3.54	0.92	154	2	87.4		9/GR12
CAN01304	-90.80	26	-99.00	57.33	1.96	1.73	1	2	87.4		9/GR13
CAN01403	-128.80	26	-89.70	52.02	4.67	0.79	148	2	87.4		9/GR12
CAN01404	-90.80	26	-84.78	52.41	3.09	2.06	153	2	87.4		9/GR13
CAN01405	-81.80	26	-84.02	52.34	2.82	2.30	172	2	87.4		9/GR14

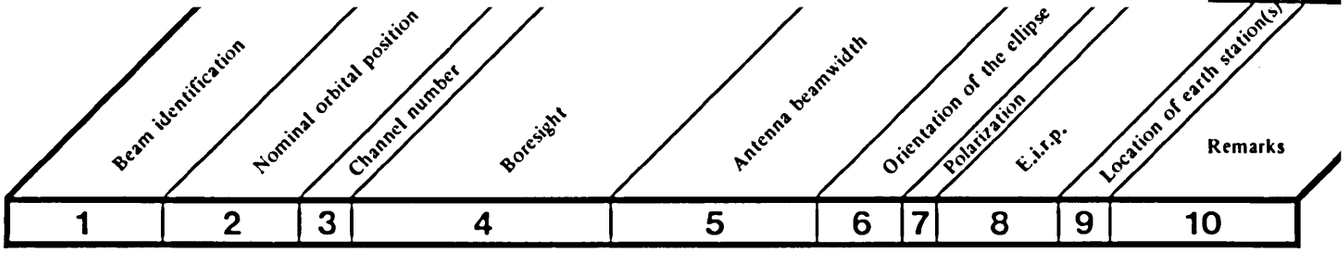


1	2	3	4		5		6	7	8	9	10
CAN01504	-90.80	26	-72.68	53.78	3.57	1.67	157	2	87.4		9/GR13
CAN01505	-81.80	26	-71.76	53.76	3.30	1.89	162	2	87.4		9/GR14
CAN01605	-81.80	26	-61.54	49.50	2.66	1.39	144	2	87.4		9/GR14
CAN01606	-70.30	26	-61.32	49.51	2.41	1.65	148	2	87.4		9/GR15
CHLCONT4	-105.80	26	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	26	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	26	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBEK01	-92.30	26	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	26	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	26	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	26	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CTRJ0201	-130.80	26	-84.33	9.67	0.82	0.68	119	2	87.4		
DMAIFRB1	-79.30	26	-61.30	15.35	0.60	0.60	90	2	87.4		
EQAC0001	-94.80	26	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	26	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
HWA00002	-165.80	26	-165.79	23.32	4.20	0.68	160	2	87.4		9/GR1
HWA00003	-174.80	26	-166.10	23.42	4.25	0.68	159	2	87.4		9/GR2
MEX01NTE	-77.80	26	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	26	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	26	-96.39	19.88	3.19	1.87	158	2	87.4		1
NCG00003	-107.30	26	-84.99	12.90	1.05	1.01	176	1	87.4		
PRU00004	-85.80	26	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	26	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	26	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH001	-61.30	26	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	26	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	26	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH004	-118.80	26	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
USAPSA02	-165.80	26	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	26	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	26	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	26	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN11VEN	-103.80	26	-66.79	6.90	2.50	1.77	122	2	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	27	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	27	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	27	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	27	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	27	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	27	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
B CE311	-64.20	27	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	27	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	27	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	27	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	27	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	27	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	27	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	27	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	27	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	27	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	27	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	27	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	27	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	27	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
BOL00001	-87.20	27	-64.61	-16.71	2.52	2.19	85	1	87.4		
BRB00001	-92.70	27	-59.85	12.93	0.60	0.60	90	2	87.4		
CAN01101	-138.20	27	-125.63	57.24	3.45	1.27	157	1	87.4		9/GR10
CAN01201	-138.20	27	-112.04	55.95	3.35	0.97	151	1	87.4		9/GR10
CAN01202	-72.70	27	-107.70	55.63	2.74	1.12	32	1	87.4		9/GR11
CAN01203	-129.20	27	-111.48	55.61	3.08	1.15	151	1	87.4		9/GR12
CAN01303	-129.20	27	-102.42	57.12	3.54	0.91	154	1	87.4		9/GR12
CAN01304	-91.20	27	-99.12	57.36	1.98	1.72	2	1	87.4		9/GR13



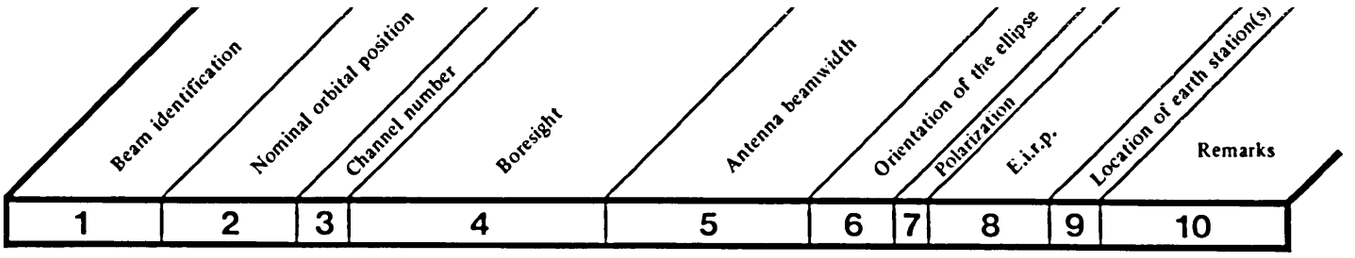
1	2	3	4		5		6	7	8	9	10
CAN01403	-129.20	27	-89.75	52.02	4.68	0.78	148	1	87.4		9/GR12
CAN01404	-91.20	27	-84.82	52.42	3.10	2.05	152	1	87.4		9/GR13
CAN01405	-82.20	27	-84.00	52.39	2.84	2.29	172	1	87.4		9/GR14
CAN01504	-91.20	27	-72.66	53.77	3.57	1.67	156	1	87.4		9/GR13
CAN01505	-82.20	27	-71.77	53.79	3.30	1.89	162	1	87.4		9/GR14
CAN01605	-82.20	27	-61.50	49.55	2.65	1.40	143	1	87.4		9/GR14
CAN01606	-70.70	27	-61.30	49.55	2.40	1.65	148	1	87.4		9/GR15
CHLCONT5	-106.20	27	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	27	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	27	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	27	-74.50	5.87	3.98	1.96	118	1	87.4		
CUB00001	-89.20	27	-79.81	21.62	2.24	0.68	168	1	87.4		
EQACAND1	-115.20	27	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	27	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
GRD00059	-57.20	27	-61.58	12.29	0.60	0.60	90	1	87.4		
GRLDNK01	-53.20	27	-44.89	66.56	2.70	0.82	173	1	87.4		2
GUY00201	-84.70	27	-59.19	4.78	1.44	0.85	95	1	87.4		
HWA00002	-166.20	27	-165.79	23.42	4.20	0.68	160	1	87.4		9/GR1
HWA00003	-175.20	27	-166.10	23.42	4.25	0.68	159	1	87.4		9/GR2
MEX01NTE	-78.20	27	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	27	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	27	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	27	-96.39	19.88	3.18	1.87	157	1	87.4		1
MSR00001	-79.70	27	-61.73	16.75	0.60	0.60	90	1	87.4		4
PAQPAC01	-106.20	27	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	27	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	27	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	27	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20

1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
PTRVIR02	-110.20	27	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
URG00001	-71.70	27	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	27	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	27	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	27	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	27	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	27	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	27	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	27	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	27	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	27	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	28	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	28	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	28	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	28	-62.85	-29.80	3.24	2.89	47	2	87.4		
B CE311	-63.80	28	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	28	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	28	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	28	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	28	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	28	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	28	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	28	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	28	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	28	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	28	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	28	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	28	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	28	-125.60	57.24	3.45	1.27	157	2	87.4		9/GR10
CAN01201	-137.80	28	-111.92	55.89	3.33	0.98	151	2	87.4		9/GR10
CAN01202	-72.30	28	-107.64	55.62	2.75	1.11	32	2	87.4		9/GR11
CAN01203	-128.80	28	-111.43	55.56	3.07	1.15	151	2	87.4		9/GR12
CAN01303	-128.80	28	-102.39	57.12	3.54	0.92	154	2	87.4		9/GR12
CAN01304	-90.80	28	-99.00	57.33	1.96	1.73	1	2	87.4		9/GR13
CAN01403	-128.80	28	-89.70	52.02	4.67	0.79	148	2	87.4		9/GR12
CAN01404	-90.80	28	-84.78	52.41	3.09	2.06	153	2	87.4		9/GR13
CAN01405	-81.80	28	-84.02	52.34	2.82	2.30	172	2	87.4		9/GR14
CAN01504	-90.80	28	-72.68	53.78	3.57	1.67	157	2	87.4		9/GR13
CAN01505	-81.80	28	-71.76	53.76	3.30	1.89	162	2	87.4		9/GR14

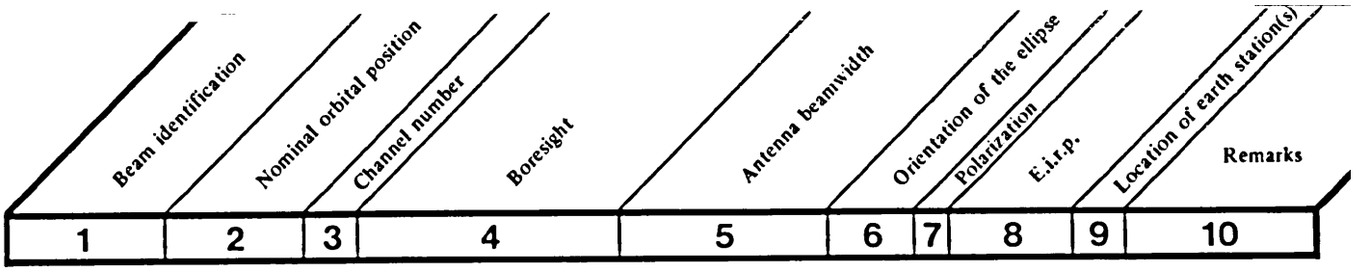
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10



1	2	3	4		5		6	7	8	9	10
CAN01605	-81.80	28	-61.54	49.50	2.66	1.39	144	2	87.4		9/GR14
CAN01606	-70.30	28	-61.32	49.51	2.41	1.65	148	2	87.4		9/GR15
CHLCONT4	-105.80	28	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	28	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	28	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	28	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	28	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	28	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	28	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
EQAC0001	-94.80	28	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	28	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GRDJ0003	-79.30	28	-61.62	12.34	0.60	0.60	90	2	87.4		
GTMIFRB2	-107.30	28	-90.50	15.64	1.03	0.74	84	1	87.4		
GUFMGG02	-52.80	28	-56.42	8.47	4.16	0.81	123	2	87.4		2 7
HWA00002	-165.80	28	-165.79	23.32	4.20	0.68	160	2	87.4		9/GR1
HWA00003	-174.80	28	-166.10	23.42	4.25	0.68	159	2	87.4		9/GR2
MEX01NTE	-77.80	28	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	28	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	28	-96.39	19.88	3.19	1.87	158	2	87.4		1
PNRIFRB2	-121.00	28	-80.15	8.46	1.01	0.73	170	1	87.4		
PRUJ0004	-85.80	28	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	28	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	28	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH001	-61.30	28	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	28	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	28	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH004	-118.80	28	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	28	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
USAPSA03	-174.80	28	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	28	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	28	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN02VEN	-103.80	28	-66.79	6.90	2.50	1.77	122	2	87.4		9/GR22
VEN11VEN	-103.80	28	-66.79	6.90	2.50	1.77	122	2	87.4		9/GR22



1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	29	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	29	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	29	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	29	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	29	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	29	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
B CE311	-64.20	29	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	29	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	29	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	29	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	29	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	29	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	29	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	29	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	29	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	29	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	29	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	29	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	29	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	29	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CAN01101	-138.20	29	-125.63	57.24	3.45	1.27	157	1	87.4		9/GR10
CAN01201	-138.20	29	-112.04	55.95	3.35	0.97	151	1	87.4		9/GR10
CAN01202	-72.70	29	-107.70	55.63	2.74	1.12	32	1	87.4		9/GR11
CAN01203	-129.20	29	-111.48	55.61	3.08	1.15	151	1	87.4		9/GR12
CAN01303	-129.20	29	-102.42	57.12	3.54	0.91	154	1	87.4		9/GR12
CAN01304	-91.20	29	-99.12	57.36	1.98	1.72	2	1	87.4		9/GR13
CAN01403	-129.20	29	-89.75	52.02	4.68	0.78	148	1	87.4		9/GR12
CAN01404	-91.20	29	-84.82	52.42	3.10	2.05	152	1	87.4		9/GR13

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAND1405	-82.20	29	-84.00	52.39	2.84	2.29	172	1	87.4		9/GR14
CAND1504	-91.20	29	-72.66	53.77	3.57	1.67	156	1	87.4		9/GR13
CAND1505	-82.20	29	-71.77	53.79	3.30	1.89	162	1	87.4		9/GR14
CAND1605	-82.20	29	-61.50	49.55	2.65	1.40	143	1	87.4		9/GR14
CAND1606	-70.70	29	-61.30	49.55	2.40	1.65	148	1	87.4		9/GR15
CHLCONT5	-106.20	29	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	29	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	29	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	29	-74.50	5.87	3.98	1.96	118	1	87.4		
EQACAND1	-115.20	29	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	29	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
HWA00002	-166.20	29	-165.79	23.42	4.20	0.68	160	1	87.4		9/GR1
HWA00003	-175.20	29	-166.10	23.42	4.25	0.68	159	1	87.4		9/GR2
JMC00002	-92.70	29	-77.30	18.12	0.62	0.62	90	2	87.4		
MEX01NTE	-78.20	29	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	29	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	29	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	29	-96.39	19.88	3.18	1.87	157	1	87.4		1
PAQPAC01	-106.20	29	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	29	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	29	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	29	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
PTRVIRU2	-110.20	29	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
SCN00001	-79.70	29	-62.46	17.44	0.60	0.60	90	1	87.4		
SPMFRAN3	-53.20	29	-67.24	47.51	3.16	0.79	7	1	87.4		2 7
SURINAM2	-84.70	29	-55.69	4.35	1.00	0.69	86	1	87.4		
URG00001	-71.70	29	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	29	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAEH002	-101.20	29	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	29	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	29	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	29	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	29	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	29	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	29	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	29	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

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Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	30	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	30	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	30	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	30	-62.85	-29.80	3.24	2.89	47	2	87.4		
ATNBEAM1	-52.80	30	-66.44	14.87	1.83	0.68	39	2	87.4		
B CE311	-63.80	30	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	30	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	30	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	30	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	30	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	30	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	30	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	30	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	30	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	30	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	30	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	30	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	30	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
BLZ00001	-115.80	30	-88.68	17.27	0.62	0.62	90	2	87.4		
CAN01101	-137.80	30	-125.60	57.24	3.45	1.27	157	2	87.4		9/GR10
CAN01201	-137.80	30	-111.92	55.89	3.33	0.98	151	2	87.4		9/GR10
CAN01202	-72.30	30	-107.64	55.62	2.75	1.11	32	2	87.4		9/GR11
CAN01203	-128.80	30	-111.43	55.56	3.07	1.15	151	2	87.4		9/GR12
CAN01303	-128.80	30	-102.39	57.12	3.54	0.92	154	2	87.4		9/GR12
CAN01304	-90.80	30	-99.00	57.33	1.96	1.73	1	2	87.4		9/GR13
CAN01403	-128.80	30	-89.70	52.02	4.67	0.79	148	2	87.4		9/GR12
CAN01404	-90.80	30	-84.78	52.41	3.09	2.06	153	2	87.4		9/GR13
CAN01405	-81.80	30	-84.02	52.34	2.82	2.30	172	2	87.4		9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01504	-90.80	30	-72.68	53.78	3.57	1.67	157	2	87.4		9/GR13
CAN01505	-81.80	30	-71.76	53.76	3.30	1.89	162	2	87.4		9/GR14
CAN01605	-81.80	30	-61.54	49.50	2.66	1.39	144	2	87.4		9/GR14
CAN01606	-70.30	30	-61.32	49.51	2.41	1.65	148	2	87.4		9/GR15
CHLCONT4	-105.80	30	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	30	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	30	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	30	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	30	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	30	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	30	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
CTR00201	-130.80	30	-84.33	9.67	0.82	0.68	119	2	87.4		
DMAIFRB1	-79.30	30	-61.30	15.35	0.60	0.60	90	2	87.4		
EQAC0001	-94.80	30	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	30	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
HWA00002	-165.80	30	-165.79	23.32	4.20	0.68	160	2	87.4		9/GR1
HWA00003	-174.80	30	-166.10	23.42	4.25	0.68	159	2	87.4		9/GR2
MEX01NTE	-77.80	30	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	30	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	30	-96.39	19.88	3.19	1.87	158	2	87.4		1
NCGJ0003	-107.30	30	-84.99	12.90	1.05	1.01	176	1	87.4		
PRU00004	-85.80	30	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	30	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	30	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH001	-61.30	30	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	30	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	30	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH004	-118.80	30	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6

1	2	3	4	5	6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks

1	2	3	4		5		6	7	8	9	10
USAPSA02	-165.80	30	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
USAPSA03	-174.80	30	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	30	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	30	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN11VEN	-103.80	30	-66.79	6.90	2.50	1.77	122	2	87.4		

Beam identification	Nominal orbital position	Channel number	Boresight	Antenna beamwidth	Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4	5	6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-166.20	31	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
ALS00003	-175.20	31	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
ARGINSU4	-94.20	31	-52.98	-59.81	3.40	0.68	19	1	87.4		9/GR3
ARGINSU5	-55.20	31	-44.17	-59.91	3.77	0.70	13	1	87.4		9/GR4
ARGSUR04	-94.20	31	-65.04	-43.33	3.32	1.50	40	1	87.4		9/GR3
ARGSUR05	-55.20	31	-63.68	-43.01	2.54	2.38	152	1	87.4		9/GR4
B CE311	-64.20	31	-40.60	-6.07	3.04	2.06	174	1	87.4		8 9/GR7
B CE312	-45.20	31	-40.27	-6.06	3.44	2.09	174	1	87.4		8 9/GR9
B CE411	-64.20	31	-50.97	-15.27	3.86	1.38	49	1	87.4		8 9/GR7
B CE412	-45.20	31	-50.71	-15.30	3.57	1.56	52	1	87.4		8 9/GR9
B CE511	-64.20	31	-53.10	-2.90	2.44	2.13	104	1	87.4		8 9/GR7
B NO611	-74.20	31	-59.60	-11.62	2.85	1.69	165	2	87.4		8 9/GR8
B NO711	-74.20	31	-60.70	-1.78	3.54	1.78	126	2	87.4		8 9/GR8
B NO811	-74.20	31	-68.76	-4.71	2.37	1.65	73	2	87.4		8 9/GR8
B SU111	-81.20	31	-51.12	-25.63	2.76	1.05	50	1	87.4		8 9/GR6
B SU112	-45.20	31	-50.75	-25.62	2.47	1.48	56	1	87.4		8 9/GR9
B SU211	-81.20	31	-44.51	-16.95	3.22	1.36	60	1	87.4		8 9/GR6
B SU212	-45.20	31	-44.00	-16.87	3.20	1.96	58	1	87.4		8 9/GR9
BERBERMU	-96.20	31	-64.77	32.32	0.60	0.60	90	2	87.4		
BOLAND01	-115.20	31	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
BOL00001	-87.20	31	-64.61	-16.71	2.52	2.19	85	1	87.4		
BRB00001	-92.70	31	-59.85	12.93	0.60	0.60	90	2	87.4		
CAN01101	-138.20	31	-125.63	57.24	3.45	1.27	157	1	87.4		9/GR10
CAN01201	-138.20	31	-112.04	55.95	3.35	0.97	151	1	87.4		9/GR10
CAN01202	-72.70	31	-107.70	55.63	2.74	1.12	32	1	87.4		9/GR11
CAN01203	-129.20	31	-111.48	55.61	3.08	1.15	151	1	87.4		9/GR12
CAN01303	-129.20	31	-102.42	57.12	3.54	0.91	154	1	87.4		9/GR12
CAN01304	-91.20	31	-99.12	57.36	1.98	1.72	2	1	87.4		9/GR13

1	Beam identification	2	Nominal orbital position	3	Channel number	4	Boresight	5	Antenna beamwidth	6	Orientation of the ellipse	7	Polarization	8	E.i.r.p.	9	Location of earth station(s)	10	Remarks

1	2	3	4		5		6	7	8	9	10
CAN01403	-129.20	31	-89.75	52.02	4.68	0.78	148	1	87.4		9/GR12
CAN01404	-91.20	31	-84.82	52.42	3.10	2.05	152	1	87.4		9/GR13
CAN01405	-82.20	31	-84.00	52.39	2.84	2.29	172	1	87.4		9/GR14
CAN01504	-91.20	31	-72.66	53.77	3.57	1.67	156	1	87.4		9/GR13
CAN01505	-82.20	31	-71.77	53.79	3.30	1.89	162	1	87.4		9/GR14
CAN01605	-82.20	31	-61.50	49.55	2.65	1.40	143	1	87.4		9/GR14
CAN01606	-70.70	31	-61.30	49.55	2.40	1.65	148	1	87.4		9/GR15
CHLCONT5	-106.20	31	-72.23	-35.57	2.60	0.68	55	1	87.4		9/GR17
CHLPAC02	-106.20	31	-80.06	-30.06	1.36	0.68	69	1	87.4		9/GR17
CLMAND01	-115.20	31	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
CLM00001	-103.20	31	-74.50	5.87	3.98	1.96	118	1	87.4		
CUB00001	-89.20	31	-79.81	21.62	2.24	0.68	168	1	87.4		
EQACAND1	-115.20	31	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
EQAGAND1	-115.20	31	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
GRD00059	-57.20	31	-61.58	12.29	0.60	0.60	90	1	87.4		
GRLDNK01	-53.20	31	-44.89	66.56	2.70	0.82	173	1	87.4		2
GUY00201	-84.70	31	-59.19	4.78	1.44	0.85	95	1	87.4		
HWA00002	-166.20	31	-165.79	23.42	4.20	0.68	160	1	87.4		9/GR1
HWA00003	-175.20	31	-166.10	23.42	4.25	0.68	159	1	87.4		9/GR2
MEX01NTE	-78.20	31	-105.81	26.01	2.89	2.08	155	1	87.4		1
MEX01SUR	-69.20	31	-94.84	19.82	3.05	2.09	4	1	87.4		1
MEX02NTE	-136.20	31	-107.21	26.31	3.84	1.55	148	1	87.4		1
MEX02SUR	-127.20	31	-96.39	19.88	3.18	1.87	157	1	87.4		1
MSR00001	-79.70	31	-61.73	16.75	0.60	0.60	90	1	87.4		4
PAQPAC01	-106.20	31	-109.18	-27.53	0.60	0.60	90	1	87.4		9/GR17
PRG00002	-99.20	31	-58.66	-23.32	1.45	1.04	76	1	87.4		
PRUAND02	-115.20	31	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5
PTRVIR01	-101.20	31	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20

1	2	3	4		5		6	7	8	9	10
Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
PTRVIR02	-110.20	31	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
URG00001	-71.70	31	-56.22	-32.52	1.02	0.89	11	1	87.4		
USAEH001	-61.70	31	-87.57	36.17	6.42	3.49	12	1	87.4		1 5 6
USAEH002	-101.20	31	-93.94	36.32	8.24	3.56	171	1	87.4		1 6 9/GR20
USAEH003	-110.20	31	-95.23	36.29	8.27	3.37	168	1	87.4		1 6 9/GR21
USAEH004	-119.20	31	-96.45	36.21	8.20	3.12	165	1	87.4		1 5 6
USAPSA02	-166.20	31	-109.94	36.86	6.04	1.11	137	1	87.4		9/GR1
USAPSA03	-175.20	31	-116.23	37.50	5.60	0.75	132	1	87.4		9/GR2
USAWH101	-148.20	31	-111.02	40.68	4.36	2.15	162	1	87.4		
USAWH102	-157.20	31	-113.07	40.74	3.72	1.78	149	1	87.4		
VENAND03	-115.20	31	-71.37	-4.69	6.49	2.57	87	1	87.4		9/GR5

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
ALS00002	-165.80	32	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1
ALS00003	-174.80	32	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
ARGNORT4	-93.80	32	-63.96	-30.01	3.86	1.99	48	2	87.4		
ARGNORT5	-54.80	32	-62.85	-29.80	3.24	2.89	47	2	87.4		
B CE311	-63.80	32	-40.60	-6.07	3.04	2.06	174	2	87.4		8 9/GR7
B CE312	-44.80	32	-40.26	-6.06	3.44	2.09	174	2	87.4		8 9/GR9
B CE411	-63.80	32	-50.97	-15.26	3.86	1.38	49	2	87.4		8 9/GR7
B CE412	-44.80	32	-50.71	-15.30	3.57	1.56	52	2	87.4		8 9/GR9
B CE511	-63.80	32	-53.11	-2.98	2.42	2.15	107	2	87.4		8 9/GR7
B NO611	-73.80	32	-59.60	-11.62	2.86	1.69	165	1	87.4		8 9/GR8
B NO711	-73.80	32	-60.70	-1.78	3.54	1.78	126	1	87.4		8 9/GR8
B NO811	-73.80	32	-68.75	-4.71	2.37	1.65	73	1	87.4		8 9/GR8
B SE911	-101.80	32	-45.99	-19.09	2.22	0.79	62	2	87.4		8
B SU111	-80.80	32	-51.10	-25.64	2.76	1.06	50	2	87.4		8 9/GR6
B SU112	-44.80	32	-50.76	-25.62	2.47	1.48	56	2	87.4		8 9/GR9
B SU211	-80.80	32	-44.51	-16.94	3.22	1.37	60	2	87.4		8 9/GR6
B SU212	-44.80	32	-43.99	-16.97	3.27	1.92	59	2	87.4		8 9/GR9
CAN01101	-137.80	32	-125.60	57.24	3.45	1.27	157	2	87.4		9/GR10
CAN01201	-137.80	32	-111.92	55.89	3.33	0.98	151	2	87.4		9/GR10
CAN01202	-72.30	32	-107.64	55.62	2.75	1.11	32	2	87.4		9/GR11
CAN01203	-128.80	32	-111.43	55.56	3.07	1.15	151	2	87.4		9/GR12
CAN01303	-128.80	32	-102.39	57.12	3.54	0.92	154	2	87.4		9/GR12
CAN01304	-90.80	32	-99.00	57.33	1.96	1.73	1	2	87.4		9/GR13
CAN01403	-128.80	32	-89.70	52.02	4.67	0.79	148	2	87.4		9/GR12
CAN01404	-90.80	32	-84.78	52.41	3.09	2.06	153	2	87.4		9/GR13
CAN01405	-81.80	32	-84.02	52.34	2.82	2.30	172	2	87.4		9/GR14
CAN01504	-90.80	32	-72.68	53.78	3.57	1.67	157	2	87.4		9/GR13
CAN01505	-81.80	32	-71.76	53.76	3.30	1.89	162	2	87.4		9/GR14

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
CAN01605	-81.80	32	-61.54	49.50	2.66	1.39	144	2	87.4		9/GR14
CAN01606	-70.30	32	-61.32	49.51	2.41	1.65	148	2	87.4		9/GR15
CHLCONT4	-105.80	32	-69.59	-23.20	2.21	0.69	68	2	87.4		9/GR16
CHLCONT6	-105.80	32	-73.52	-55.52	3.65	1.31	39	2	87.4		9/GR16
CRBBAH01	-92.30	32	-76.09	24.13	1.83	0.68	141	1	87.4		9/GR18
CRBBER01	-92.30	32	-64.76	32.13	0.60	0.60	90	1	87.4		9/GR18
CRBBLZ01	-92.30	32	-88.61	17.26	0.64	0.64	90	1	87.4		9/GR18
CRBEC001	-92.30	32	-60.07	8.26	4.20	0.86	115	1	87.4		9/GR18
CRBJMC01	-92.30	32	-79.45	17.97	0.99	0.68	151	1	87.4		9/GR18
EQAC0001	-94.80	32	-78.31	-1.52	1.48	1.15	65	1	87.4		9/GR19
EQAG0001	-94.80	32	-90.36	-0.57	0.94	0.89	99	1	87.4		9/GR19
GRD00003	-79.30	32	-61.62	12.34	0.60	0.60	90	2	87.4		
GTMIFRB2	-107.30	32	-90.50	15.64	1.03	0.74	84	1	87.4		
GUFMGG02	-52.80	32	-56.42	8.47	4.16	0.81	123	2	87.4		2 7
HWA00002	-165.80	32	-165.79	23.32	4.20	0.68	160	2	87.4		9/GR1
HWA00003	-174.80	32	-166.10	23.42	4.25	0.68	159	2	87.4		9/GR2
MEX01NTE	-77.80	32	-105.80	25.99	2.88	2.07	155	2	87.4		1
MEX02NTE	-135.80	32	-107.36	26.32	3.80	1.57	149	2	87.4		1
MEX02SUR	-126.80	32	-96.39	19.88	3.19	1.87	158	2	87.4		1
PNRIFRB2	-121.00	32	-80.15	8.46	1.01	0.73	170	1	87.4		
PRU00004	-85.80	32	-74.19	-8.39	3.74	2.45	112	2	87.4		
PTRVIR01	-100.80	32	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
PTRVIR02	-109.80	32	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH001	-61.30	32	-87.53	36.18	6.41	3.49	12	2	87.4		1 5 6
USAEH002	-100.80	32	-93.85	36.31	8.26	3.55	171	2	87.4		1 6 9/GR20
USAEH003	-109.80	32	-95.47	36.38	8.10	3.45	168	2	87.4		1 6 9/GR21
USAEH004	-118.80	32	-96.42	36.21	8.20	3.12	165	2	87.4		1 5 6
USAPSA02	-165.80	32	-109.83	36.82	6.03	1.12	137	2	87.4		9/GR1

Beam identification	Nominal orbital position	Channel number	Boresight		Antenna beamwidth		Orientation of the ellipse	Polarization	E.i.r.p.	Location of earth station(s)	Remarks
1	2	3	4		5		6	7	8	9	10

1	2	3	4		5		6	7	8	9	10
USAPSA03	-174.80	32	-116.10	37.47	5.60	0.76	132	2	87.4		9/GR2
USAWH101	-147.80	32	-111.01	40.67	4.38	2.15	162	2	87.4		
USAWH102	-156.80	32	-113.01	40.71	3.74	1.79	149	2	87.4		
VEN02VEN	-103.80	32	-66.79	6.90	2.50	1.77	122	2	87.4		9/GR22
VEN11VEN	-103.80	32	-66.79	6.90	2.50	1.77	122	2	87.4		9/GR22

ARTICLE 10

Interference

10.1 The Members of the Union in Region 2 shall endeavour to agree on the action required to reduce harmful interference which might be caused by the application of these provisions and the associated Plan.

ARTICLE 11

Period of Validity of the Provisions and Associated Plan

11.1 The provisions and associated Plan have been prepared in order to meet the requirements for feeder links for the broadcasting-satellite service in the bands concerned for a period extending until at least 1 January 1994. [1]

11.2 In any event, the provisions and associated Plan shall remain in force until their revision by a competent administrative radio conference convened in accordance with the relevant provisions of the Convention in force.

[1] See also Resolution No. 1(Sat-R2).

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ANNEX 1

Limits for Determining Whether a Service of an Administration Is Considered to be Affected by a Proposed Modification to the Plan or When It Is Necessary Under This Part of the Final Acts to Seek the Agreement of any other Administration [1, 2]

1. *Limits applicable in the band 17.3 - 17.8 GHz (of Region 2) to protect a frequency assignment to the fixed-satellite service (Earth-to-space) for feeder links to broadcasting satellites in Regions 1 and 3*

An administration of Region 1 or 3 shall be considered as being affected if the proposed use would cause, to a feeder link to broadcasting satellites in Regions 1 and 3, an increase in the noise temperature of the feeder-link space station, calculated at the feeder-link space station in accordance with the method given in Appendix **29** to the Radio Regulations (see Recommendation No. **2**(Sat-R2)).

2. *Limits applicable to protect a frequency assignment in the band 17.7 - 17.8 GHz to an earth station in the fixed-satellite service (space-to-Earth)*

An administration shall be considered as being affected if, upon application of the procedures of Section 3 of Annex 4 to this Part, that administration is included in the coordination area of the frequency assignment to a transmitting feeder-link earth station.

For this purpose, the parameters of the transmitting feeder-link earth station, as may be modified from those parameters given in Annex 3 to this Part, shall be used.

3. *Limits applicable to protect a terrestrial station in the band 17.7 - 17.8 GHz*

An administration shall be considered as being affected if, upon application of the procedures of Appendix **28** to the Radio Regulations, that administration is included in the coordination area of the frequency assignment to a transmitting feeder-link earth station.

For this purpose, the parameters of the transmitting feeder-link earth station, as may be modified from those parameters given in Annex 3 to this Part, shall be used.

4. *Limits to the change in the overall equivalent protection margin with respect to frequency assignments in conformity with the Plan*

With respect to the modification to the Plan and when it is necessary under this Part to the Final Acts to seek the agreement of any other administration, except in cases covered by Resolution No. **2**(Sat-R2), an administration shall be considered as being affected if the overall equivalent protection margin [3] corresponding to a test point of its entry in the Plan, including the cumulative effect of any previous modification to the Plan or any previous agreement, falls more than 0.25 dB below 0 dB, or, if already negative, more than 0.25 dB below the value resulting from:

- the Plan as established by this Conference; *or*
- a modification of the assignment in accordance with this Part; *or*
- a new entry in the Plan under Article 4 of this Part; *or*
- any agreement reached in accordance with this Part of the Final Acts except for Resolution No. **2**(Sat-R2).

[1] The limits specified in this Annex relate to the power flux-densities which would be obtained assuming clear sky conditions, i.e. including the effects of atmospheric absorption described in paragraph 2.1.1 of Annex 5 to Part I.

[2] See Resolution No. **9**(Sat-R2).

[3] For the definition of the overall equivalent protection margin, see paragraph 1.11 of Annex 5 to Part I.

ANNEX 2

**Basic Characteristics to be Furnished in Notices [1]
Relating to Feeder-Link Stations in the Fixed-Satellite Service
Operating in the Band 17.3 - 17.8 GHz in Region 2 [2]**

1. The following information is required in notices relating to transmitting earth stations.

1.1 Country and beam identification.

1.2 Assigned frequency or channel number.

1.3 Assigned frequency band.

1.4 Date of bringing into use.

1.5 Identity of the transmitting feeder-link station.

1.6 Geographical coordinates of a feeder-link earth station transmitting in the band 17.7 - 17.8 GHz.

1.7 Feeder-link service area for a feeder-link earth station transmitting in the band 17.3 - 17.7 GHz identified by a set of geographical coordinates of the polygon points of the feeder-link service area.

1.8 Identity of the space station with which communication is to be established.

1.9 Rain climatic zone [3].

1.10 Class of emission, necessary bandwidth and description of transmission.

1.11 Power characteristics of the transmission:

a) The following information is required for each assigned frequency:

- transmit power (dBW) supplied to the input of the antenna;
- maximum power density per Hz [dB (W/Hz)], averaged over the worst 1 MHz band, supplied to the antenna.

b) Additional information required if power control is used (see paragraph 3.10 of Annex 3 to this Part):

- mode of control;
- range, expressed in dB, above the transmit power used in *a)* above.

c) Additional information required if site diversity is used (see paragraph 3.11 of Annex 3 to this Part):

- identity of other earth station with which diversity operation is to be employed.

d) Additional information required if depolarization compensation is used (see paragraph 3.12 of Annex 3 to this Part):

- characteristics.

[1] The Board shall develop and keep up-to-date forms of notice to meet fully the statutory provisions of this Annex and related decisions of this Conference. The Board is further invited to consider the feasibility of a single notice for feeder-link earth stations operating within more than one up-link service area.

[2] Only those notices relating to frequency assignments for space stations and earth stations used for telecommand and tracking purposes associated with the Plan shall be furnished in accordance with Appendix **3** to the Radio Regulations.

[3] This information as defined in Appendix **28** to the Radio Regulations is required for frequency assignments in the band 17.7 - 17.8 GHz.

1.12 Transmitting antenna characteristics:

a) antenna diameter (metres);

b) gain of the antenna in the direction of maximum radiation referred to an isotropic radiator (dBi);

c) beamwidth in degrees between the half-power points (describe in detail if not symmetrical);

d) the measured radiation diagram of the antenna (taking as a reference the direction of maximum radiation), or the reference radiation diagram to be used for coordination;

e) type of polarization;

f) sense of polarization;

g) the horizon elevation angle in degrees and the antenna gain in the direction of the horizon for each azimuth [4] around the earth station [5];

h) altitude of the antenna above mean sea level in metres [5];

i) minimum elevation angle in degrees [5].

1.13 Modulation characteristics:

a) type of modulation;

b) pre-emphasis characteristics;

c) TV system;

d) sound-broadcasting characteristics;

e) frequency deviation:

f) composition of the baseband;

g) type of multiplexing of the video and sound signals;

h) energy dispersal characteristics (if used).

1.14 Regular hours of operation (UTC).

1.15 Coordination.

1.16 Agreements.

1.17 Other information.

1.18 Operating administration or company.

2. The following information is required in notices relating to receiving space stations:

2.1 Country and beam identification.

2.2 Orbital position (xxx.xx degrees from the Greenwich meridian).

2.3 Assigned frequency or channel number.

2.4 Assigned frequency band.

2.5 Date of bringing into use.

2.6 Identity of the space station.

2.7 Class of station.

2.8 Class of emission and necessary bandwidth of the transmission to be received.

[4] Every five degrees, in tabular or graphical form.

[5] This information is required for frequency assignments in the band 17.7 - 17.8 GHz.

2.9 Antenna characteristics:

a) gain of the antenna in the direction of maximum radiation referred to an isotropic radiator (dBi);

b) shape of the beam (circular, elliptical or other);

c) pointing accuracy;

d) type of polarization;

e) sense of polarization;

f) for circular beams, indicate the following:

- half-power beamwidth (degrees);
- co-polar and cross-polar radiation patterns;
- nominal intersection of the antenna beam axis with the Earth;

g) for elliptical beams, indicate the following:

- co-polar and cross-polar radiation patterns;
- rotation accuracy;
- orientation;
- major axis (degrees) at the half-power beamwidth;
- minor axis (degrees) at the half-power beamwidth;
- nominal intersection of the antenna beam axis with the Earth.

h) for beams of other than circular or elliptical shape, indicate the following:

- co-polar and cross-polar gain contours plotted on a map of the Earth's surface, preferably in a radial projection from the satellite onto a plane perpendicular to the axis from the centre of the Earth to the satellite. The isotropic or absolute gain shall be indicated at each contour which corresponds to a decrease in gain of 2, 4, 6, 10 and 20 dB and thereafter at 10 dB intervals, down to a value of 0 dB relative to an isotropic radiator;
- wherever practicable, a numerical equation or table providing the necessary information to allow the gain contours to be plotted;

i) for an assignment in the band 17.7 - 17.8 GHz, the gain in the direction of those parts of the geostationary-satellite orbit which are not obstructed by the Earth. Use a diagram showing estimated gain versus orbit longitude.

2.10 Receiver system noise temperature referred to the output of the antenna.

2.11 Station-keeping accuracy.

2.12 Modulation characteristics:

a) type of modulation;

b) pre-emphasis characteristics;

c) TV system;

d) sound-broadcasting characteristics;

e) frequency deviation;

f) composition of the baseband;

g) type of multiplexing of the video and sound signals;

h) energy dispersal characteristics (if used).

2.13 Regular hours of operation (UTC).

2.14 Coordination.

2.15 Agreements.

2.16 Other information.

2.17 Operating administration or company.

2.18 Range of automatic gain control. [6]

[6] See paragraph 3.9 of Annex 3 to this Part.

ANNEX 3

Technical Data Used in Establishing the Provisions and Associated Plan and Which Should Be Used for their Application

1. DEFINITIONS

1.1 *Feeder link*

In the Region 2 broadcasting-satellite service Plan, the term feeder link, as defined in No. **109** of the Radio Regulations, is further qualified to indicate a fixed-satellite service link in the frequency band 17.3 to 17.8 GHz from any earth station within the feeder-link service area to the associated space station in the broadcasting-satellite service.

1.2 *Feeder-link beam area*

The area delineated by the intersection of the half-power beam of the satellite receiving antenna with the surface of the Earth.

1.3 *Feeder-link service area*

The area on the surface of the Earth within the feeder-link beam area within which the administration responsible for the service has the right to locate transmitting earth stations for the purpose of providing feeder links to broadcasting-satellite space stations.

1.4 *Nominal orbital position*

The longitude of a position in the geostationary-satellite orbit associated with a frequency assignment to a space station in a space radiocommunication service. The position is given in degrees from the Greenwich meridian.

1.5 *Adjacent channel*

The RF channel in the broadcasting-satellite service frequency Plan, or in the associated feeder-link frequency Plan, which is situated immediately higher or lower in frequency with respect to the RF reference channel.

1.6 *Second adjacent channel*

The RF channel in the broadcasting-satellite service frequency Plan, or in the associated feeder-link frequency Plan, which is situated immediately beyond either of the adjacent channels.

1.7 *Overall carrier-to-interference ratio*

The overall carrier-to-interference ratio is the ratio of the wanted carrier power to the sum of all interfering RF powers in a given channel including both feeder links and down-links. The overall carrier-to-interference ratio due to interference from the given channel is calculated as the reciprocal of the sum of the reciprocals of the feeder-link carrier-to-interference ratio and the down-link carrier-to-interference ratio referred to the satellite receiver input and earth station receiver input, respectively. [1]

[1] There are a total of five overall carrier-to-interference ratios used in the analysis of the Plan, namely, co-channel, upper and lower adjacent channels, and upper and lower second adjacent channels.

1.8 *Overall co-channel protection margin*

The overall co-channel protection margin in a given channel is the difference in dB between the overall co-channel carrier-to-interference ratio and the co-channel protection ratio.

1.9 *Overall adjacent channel protection margin*

The overall adjacent channel protection margin is the difference, in dB, between the overall adjacent channel carrier-to-interference ratio and the adjacent channel protection ratio.

1.10 *Overall second adjacent channel protection margin*

The overall second adjacent channel protection margin is the difference in dB between the overall second adjacent channel carrier-to-interference ratio and the second adjacent channel protection ratio.

1.11 *Overall equivalent protection margin*

The overall equivalent protection margin M is given in dB by the expression:

$$M = -10 \log \left(\sum_{i=1}^{5} 10^{(-M_i/10)} \right) \quad \text{(dB)}$$

where:

M_1 = overall co-channel protection margin, in dB (as defined in 1.8),

M_2, M_3 = overall adjacent channel protection margins for the upper and lower adjacent channels respectively, in dB (as defined in 1.9),

M_4, M_5 = overall second adjacent channel protection margins for the upper and lower second adjacent channels respectively, in dB (as defined in 1.10).

The adjective "equivalent" indicates that the protection margins for all interference sources from the adjacent and second adjacent channels as well as co-channel interference sources have been included.

2. RADIO PROPAGATION FACTORS

The propagation loss on an earth-space path is equal to the free space path loss plus the atmospheric absorption loss plus the rain attenuation exceeded for 1% of the worst month.

2.1 *Atmospheric absorption*

The loss due to atmospheric absorption (i.e. clear air attenuation) is given by:

$$A_a = \frac{0.0669 + 0.0091\,\rho}{\sin\theta} \quad \text{(dB)} \quad \text{for} \quad \theta \geqslant 5^\circ$$

where:

θ = the elevation angle (degrees);

ρ = the surface water vapour concentration, g/m^3,
with ρ = 10 g/m^3 for rain climatic zones A to K
and ρ = 20 g/m^3 for rain climatic zones M to P (see Figure 1).

2.2 *Rain attenuation*

For circularly polarized signals, the rain attenuation A_p exceeded for 1% of the worst month at 17.5 GHz is calculated using the method outlined in paragraph 2.1.2 of Annex 5, Part I, by substituting the relation

$$\gamma = 0.0521\ R^{1.114} \qquad \text{(dB/km)}$$

for the one given in that paragraph.

Figure 2 presents plot of rain attenuation of circularly polarized signals exceeded for 1% of the worst month at 17.5 GHz, as a function of earth station latitude and elevation angle for each of the rain climatic zones in Region 2.

2.3 *Rain attenuation limit*

In the analysis of the Plan, a maximum rain attenuation on the feeder link of 13 dB was considered assuming that other means would be used at the implementation stage to protect for larger rain attenuation on the feeder links.

2.4 *Depolarization*

Rain and ice can cause depolarization of radio frequency signals. The level of the co-polar component relative to the depolarized component is given by the cross-polarization discrimination (XPD) ratio. For the feeder link, the XPD ratio, in dB, not exceeded for 1% of the worst month is given by:

$$\text{XPD} = 30 \log f - 40 \log (\cos \theta) - 23 \log A_p \qquad \text{(dB)} \qquad \text{for } 5^\circ \leqslant \theta \leqslant 60^\circ$$

where A_p (dB) is the co-polar rain attenuation exceeded for 1% of the worst month, f is the frequency in GHz and θ is the elevation angle. For values of θ greater than 60°, use $\theta = 60^\circ$ in the previous equation.

3. BASIC TECHNICAL CHARACTERISTICS

3.1 *Translation frequency and guard bands*

The feeder-link Plan is based on the use of a single frequency translation of 5.1 GHz between the 17 GHz feeder-link channels and the 12 GHz down-link channels. Other values of the translation frequency may be used, provided that the corresponding channels have been assigned to the space station of the administration concerned.

With a single value frequency translation between the feeder-link frequency band (17.3 - 17.8 GHz) and the down-link frequency band (12.2 - 12.7 GHz), the guard bands present in the down-link Plan result in corresponding bandwidths of 12 MHz at the upper and lower feeder-link band edges. These feeder-link guard bands may be used for transmissions in the space operation service.

3.2 *Carrier-to-noise ratio*

Paragraph 3.3 of Annex 5 to Part I provides guidance for planning and the basis for the evaluation of the carrier-to-noise ratios of the feeder-link and down-link Plans.

As a guidance for planning, the reduction in quality in the down-link due to thermal noise in the feeder link is taken as equivalent to a degradation in the down-link carrier-to-noise ratio of approximately 0.5 dB for 99% of the worst month.

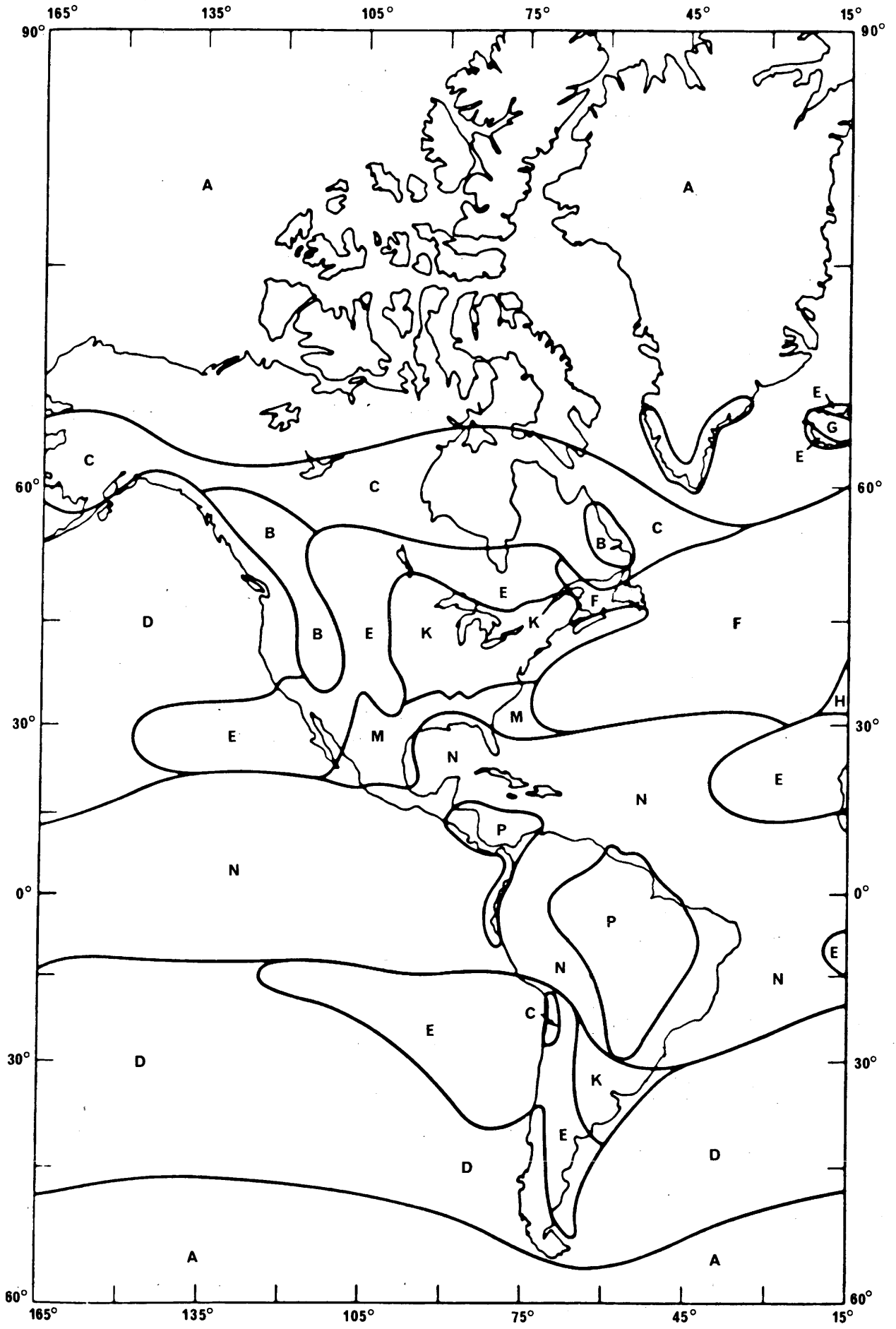
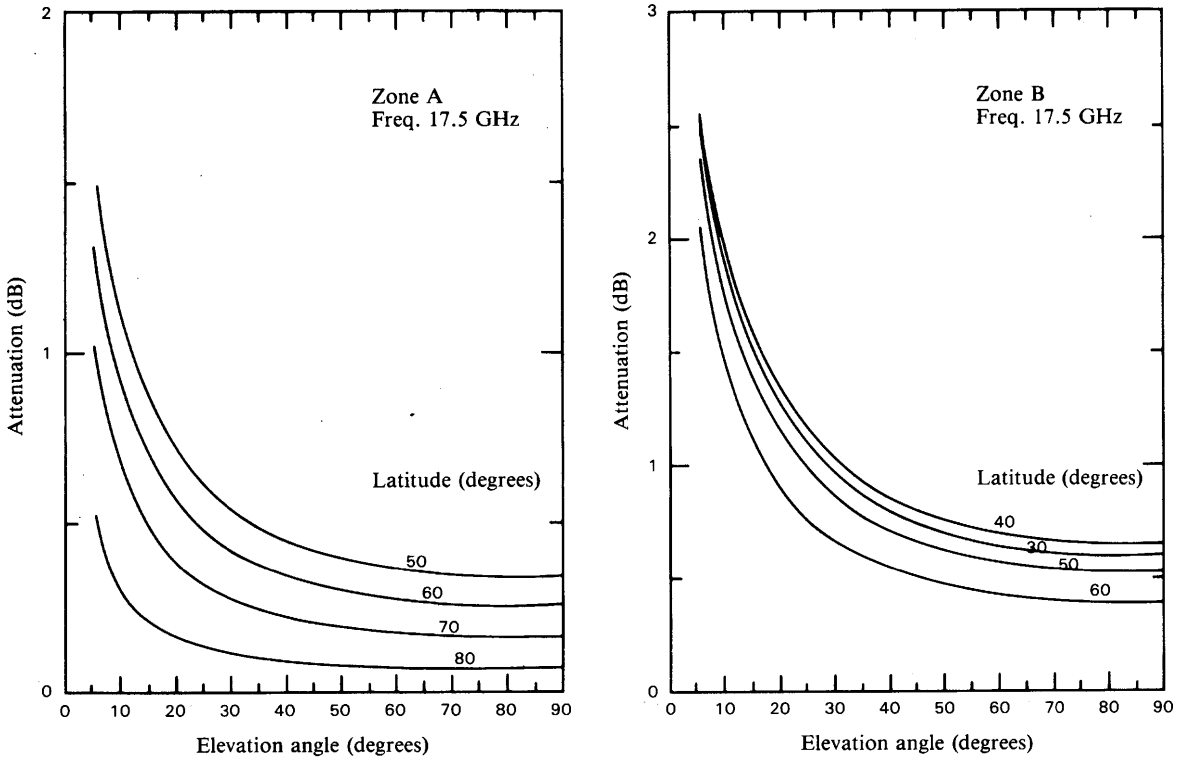


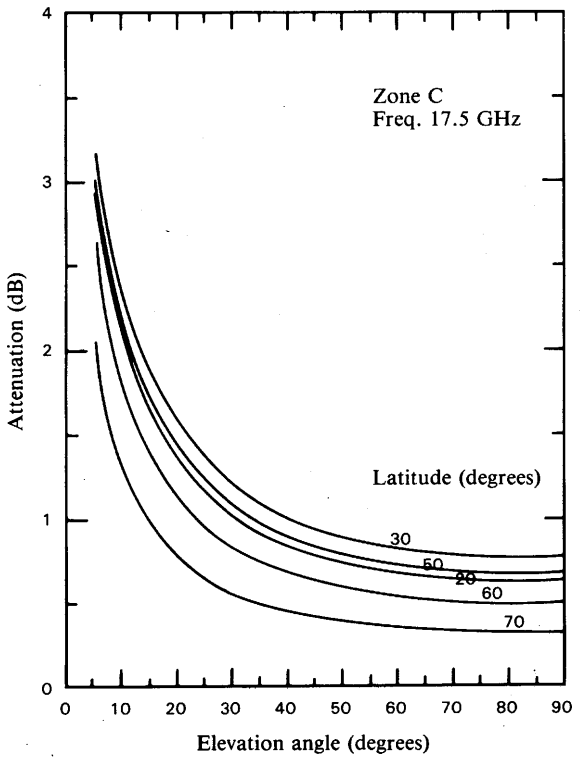
FIGURE 1

Rain climatic zones (Region 2)

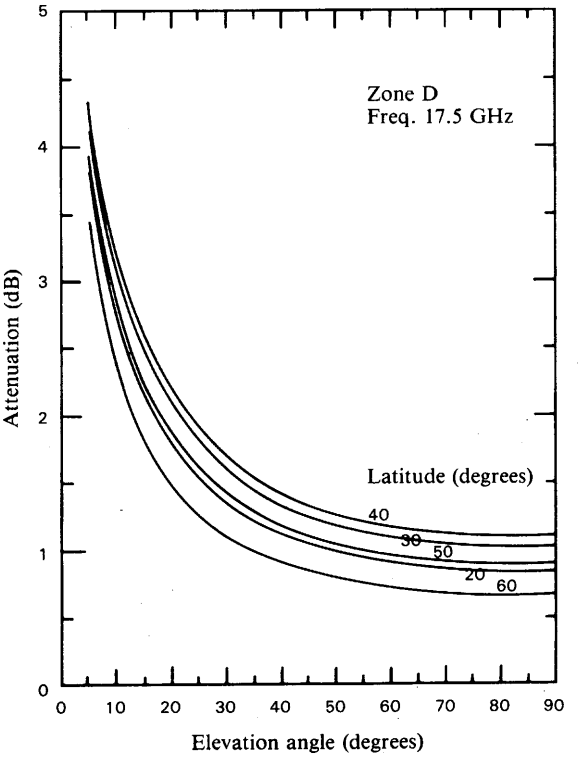


a) Rain climatic zone A

b) Rain climatic zone B



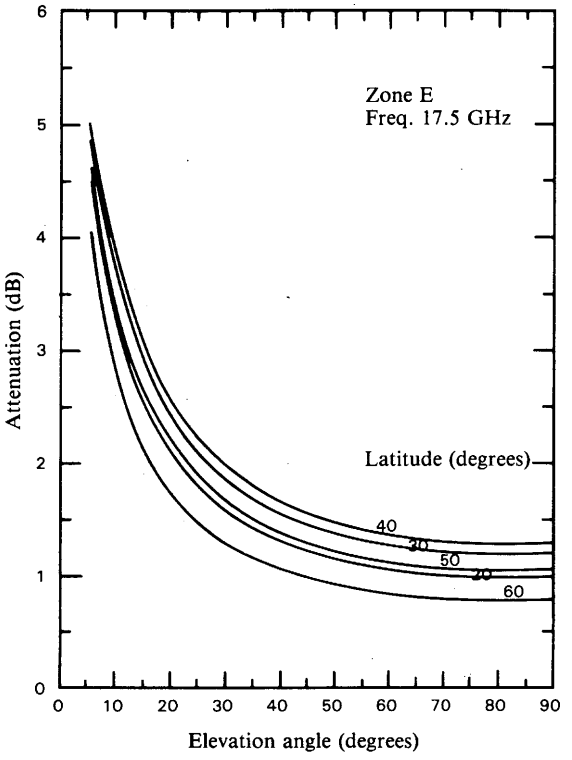
c) Rain climatic zone C



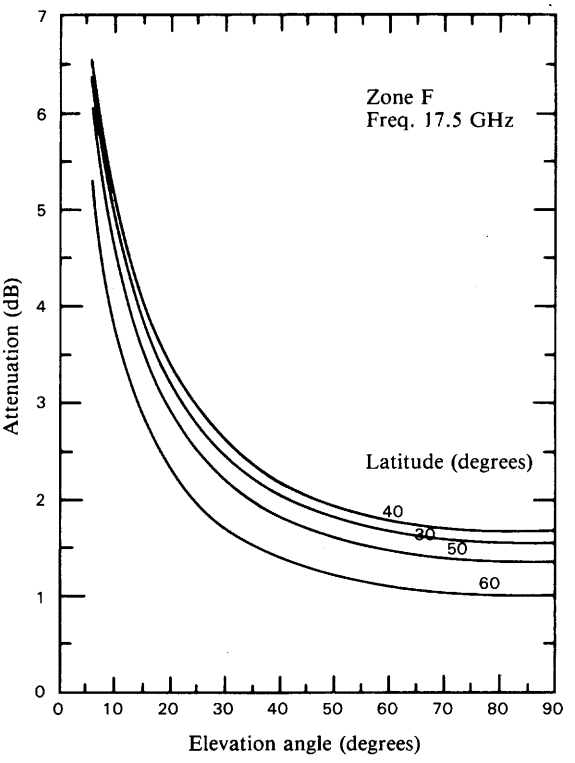
d) Rain climatic zone D

FIGURE 2

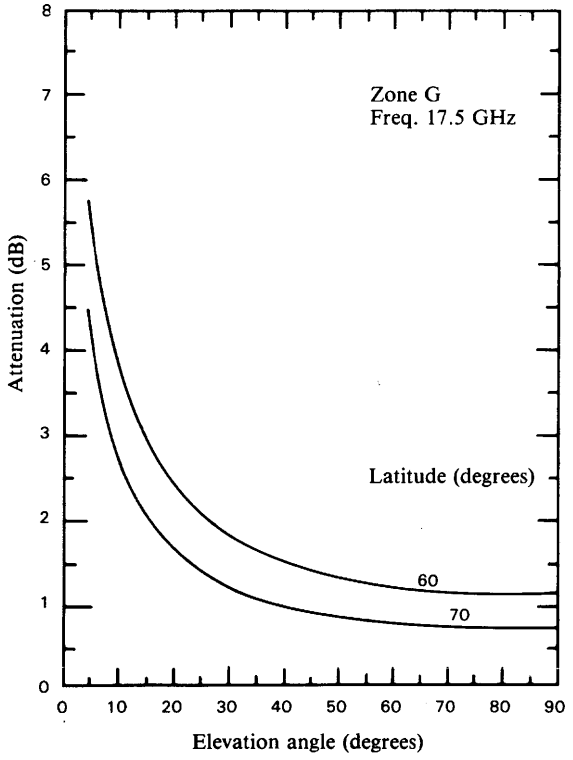
Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain climatic zones



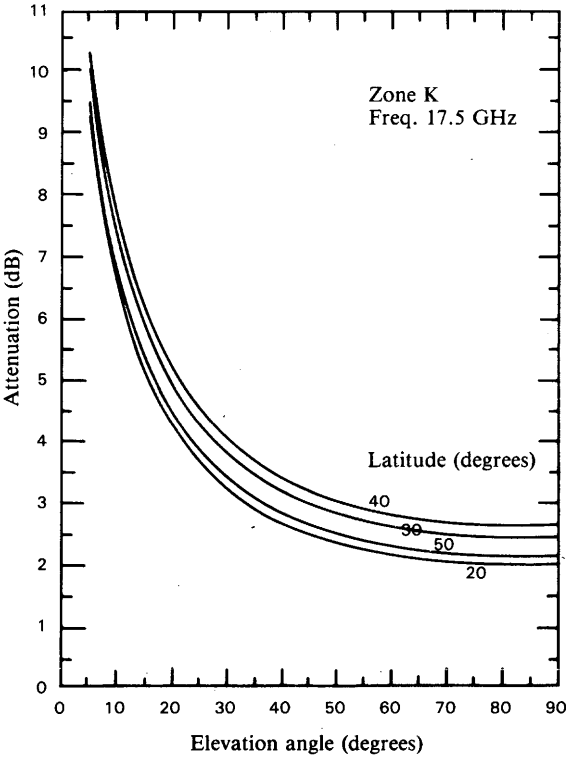
e) Rain climatic zone E



f) Rain climatic zone F



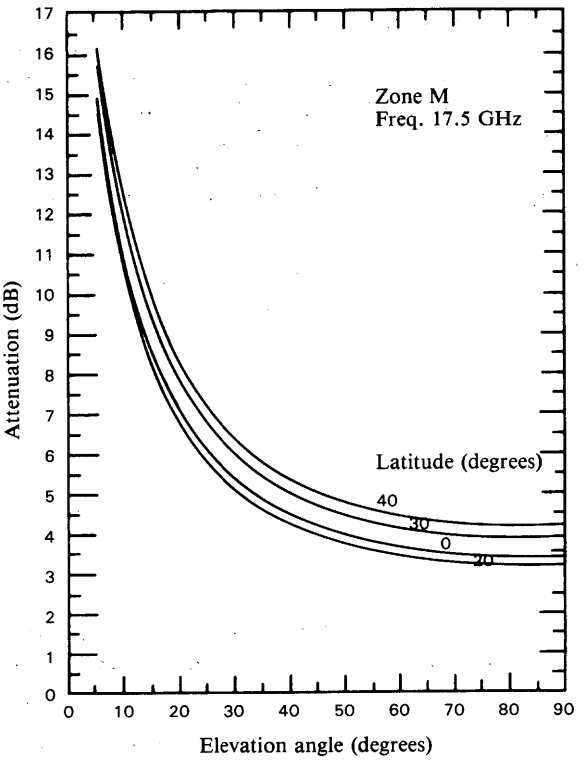
g) Rain climatic zone G



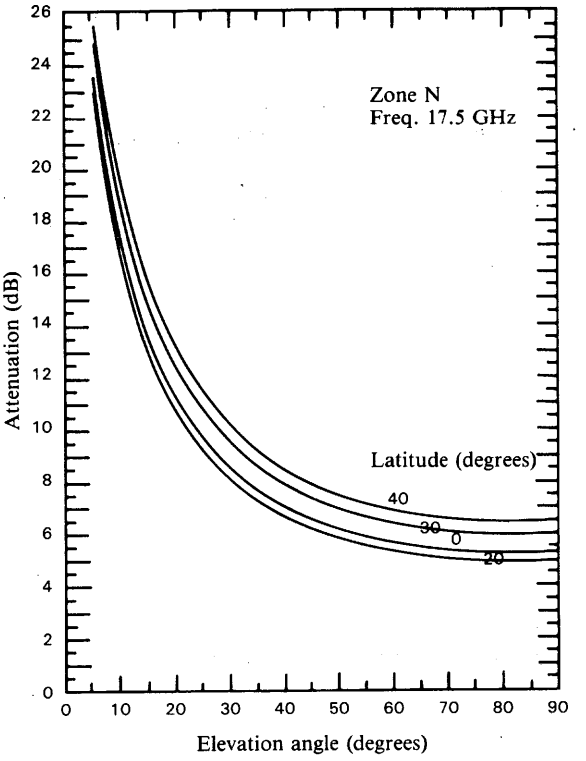
h) Rain climatic zone K

FIGURE 2 *(cont.)*

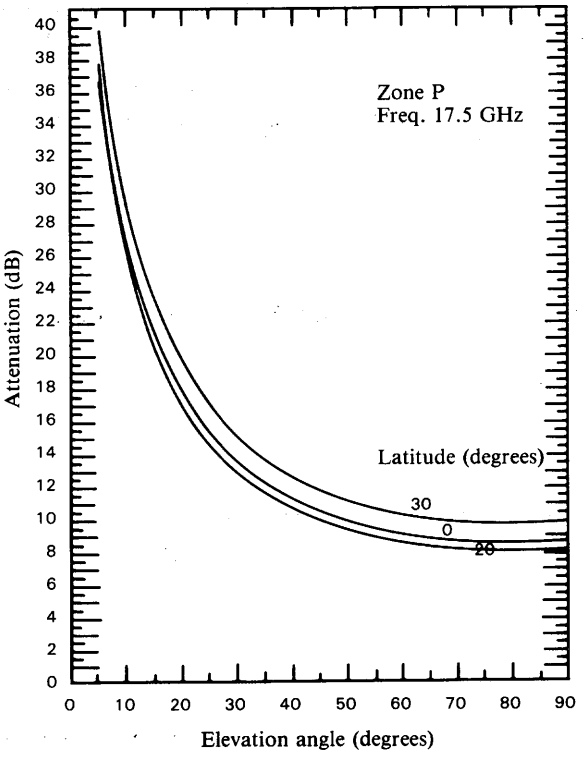
Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain climatic zones



i) Rain climatic zone M



j) Rain climatic zone N



k) Rain climatic zone P

FIGURE 2 *(cont.)*

Rain attenuation values exceeded for 1% of the worst month (sea level) for Region 2 rain climatic zones

3.3 *Carrier-to-interference ratio*

Paragraph 3.4 of Annex 5 to Part I of the Final Acts provides guidance for planning for the contribution of the feeder link co-channel interference to the overall co-channel carrier-to-interference ratio. However, the feeder-link and down-link Plans are evaluated on the overall equivalent protection margin which includes the combined down-link and feeder link contributions. Definitions 1.7, 1.8, 1.9, 1.10 and 1.11 of this Annex and the protection ratios given in paragraph 3.4 of Annex 5 to Part I are used in the analysis of the Plans.

For the adjacent channels, the Plan is based on an orbital separation of 0.4° between nominally co-located satellites having cross-polarized adjacent channel assignments.

For the second adjacent channels, the Plan is based on a 10 dB improvement on the feeder-link carrier-to-interference ratio due to the satellite receive filtering.

3.4 *Transmitting antenna*

3.4.1 *Antenna diameter*

The feeder-link Plan is based on an antenna diameter of 5 metres.

The minimum antenna diameter permitted in the Plan is 2.5 metres. However, the feeder-link carrier-to-noise ratio and carrier-to-interference ratio resulting from the use of antennae with diameters smaller than 5 metres would generally be less than those calculated in the Plan.

The use of antennae larger than 5 metres, with corresponding values of on-axis e.i.r.p. higher than the planned value (indicated in paragraph 3.4.3) but without augmented off-axis e.i.r.p., is permitted if the orbital separation between the assigned orbital location of the administration and the assigned orbital location of any other administration is greater than 0.5°.

Antennae with diameters larger than 5 metres can also be implemented if the above orbital separation is less than 0.5° and if the e.i.r.p. of the desired feeder-link earth station does not exceed the planned value of e.i.r.p.

If the above orbital separation is less than 0.5° and if the e.i.r.p. of the desired feeder-link earth station exceeds the planned value, agreement between administrations is required in accordance with paragraph 3.3.1, Article 3 of this Part.

3.4.2 *Reference patterns of transmitting antennae*

The co-polar and cross-polar reference patterns of transmitting antennae used for planning in Region 2 are given in Figure 3.

3.4.3 *Antenna efficiency*

The Plan is based on an antenna efficiency of 65%. The corresponding on-axis gain for an antenna having a 5-metre diameter is 57.4 dBi at 17.55 GHz, and the corresponding value of e.i.r.p. used for planning purposes is 87.4 dBW.

3.4.4 *Pointing accuracy*

The Plan has been developed to accommodate a loss in gain due to earth station antenna mis-pointing of 1 dB. Under no circumstances shall the Plan allow for a mis-pointing angle greater than 0.1°.

3.5 *Transmit power*

The maximum transmit power delivered to the input of the antenna of the feeder-link earth station is 1,000 watts per 24 MHz television channel. This level of power can only be exceeded under certain conditions specified in paragraph 3.10 of this Annex.

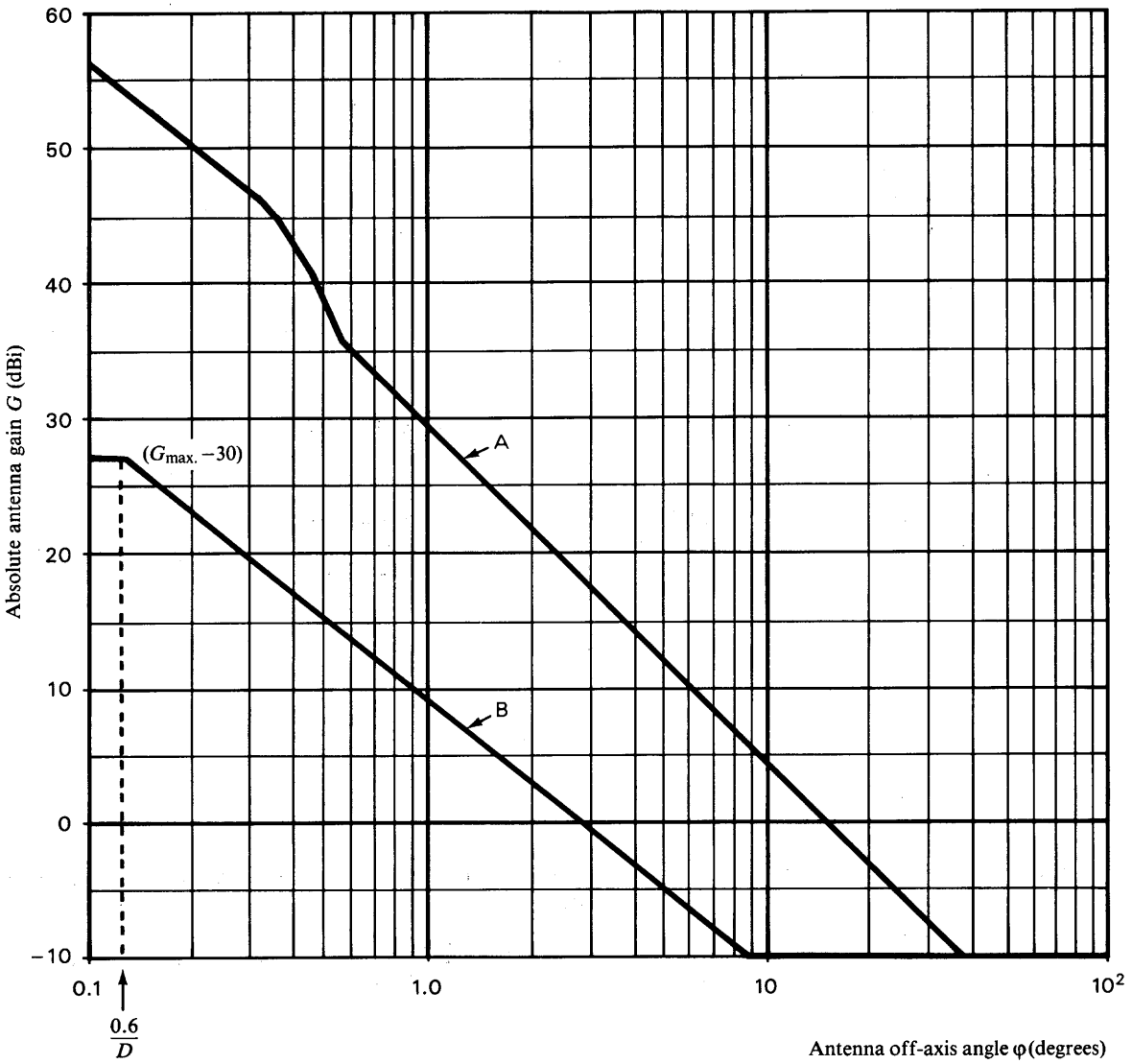


FIGURE 3

Reference patterns for co-polar and cross-polar components for transmitting antennae for Region 2

Curve A: Co-polar component (dBi)

$36 - 20 \log_{10} \varphi$	for	$0.1° \leqslant \varphi < 0.32°$
$51.3 - 53.2\, \varphi^2$	for	$0.32° \leqslant \varphi < 0.54°$
$29 - 25 \log_{10} \varphi$	for	$0.54° \leqslant \varphi < 36°$
-10	for	$\varphi \geqslant 36°$

Curve B: Cross-polar component (dBi)

$G_{max} - 30$	for	$\varphi < \left(\frac{0.6}{D}\right)°$
$9 - 20 \log_{10} \varphi$	for	$\left(\frac{0.6}{D}\right)° \leqslant \varphi < 8.7°$
-10	for	$\varphi \geqslant 8.7°$

where:

φ = off-axis angle referred to the main-lobe axis;

G_{max} = on-axis co-polar gain of the antenna;

D = diameter of the antenna in meters ($D \geqslant 2.5$).

Note 1: In the angular range between 0.1° and 0.54°, the co-polar gain must not exceed the reference pattern.

Note 2: In the angular range between 0° and $(0.6/D)°$, the cross polar gain must not exceed the reference pattern.

Note 3: At the larger off-axis angles and for 90% of all sidelobe peaks in each of the reference angular windows, the gain must not exceed the reference patterns. The reference angular windows are 0.54° to 1°, 1° to 2°, 2° to 4°, 4° to 7°, 7° to 10°, 10° to 20°, 20° to 40°, 40° to 70°, 70° to 100°, 100° to 180°. The first reference angular window for evaluating the cross-polar component should be $(0.6/D)°$ to 1°.

3.6 *Receiving antenna*

3.6.1 *Cross-section of receiving antenna beam*

Planning has been based on beams of elliptical or circular cross-section. When the assignments are implemented, or when the Plan is modified, administrations may use non-elliptical or shaped beams.

If the cross-section of the receiving antenna beam is elliptical, the effective beamwidth φ_0 is a function of the angle of rotation q between the plane containing the satellite and the major axis of the beam cross-section and the plane in which the beamwidth is required.

The relationship between the maximum gain of an antenna and the half-power beamwidth can be derived from the expression:

$$G_m = 27\,843/ab$$

or

$$G_m(\text{dB}) = 44.44 - 10 \log_{10} a - 10 \log_{10} b$$

where:

a and b are the angles (in degrees) subtended at the satellite by the major and minor axes of the elliptical cross-section of the beam.

An antenna efficiency of 55% is assumed.

3.6.2 *Minimum beamwidth*

A minimum value of 0.6° for the half-power beamwidth of the receiving antenna has been agreed on for planning.

3.6.3 *Reference patterns*

The reference patterns for the co-polar and cross-polar components of the satellite receiving antenna used in preparing the Plan are given in Figure 4.

Where it was necessary to reduce interference, the pattern shown in Figure 5 was used; this use will be indicated in the Plan by an appropriate symbol. This pattern is derived from an antenna producing an elliptical beam with fast roll-off in the main lobe. Three curves for different values of φ_0 are shown as examples.

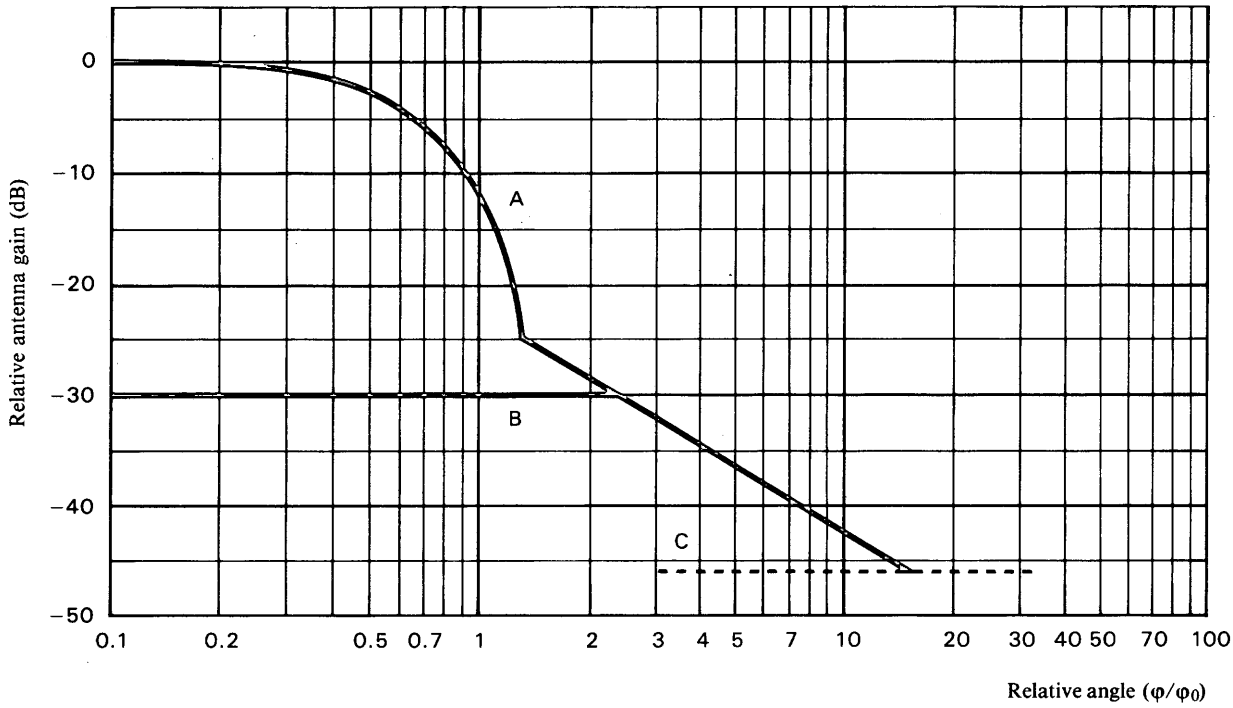


FIGURE 4

Reference patterns for co-polar and cross-polar components for satellite receiving antenna in Region 2

Curve A: Co-polar component (dB relative to main beam gain)

$-12\ (\varphi/\varphi_0)^2$ for $0 \leqslant (\varphi/\varphi_0) \leqslant 1.45$

$-(22 + 20\ \log_{10}\ (\varphi/\varphi_0))$ for $1.45 < (\varphi/\varphi_0)$

after intersection with curve C: as curve C

Curve B: Cross-polar component (dB relative to main beam gain)

-30 for $0 \leqslant (\varphi/\varphi_0) \leqslant 2.51$

after intersection with curve A: as curve A

Curve C: Minus the on-axis gain.

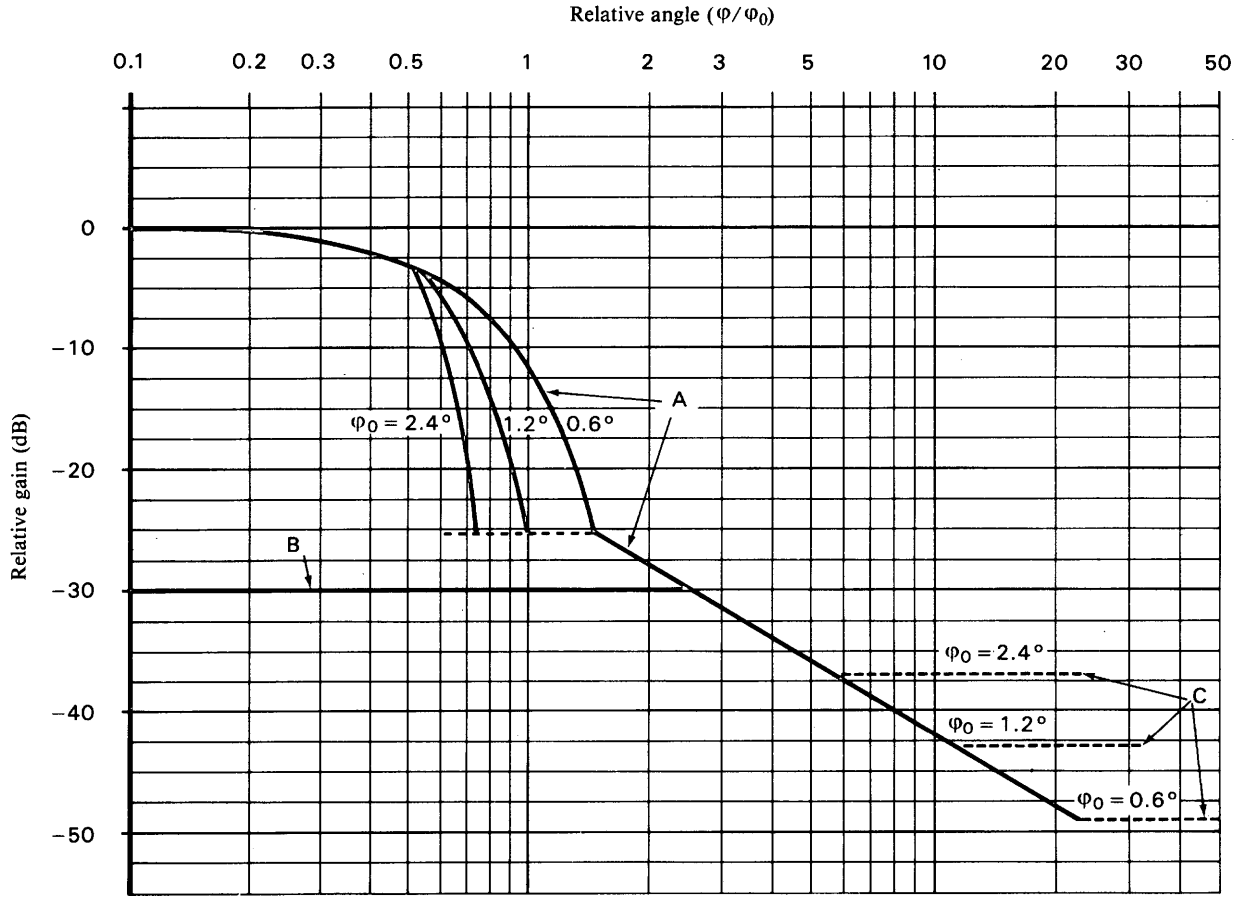


FIGURE 5

Reference patterns for co-polar and cross-polar components for satellite receiving antennae with fast roll-off in the main beam for Region 2

Curve A: Co-polar component (dB relative to main beam gain)

$-12\ (\varphi/\varphi_0)^2$ for $0 \leqslant \varphi/\varphi_0 \leqslant 0.5$

$-33.33\ \varphi_0^2\left(\varphi/\varphi_0 - x\right)^2$ for $0.5 < \varphi/\varphi_0 \leqslant \frac{0.87}{\varphi_0} + x$

-25.23 for $\frac{0.87}{\varphi_0} + x < \varphi/\varphi_0 \leqslant 1.413$

$-\left(22 + 20\ \log_{10}\ (\varphi/\varphi_0)\right)$ for $1.413 < \varphi/\varphi_0$

after intersection with curve C: as curve C

Curve B: Cross-polar component (dB relative to main beam gain)

-30 for $0 \leqslant \varphi/\varphi_0 < 2.51$

after intersection with curve A: as curve A

Curve C: Minus the on-axis gain

where:

φ = off-axis angle (degrees)

φ_0 = dimension of the minimum ellipse fitted around the feeder link service area in the direction of interest

$x = 0.5\left(1 - \frac{0.6}{\varphi_0}\right)$

3.6.4 *Pointing accuracy*

The deviation of the receiving antenna beam from its nominal pointing direction must not exceed 0.1° in any direction. Moreover, the angular rotation of the receiving beam about its axis must not exceed ± 1°; this latter limit is not necessary for beams of circular cross-section using circular polarization.

3.7 *System noise temperature*

The Plan is based on a value of 1500 K for the satellite system noise temperature.

3.8 *Polarization*

3.8.1 In Region 2, for the purpose of planning the feeder links, circular polarization is used.

3.8.2 In the cases where there are polarization constraints, use of polarization other than circular is permitted only upon agreement of administrations that may be affected.

3.9 *Automatic gain control*

3.9.1 The Plan is based on use of automatic gain control on-board satellites to maintain a constant signal level at the satellite transponder output.

3.9.2 The dynamic range of automatic gain control is limited to 15 dB when satellites are located within 0.4 degrees of each other and operate on cross-polarized adjacent channels serving common or adjacent feeder-link service areas.

3.9.3 The 15 dB limit of automatic gain control does not apply to satellites other than those specified in paragraph 3.9.2 above.

3.10 *Power control*

The Plan has been developed without the use of power control.

The use of transmit power levels higher than those given in paragraph 3.5 is permitted only when rain attenuation exceeds 5 dB at 17 GHz. In such cases, the transmit power may be increased by the amount that the instantaneous rain attenuation exceeds 5 dB at 17 GHz up to the limit given in Table I.

TABLE I

Transmit radio frequency power (delivered to the imput of the feeder link earth station antenna) permitted in excess of 1000 watts as a function of elevation angle

Elevation angle of feeder link earth station antenna (degrees)	Transmit power permitted in excess of 1000 watts (dB)
0 to 40	0
40 to 50	2
50 to 60	3
60 to 90	5

3.11 *Site diversity*

Site diversity refers to the alternate use during rain of two or more transmitting earth stations which may be separated by sufficient distance to ensure uncorrelated rainfall conditions.

The use of site diversity is permitted and is considered to be an effective technique for maintaining high carrier-to-noise ratio and carrier-to-interference ratio during periods of moderate to severe rain attenuation. However, the Plan is not based on the use of site diversity.

3.12 *Depolarization compensation*

The Plan is developed without the use of depolarization compensation. Depolarization compensation is permitted only to the extent that interference to other satellites does not increase by more than 0.5 dB relative to that calculated in the feeder-link Plan.

3.13 *Minimum separation between satellites*

Figure 6 illustrates two adjacent clusters of satellites separated by 0.9 degree between the centres of the clusters. Aη identifies a satellite of administration η. A cluster is formed by two or more satellites separated by 0.4 degree and located at two nominal orbital positions as specified in the Plan; one position for right-hand polarized channels and the other position for left-hand polarized channels.

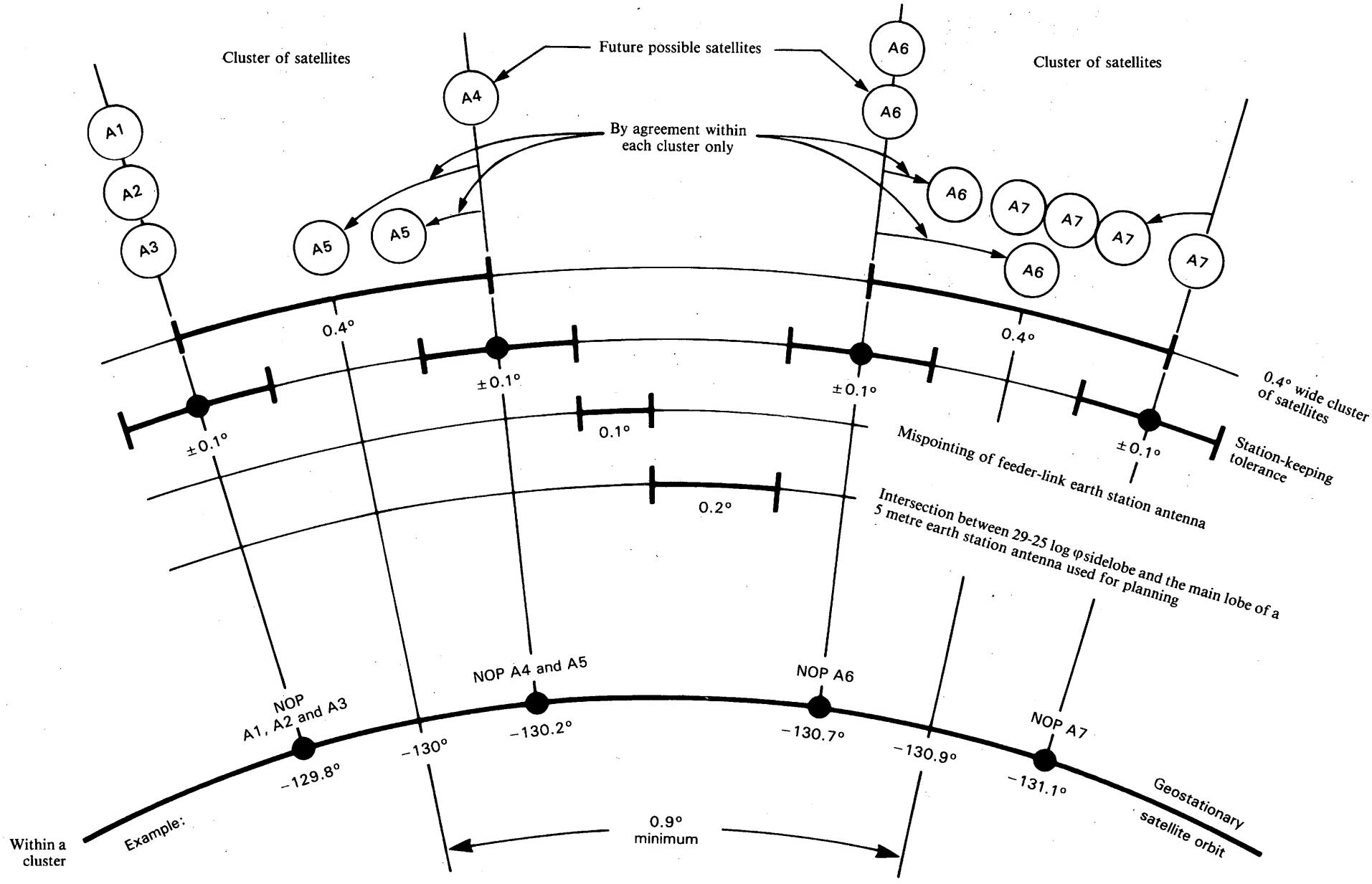
3.13.1 *Satellites of the same cluster*

The Plan is based on an orbital separation of 0.4 degree between satellites having cross-polarized adjacent channels (i.e. satellites located at $+0.2$ degree and -0.2 degree from the centre of the cluster). However, satellites within a cluster may be located at any orbital position within the cluster, requiring only the agreement of the other administrations having satellites sharing the same cluster. Such orbital positioning of satelites within a cluster is illustrated in Figure 6 by some of the satellites A5, A6 and A7.

The station-keeping tolerance of $\pm$ 0.1 degree indicated in paragraph 3.11 of Annex 5 to Part I of these Final Acts must be applied to satellites located at any position within the 0.4 degree-wide cluster.

3.13.2 *Satellites of different clusters*

In the Plan, the orbital separation between the centres of adjacent clusters of satellites is at least 0.9 degree. The value of 0.9 degree is also the minimum orbital separation to provide flexibility in the implementation of feeder links indicated in paragraph 3.4.1 of this Annex without the need for an agreement (see paragraph 3.3, Article 3 of this Part).



Aη: Specific Administration
NOP 1: Nominal orbital position, right hand polarization
NOP 2: Nominal orbital position, left hand polarization

FIGURE 6

Exploded view of geostationary satellite orbit

ANNEX 4

Criteria for sharing between services

1. *Threshold values for determining when coordination is required between a transmitting space station in the fixed-satellite service and a receiving space station in the feeder-link Plan in the band 17.7 - 17.8 GHz*

With respect to paragraph 7.1, Article 7 of this Part, coordination of a transmitting space station in the fixed-satellite service with a broadcasting-satellite in the Region 2 Plan is required, for inter-satellite geocentric angular separations less than 10° or greater than 150°, when the power flux-density arriving at the receiving space station of a broadcasting-satellite feeder-link station of another administration would cause an increase in the noise temperature of the feeder-link space station which, calculated in accordance with the method given in Appendix **29** to the Radio Regulations, exceeds a threshold value of $\Delta T/T$ corresponding to 10%. The above provision does not apply when the geocentric angular separation, between a transmitting space station in the fixed-satellite service and a receiving space station in the feeder-link Plan, exceeds 150° of arc and the free-space power flux-density of the transmitting space station in the fixed-satellite service does not exceed a value of -123 dB(W/m^2/24 MHz) on the Earth's surface at the equatorial Earth limb.

2. *Threshold values for determining when coordination is required between an earth station in the fixed-satellite service (Earth-to-space) in Regions 1 and 3 and a broadcasting-satellite space station receiver in Region 2 in the band 17.7 - 17.8 GHz*

With respect to paragraph 7.1, Article 7 of this Part, an administration shall be considered as being affected by a frequency assignment in the fixed-satellite service (Earth-to-space) in Regions 1 and 3 if that assignment would result in an increase in the noise temperature of the feeder-link space station in Region 2 which, calculated in accordance with the method given in Appendix **29** to the Radio Regulations, exceeds a threshold value of $\Delta T/T$ corresponding to 10% at the feeder-link space station.

3. *Method for the determination of the coordination area around a feeder-link transmitting earth station of the Region 2 Plan with respect to receiving earth stations in the fixed-satellite service in Region 2 in the frequency band 17.7 - 17.8 GHz*

3.1 *Introduction*

In the frequency band 17.7 - 17.8 GHz, which is allocated to the fixed-satellite service, in both the Earth-to-space direction (for broadcasting-satellite service feeder links only), and the space-to-Earth direction, emissions from transmitting feeder-link earth stations may cause interference at receiving earth stations in the fixed-satellite service.

Electromagnetic coupling of an emission originating at a feeder-link earth station into a receiving earth station may occur through two propagation mechanisms or "modes":

Propagation mode (1): coupling along a great circle tropospheric interference horizon path;

Propagation mode (2): coupling through scatter from hydrometeors.

The determination of whether emissions from a feeder-link earth station may cause unacceptable interference in a receiving earth station is by means of coordination contours drawn around a feeder-link earth station on a map. When a receiving earth station is located within either or both coordination contours, i.e., within the coordination area, there is a possibility of unacceptable interference.

The procedure for the determination of the coordination area for a feeder-link earth station in relation to a receiving earth station in the fixed-satellite service is similar to that described in Appendix **28** to the Radio Regulations but differs from it in the details described below. [1]

3.2 *Determination of the coordination contour for propagation mode (1)*

The distance at which a signal of power $P_{t'}$ (in dBW) applied to the antenna terminals of a feeder-link earth station will produce a received power $P_r(p)$ at the antenna terminals of a receiving earth station, for propagation mode (1), is given by:

$$d_1 = (P_{t'} + G_{t'} + G_r - P_r(p) - A_0 - A_h)/\beta \qquad \text{(km)} \qquad (1)$$

as derived from equations (2) and (8) of Appendix **28** to the Radio Regulations,

where:

$P_{t'}$ is maximum RF power (dBW) in any 1 MHz band applied to the antenna terminals of a feeder-link earth station;

$G_{t'}$ is gain (dB) of the feeder-link earth station antenna towards the physical horizon on the azimuth to the receiving earth station;

G_r is gain (dB) of the receiving earth station antenna towards the physical horizon on the azimuth to the feeder-link earth station;

$P_r(p)$ is permissible interfering RF power (dBW) in any 1 MHz band to be exceeded for no more than p% of the time at the antenna terminals of the receiving earth station;

A_0 is a constant equal to 145.0 dB;

A_h is the sum (dB) of available site shielding at the feeder-link earth station, $A_{ht'}$, and at the receiving earth station, A_{hr}, on the respective azimuth towards the other earth station (both in dB);

β is the rate of attenuation along the interference path (dB/km), a function of the radio-climatic zone and of p as used in $P_r(p)$ above.

To determine the coordination contour for propagation mode (1) for a feeder-link earth station, equation (1) is solved for all azimuths around the earth station site (in suitable increments; e.g., every 5 degrees), and the resulting distances plotted for all azimuths on a map of suitable scale from the earth station site. The connection of the so marked distance points constitutes the coordination contour for the feeder-link earth station.

3.3 *Determination of parameters used in equation (1)*

The parameters used in equation (1) are determined as follows:

3.3.1 *Determination of $G_{t'}$ and G_r*

The determination of $G_{t'}$ follows the procedure set forth in Annex II to Appendix **28** to the Radio Regulations, using the notified feeder-link earth station antenna pattern.

For the receiving earth station, a minimum main beam elevation angle of 5° is assumed for which the reference antenna radiation diagram of paragraph 4 of Annex II to Appendix **28** to the Radio Regulations yields, in the absence of site shielding, a horizon antenna gain of $G_r = 14.5$ dB.

[1] See Resolution No. **6**(Sat-R2).

3.3.2 *Determination of $A_{ht'}$ and A_{hr}*

The calculation of $A_{ht'}$ requires the determination of the horizon elevation angle θ (degrees) for all azimuths around a feeder-link earth station site. With these horizon elevation angles and the frequency of $f = 17.75$ GHz, $A_{ht'}$ is then calculated for each azimuth from equation (7a) of Appendix **28** to the Radio Regulations for $\theta > 0°$, and it should be taken $= 0$ dB for $\theta < 0°$.

For the fixed-satellite receiving earth station, the assumption must be made that no site shielding is available; hence, $A_{hr} = 0$ dB.

3.3.3 *Determination of $P_r(p)$ and p*

The maximum permissible interfering RF power in any 1 MHz band is taken, under nominal conditions, to be limited to 15% of the total noise received at an earth station, or about 20% of the thermal noise of the receiving system. This corresponds to a value of -7 dB for the parameter J of Appendix **28** to the Radio Regulations. For percentages of time of less than 0.003%, a permissible increase in the interference by 5 dB is assumed (parameter $M(p)$ of Appendix **28** to the Radio Regulations). Considering further that the band 17.7 - 17.8 GHz is also shared with terrestrial services, the assumption is made that up to three equivalent entries of interference may be present which, however, produce their maximum interference during periods uncorrelated in time, thus allowing each to produce the maximum permissible value of interfering RF power during $p = 0.001\%$ of the time.

Therefore, according to equation (3) of Appendix **28** to the Radio Regulations:

$$P_r(p) = 10 \log (kTB) + 5 - 7 \qquad \text{(dB(W/MHz))} \qquad (2)$$

which, with

$k =$ Boltzmann's constant,

$B =$ 1 MHz, and

$T =$ receiving system noise temperature, assumed to be 200 K

yields:

$$P_r(p) = -147.6 \text{ (dB(W/MHz))},$$

with $p = 0.001\%$ of the time.

3.3.4 *Determination of β*

The rates of attenuation for a percentage of time of 0.001%, for the three radio-climatic zones as defined in paragraph 3.1 of Appendix **28** to the Radio Regulations at 17.75 GHz, are the following:

Zone A: $\beta_A = 0.198$ dB/km

Zone B: $\beta_B = 0.06$ dB/km

Zone C: $\beta_C = 0.074$ dB/km

3.3.5 *Graphical method*

Figure 1 provides curves by means of which d_1 may be determined when only a single radio-climatic zone is involved. The three curves shown are for the three radio-climatic zones as defined in Appendix **28** to the Radio Regulations. The abscissa is given in terms of the parameter P as defined below:

$$P = P_{t'} + G_{t'} + G_r - P_r(p) - A_0 - A_h \qquad \text{(dB)}$$

3.4 *Mixed zone contours*

When the solution of equation (1) yields a distance d_1, which, on the azimuth under consideration, produces a point which lies in a different radio-climatic zone from that in which the feeder-link earth station is located, it is necessary to determine a mixed-zone coordination distance for that azimuth. Thus, if the feeder-link

earth station is located in a radio-climatic zone identified by the suffix "a" and the solution of equation (1) produces a distance which ends in another radio-climatic zone, identified by the suffix "b" (a and b referring to any one of the zones A, B or C, with $a \neq b$), the coordination distance is calculated from:

$$d_1 = \frac{P - d_a\beta_a}{\beta_b} + d_a \qquad \text{(km)} \tag{3}$$

where d_a is the distance (km) from the feeder-link earth station site to the boundary between the two climatic zones.

For the rare case where more than two radio-climatic zones are involved, the applicable equation would be:

$$d_1 = \frac{P - d_a\beta_a - d_b\beta_b}{\beta_c} + d_a + d_b \qquad \text{(km)} \tag{4}$$

where the subscript "c" denotes the zone farthest away from the feeder-link earth station site within which the coordination distance ends.

3.5 *Determination of the coordination contour for propagation mode (2)*

In the case of scattering from hydrometeors, the high main beam e.i.r.p. from a transmitting feeder-link earth station antenna and the expected high sensitivity of a fixed-satellite service receiving earth station suggest that interference from a feeder-link earth station into a fixed-satellite earth station may be unacceptable only when either earth station can see the main beam of the other, below the maximum altitudes from which significant hydrometeor scatter reflectivity prevails.

Accordingly, to avoid such mutual visibility conditions, the rain scatter distance d_r is to be that distance at which the receiving earth station's horizon intersects the maximum expected rain scatter altitude h_s. [1]

3.5.1 *Rain scatter distance d_r*

For an assumed horizon elevation angle of zero degree at the fixed-satellite receiving earth station, d_r is given by

$$d_r = 130\sqrt{h_s} \qquad \text{(km)} \tag{5}$$

in a 4/3 earth radius reference atmosphere, with

$$h_s = 5.1 - 2.15 \log\left[1 + 10^{(\varphi - 27)/25}\right] \qquad \text{(km)} \tag{6}$$

where φ is the latitude (North or South) of the feeder-link earth station site (degrees).

The rain scatter distance d_r so calculated yields the rain scatter coordination contour for the feeder-link earth station by the procedure described in paragraph 4.5 of Appendix **28** to the Radio Regulations.

[1] The maximum scatter height h_s is similar to the maximum rain height h_R of paragraph 2.1.2 of Annex 5, Part I, used in the calculation of effective path-length for the determination of rain attenuation, except that the factor "c" of paragraph 2.1.2 of Annex 5, Part I, is omitted.

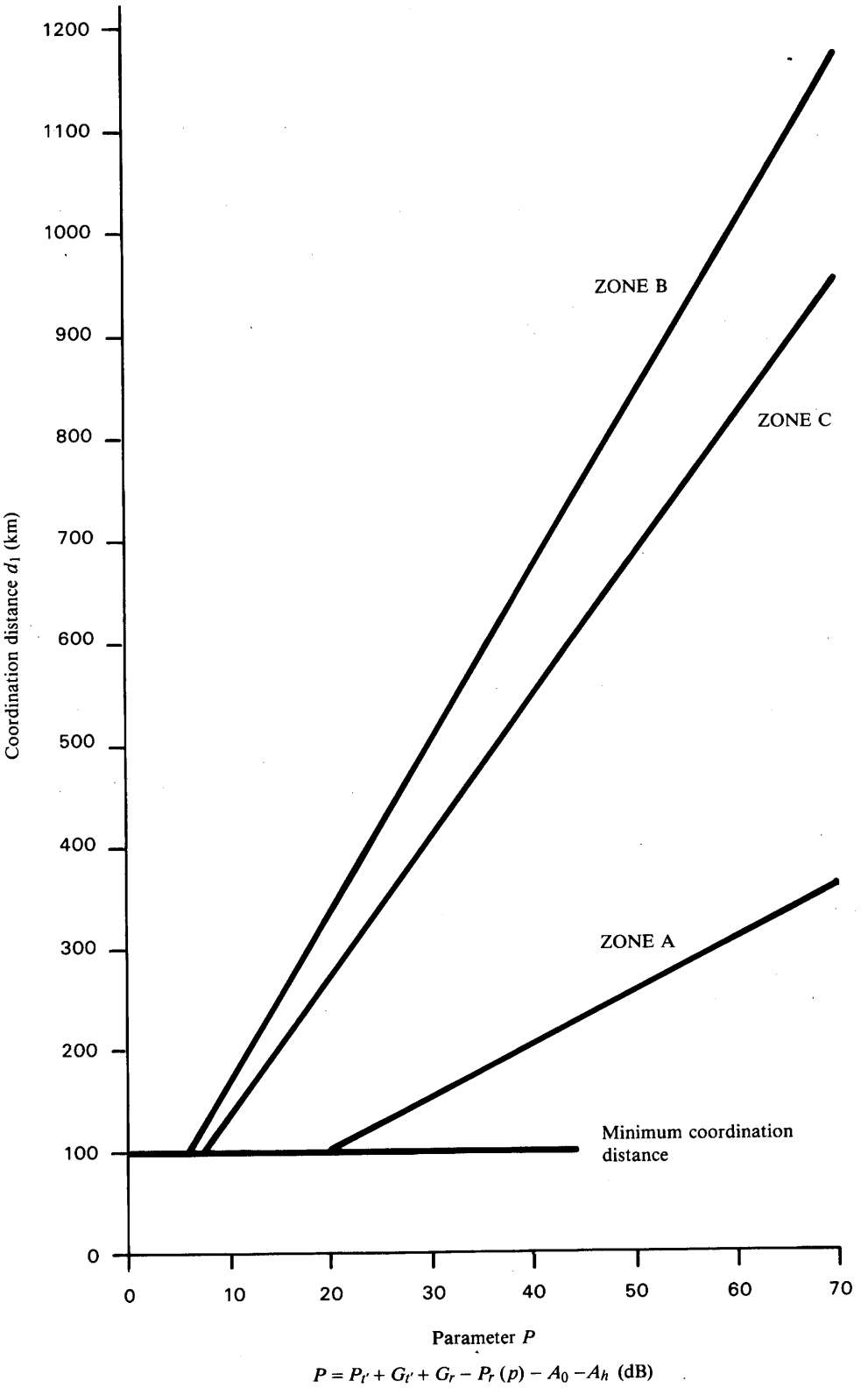


FIGURE 1

Coordination distance as a function of parameter P.
Propagation mode(1); 17.75 GHz; p = 0.001% of the time

3.5.2 *Graphical method*

Figure 2 provides a curve by means of which the rain scatter distance d_r may be read directly for a given feeder-link earth station latitude φ.

3.6 *Minimum coordination distances*

The minimum coordination distance for a feeder-link earth station shall be 100 km.

3.7 *Coordination area*

The coordination area for a feeder-link earth station is the total area contained within the combined coordination contours for propagation modes (1) and (2).

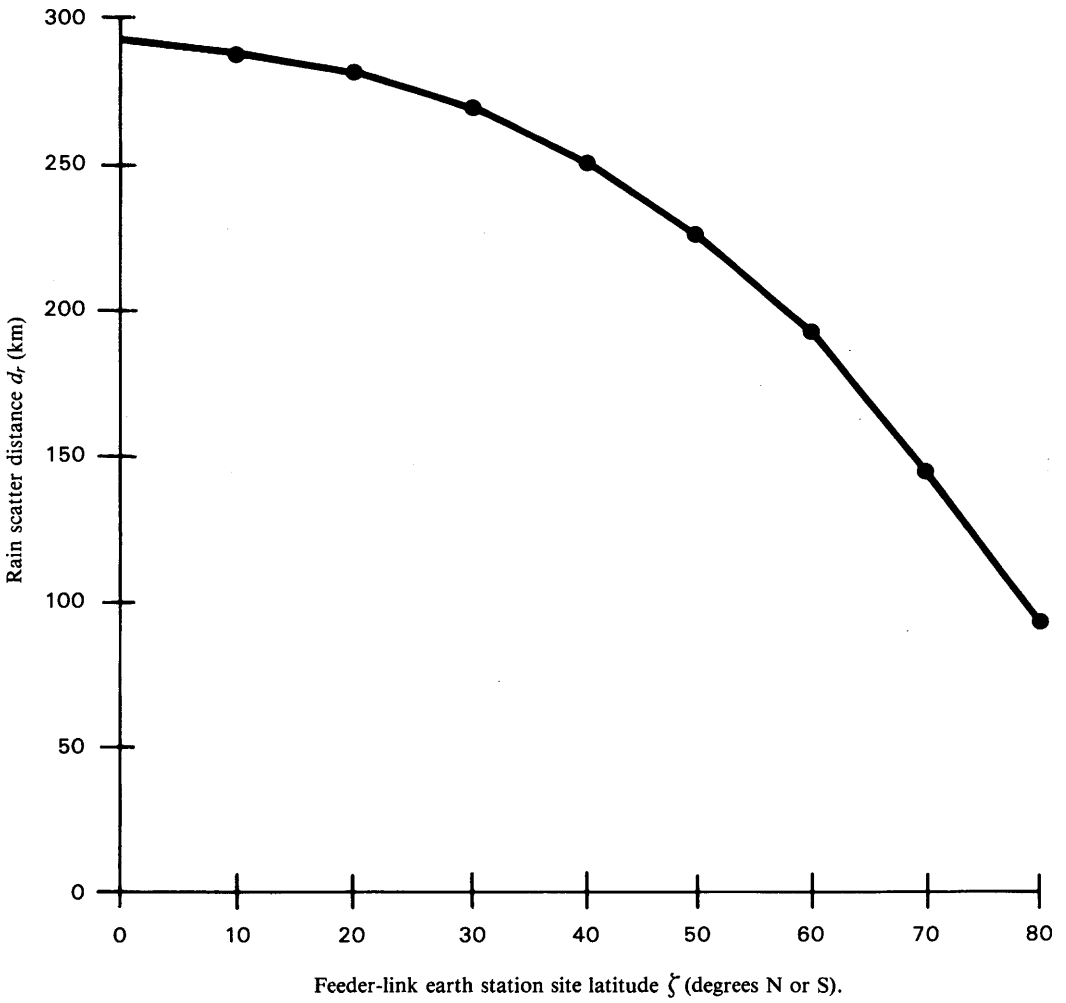


FIGURE 2

Rain scatter distance d_r as a function of feeder-link earth station site latitude ζ

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PART III

Consequential modifications to Radio Regulations

1. *Modifications to the provisions of Article 8 of the Radio Regulations*

ARTICLE 8

Table of Frequency Allocations

GHz
11.7 — 12.75

Allocation to Services		
Region 1	Region 2	Region 3
11.7 — 12.5 FIXED BROADCASTING BROADCASTING-SATELLITE Mobile except aeronautical mobile	**11.7 — 12.1** FIXED 837 FIXED-SATELLITE (space-to-Earth) Mobile except aeronautical mobile 836 839 840	**11.7 — 12.2** FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE
MOD	**12.1 — 12.2** FIXED-SATELLITE (space-to-Earth) 836 839 840 842	838 840
MOD	**12.2 — 12.7** FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE	**12.2 — 12.5** FIXED MOBILE except aeronautical mobile BROADCASTING 838 840 845
838 840	839 840 844 846	
12.5 — 12.75 FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 840 848 849 850	**12.7 — 12.75** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile 840	**12.5 — 12.75** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile BROADCASTING-SATELLITE 847 840

MOD **836** In Region 2, in the band 11.7 – 12.2 GHz, transponders on space stations in the fixed-satellite service may be used additionally for transmissions in the broadcasting-satellite service, provided that such transmissions do not have a maximum e.i.r.p. greater than 53 dBW per television channel and do not cause greater interference or require more protection from interference than the coordinated fixed-satellite service frequency assignments. With respect to the space services, this band shall be used principally for the fixed-satellite service.

MOD **837** *Different category of service:* in Canada, Mexico and the United States, the allocation of the band 11.7 – 12.1 GHz to the fixed service is on a secondary basis (see No. **424**).

MOD **839** The use of the band 11.7 – 12.7 GHz in Region 2 by the fixed-satellite and broadcasting-satellite services is limited to national and sub-regional systems. The use of the band 11.7 – 12.2 GHz by the fixed-satellite service in Region 2 is subject to previous agreement between the administrations concerned and those having services, operating or planned to operate in accordance with the Table, which may be affected (see Articles **11**, **13** and **14**). For the use of the band 12.2 – 12.7 GHz by the broadcasting-satellite service in Region 2, see Part I of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2.

MOD **840** For the use of the band 11.7 – 12.75 GHz in Regions 1, 2 and 3, see Resolution **34**.

SUP **841**

MOD **842** *Additional allocation:* the band 12.1 – 12.2 GHz in Brazil and Peru, is also allocated to the fixed service on a primary basis.

SUP **843**

MOD **844** In Region 2, in the band 12.2 – 12.7 GHz, existing and future terrestrial radiocommunication services shall not cause harmful interference to the space services operating in accordance with the Broadcasting-Satellite Plan prepared at the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2.

MOD **846** In Region 2, in the band 12.2 – 12.7 GHz, assignments to stations of the broadcasting-satellite service made available in the Plan established by the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2 may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference or require more protection from interference than the broadcasting-satellite service transmissions operating in accordance with that Plan. With respect to the space services, this band shall be used principally for the broadcasting-satellite service.

MOD **869** The use of the band 17.3 – 18.1 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. For the use of the band 17.3 – 17.8 GHz in Region 2 by the feeder links for the broadcasting-satellite service in the band 12.2 – 12.7 GHz, see Part II of Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2.

2. *Modifications to the provisions of Article 11 of the Radio Regulations*

ARTICLE 11

NOC

Coordination of Frequency Assignments to Stations in a Space Radiocommunication Service Except Stations in the Broadcasting-Satellite Service and to Appropriate Terrestrial Stations[1]

MOD **A.11.1** [1] For the coordination of frequency assignments to stations in the broadcasting-satellite service and other services in the frequency bands 11.7 – 12.2 GHz (in Region 3), 11.7 – 12.5 GHz (in Region 1) and 12.2 – 12.7 GHz (in Region 2) as well as the coordination of frequency assignments to feeder link stations utilizing the fixed-satellite service (Earth-to-space) in the frequency band 17.3 – 17.8 GHz (in Region 2) and other services in this band in Region 2, see also Article **15** and Article **15A** respectively.

3. *Modifications to the provisions of Article 12 of the Radio Regulations*

ARTICLE 12

MOD (Title)

Notification and Recording in the Master International Frequency Register of Frequency Assignments[1] to Terrestrial Radiocommunication Stations[2, 3, 4]

MOD **A.12.3** [3]For the notification and recording of frequency assignments to terrestrial stations in the frequency bands 11.7 – 12.2 GHz (in Region 3), 12.2 – 12.7 GHz (in Region 2) and 11.7 – 12.5 GHz (in Region 1), so far as their relationship to the broadcasting-satellite service in these bands is concerned, see also Article **15**.

ADD **A.12.4** [4]For the notification and recording of frequency assignments to terrestrial stations in the frequency band 17.7 – 17.8 GHz (in Region 2), so far as their relationship to the fixed-satellite service (Earth-to-space) in this band is concerned, see also Article **15A**.

4. *Modifications to the provisions of Article 13 of the Radio Regulations*

ARTICLE 13

NOC

Notification and Recording in the Master International Frequency Register of Frequency Assignments[1] to Radio Astronomy and Space Radiocommunication Stations Except Stations in the Broadcasting-Satellite Service[2]

MOD **A.13.2** [2]For notification and recording of frequency assignments to stations in the broadcasting-satellite service and other services in the frequency bands 11.7 – 12.2 GHz (in Region 3), 11.7 – 12.5 GHz (in Region 1) and 12.2 – 12.7 GHz (in Region 2), as well as the notification and recording of frequency assignments to feeder link stations in the fixed-satellite service (Earth-to-space) in the frequency band 17.3 – 17.8 GHz (in Region 2) and other services in this band in Region 2, see also Article **15** and Article **15A** respectively.

5. *Modifications to the provisions of Article 15 of the Radio Regulations*

ARTICLE 15

MOD (Title)

Coordination, Notification and Recording of Frequency Assignments to Stations of the Broadcasting-Satellite Service in the Frequency Bands 11.7 – 12.2 GHz (in Region 3), 12.2 – 12.7 GHz (in Region 2) and 11.7 – 12.5 GHz (in Region 1) and to the Other Services to Which These Bands Are Allocated, so far as Their Relationship to the Broadcasting-Satellite Service in These Bands is Concerned

MOD **1656** The provisions and associated Plan for the broadcasting-satellite service in the frequency bands 11.7 – 12.5 GHz (in Region 1) and 11.7 – 12.2 GHz (in Region 3) adopted by the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, as contained in Appendix **30** to the Radio Regulations, and the provisions and associated Region 2 Plan for the broadcasting-satellite service in the frequency band 12.2 – 12.7 GHz adopted by the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, as contained in Part I of the Final Acts of the latter Conference, shall apply to the assignment and use of frequencies by stations of the broadcasting-satellite service in these bands and to the stations of other services to which these bands are allocated so far as their relationship to the broadcasting-satellite service in these bands is concerned.

6. *New Article 15A of the Radio Regulations*

ADD

ARTICLE 15A

Coordination, Notification and Recording of Frequency Assignments to Stations in the Fixed-Satellite Service (Earth-to-Space) in the Frequency Band 17.3 – 17.8 GHz (Region 2) Providing Feeder Links for the Broadcasting-Satellite Service and also to Stations of Other Services to Which this Band is Allocated in Region 2, so far as Their Relationship to the Fixed-Satellite Service (Earth-to-space) in this Band is Concerned in Region 2

1668 The provisions and associated Plan adopted by the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, for feeder links associated with the broadcasting-satellite service utilizing the fixed-satellite service (Earth-to-space) in the band 17.3 – 17.8 GHz (Region 2) as contained in Part II of the Final Acts of the said conference, shall apply to the assignment to and use by feeder links of frequencies in this band and to stations of other services to which this band is allocated in Region 2 so far as the relationship of these other services to the fixed-satellite service (Earth-to-space) in this band is concerned in Region 2.

7. *Modifications to the provisions of Appendix 3 to the Radio Regulations*

APPENDIX 3

MOD (Title)

Notices Relating to Space Radiocommunications and Radio Astronomy Stations [1]

(See Articles **11** and **13**)

ADD

[1] For notices of assignments to feeder links (other than those for telecommand and tracking) in the band 17.3 - 17.8 GHz for the broadcasting-satellite service in the frequency band 12.2 - 12.7 GHz in Region 2, the basic characteristics to be furnished are prescribed in Annex 2, Part II of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service, Region 2, Geneva, 1983.

8. *Modifications to the provisions of Appendix 30 to the Radio Regulations*

APPENDIX 30

MOD (Title)

Provisions for All Services and Associated Plan for the Broadcasting-Satellite Service in Frequency Bands 11.7 - 12.2 GHz (in Region 3) and 11.7 - 12.5 GHz (in Region 1) [1]

(See Article **15**)

TABLE OF CONTENTS

MOD Article 6. Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Terrestrial Stations Affecting Broadcasting-Satellite Frequency Assignments in the Bands 11.7 - 12.2 GHz (in Region 3) and 11.7 -12.5 GHz (in Region 1)

SUP Article 9.

MOD Article 10. Power Flux-Density Limits Between 11.7 GHz and 12.5 GHz to Protect Space Services in Region 2 from Interference from Broadcasting-Satellite Space Stations of Regions 1 and 3

SUP Article 12.

MOD Annex 1. Limits for Determining Whether a Service of an Administration is Considered to Be Affected by a Proposed Modification to the Regions 1 and 3 Plan

MOD Annex 2. Basic Characteristics to Be Furnished in Notices Relating to Space Stations in the Broadcasting-Satellite Service in Regions 1 and 3

MOD Annex 3. Method for Determining the Limiting Interfering Power Flux-Density at the Edge of a Broadcasting-Satellite Service Area in the Bands 11.7 - 12.2 GHz (in Region 3) and 11.7 - 12.5 GHz (in Region 1) and for Predicting the Power Flux-Density Produced There by a Terrestrial Station

MOD Annex 4. Need for Coordination of a Fixed-Satellite Space Station in Region 2 with Respect to the Regions 1 and 3 Plan

MOD Annex 5. Power Flux-Density Limits Between 12.2 GHz and 12.7 GHz to Protect the Terrestrial Services in Regions 1 and 3 from Interference from Region 2 Broadcasting-Satellite Space Stations

SUP Annex 6.

SUP Annex 7.

MOD Annex 8. Technical Data Used in Establishing the Provisions and Associated Regions 1 and 3 Plan and Which Should Be Used for their Application

ARTICLE 2

Frequency Bands

MOD 2.1 The provisions of this Appendix apply to the broadcasting-satellite service in the frequency bands between 11.7 GHz and 12.5 GHz in Region 1 and between 11.7 GHz and 12.2 GHz in Region 3 and to the other services to which these bands are allocated, so far as their relationship to the broadcasting-satellite service in these bands is concerned.

ARTICLE 3

Execution of the Provisions and Associated Plan

SUP Paragraph 3.2

ARTICLE 4

Procedure for Modifications to the Plan

MOD 4.3.1.2 having a frequency assignment to a space station in the broadcasting-satellite service in Region 2 with the necessary bandwidth, any portion of which falls within the necessary bandwidth of the proposed assignment and which is recorded in the Master Register; *or* having a frequency assignment to a space station in the broadcasting-satellite service in the same channel or an adjacent channel, which is in conformity with the Plan for the broadcasting-satellite service in Region 2 or in respect of which modifications to the Plan have been published by the Board in accordance with the provision of Part I of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983.

SUP (Note) 1

ARTICLE 6

MOD (Title) **Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Terrestrial Stations Affecting Broadcasting-Satellite Frequency Assignments in the Bands 11.7 - 12.2 GHz (in Region 3) and 11.7 - 12.5 GHz (in Region 1)** [1]

SUP (Note) 2

SUP ARTICLE 9

ARTICLE 10

MOD (Title) **Power Flux-Density Limits Between 11.7 GHz and 12.5 GHz to Protect Space Services in Region 2 from Interference from Broadcasting-Satellite Space Stations of Regions 1 and 3**

SUP

ARTICLE 12

ANNEX 1

MOD (Title)

Limits for Determining Whether a Service of an Administration is Considered to Be Affected by a Proposed Modification to the Regions 1 and 3 Plan (Article 4, paragraph 4.3.1) [1]

MOD (Title) 1. *Limits on the change in the wanted-to-interfering signal ratio with respect to frequency assignments in accordance with the Regions 1 and 3 Plan*

MOD (Title) 2. *Limits on the change in the power flux-density to protect the broadcasting-satellite service in the band 12.2 - 12.5 GHz in Region 2*

ANNEX 2

MOD (Title)

Basic Characteristics to Be Furnished in Notices Relating to Space Stations in the Broadcasting-Satellite Service in Regions 1 and 3

ANNEX 3

MOD (Title)

Method for Determining the Limiting Interfering Power Flux-Density at the Edge of a Broadcasting-Satellite Service Area in the Bands 11.7 - 12.2 GHz (in Region 3) and 11.7 - 12.5 GHz (in Region 1) and for Predicting the Power Flux-Density Produced There by a Terrestrial Station

2.2 *Wanted power flux-density (F_0)*

The value of F_0 is equal to:

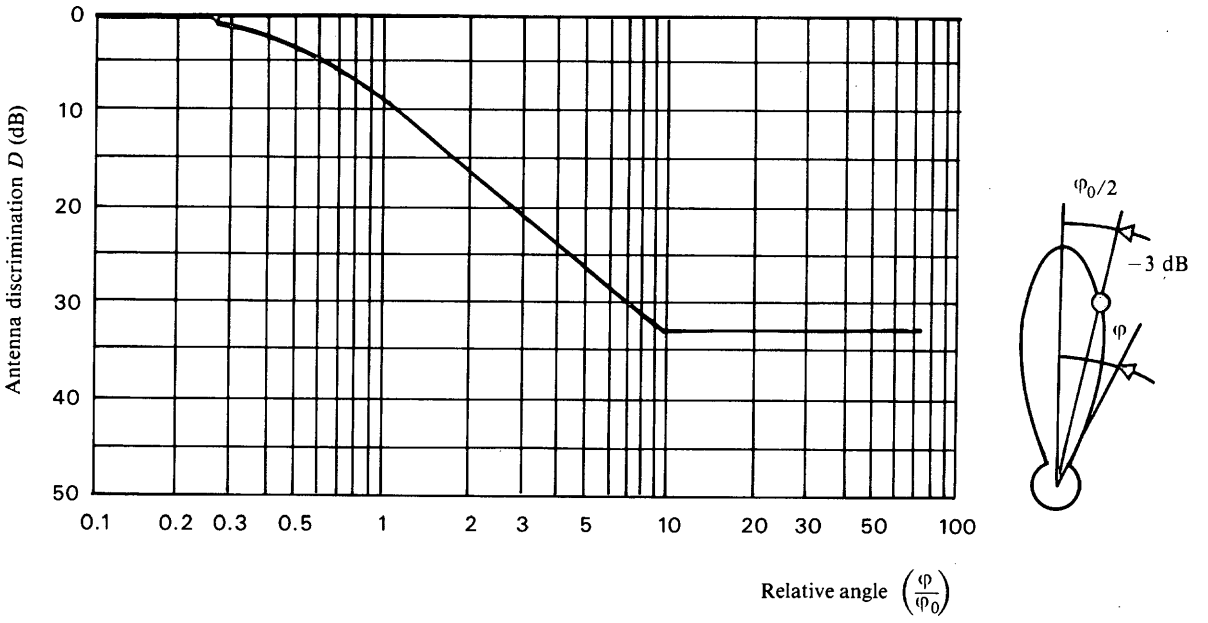
MOD -103 dB(W/m^2) for service areas in Regions 1 and 3.

SUP Paragraph *b)*

2.4 *Angular discrimination (D)*

SUP (Title) 2.4.1

SUP 2.4.2



MOD

FIGURE 2

Discrimination D (dB) of broadcasting-satellite receiver antenna as a function of satellite elevation angle

For service areas in Regions 1 and 3, $\varphi_0 = 2°$.

ANNEX 4

MOD (Title)

Need for Coordination of a Fixed-Satellite Space Station in Region 2 with Respect to the Regions 1 and 3 Plan (Article 7)

MOD With respect to paragraph 7.2.1, coordination of a space station in the fixed-satellite service of Region 2 is required when, under assumed free-space propagation conditions, the power flux-density on the territory of an administration in Region 1 or Region 3 exceeds the value derived from the following expressions:

-147 dB(W/m^2/27 MHz)	for $0° \leqslant \theta < 0.44°$
$-138 + 25 \log_{10} \theta$ dB(W/m^2/27 MHz)	for $0.44° \leqslant \theta < 19.1°$
-106 dB(W/m^2/27 MHz)	for $19.1° \leqslant \theta$

MOD θ = the difference in degrees between the longitude of the interfering fixed-satellite space station in Region 2 and the longitude of the affected broadcasting-satellite space station in Regions 1 and 3.

ANNEX 5

MOD (Title)

Power Flux-Density Limits between 12.2 and 12.7 GHz to Protect the Terrestrial Services in Regions 1 and 3 from Interference from Region 2 Broadcasting-Satellite Space Stations

The power flux-density limits are as follows:

MOD 1) for all the territories of administrations in Regions 1 [1] and 3:

-125 dB(W/m^2/4 kHz)	for broadcasting-satellite space stations using circular polarization;
-128 dB(W/m^2/4 kHz)	for broadcasting-satellite space stations using linear polarization;

for all angles of arrival; and

MOD 2) in the band 12.2 - 12.5 GHz, for territories of administrations in Region 3 and those in the western part of Region 1, West of longitude 30° E:

-132 dB(W/m^2/5 MHz)	for angles of arrival between 0° and 10° above the horizontal plane;
$-132 + 4.2\,(\gamma - 10)$ dB(W/m^2/5 MHz)	for angles of arrival γ (in degrees) between 10° and 15° above the horizontal plane;
-111 dB(W/m^2/5 MHz)	for angles of arrival between 15° and 90° above the horizontal plane.

ADD [1] In the band 12.5 - 12.7 GHz in Region 1, these limits are applicable only to the territory of administrations mentioned in Nos. **848** and **850** of the Radio Regulations.

SUP ANNEX 6

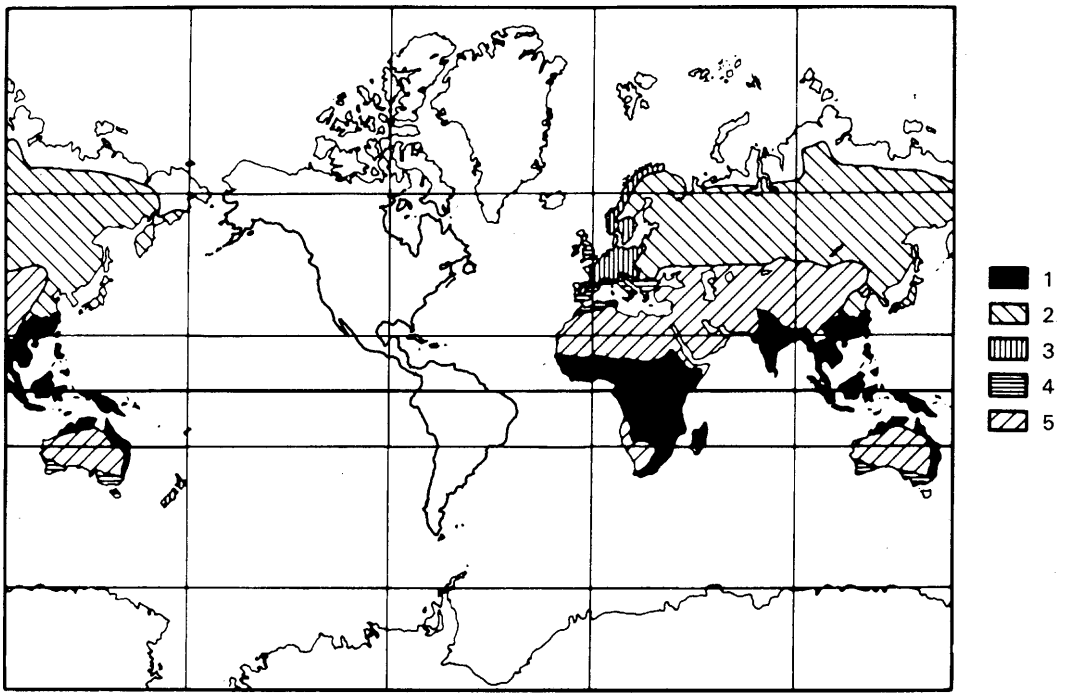
SUP ANNEX 7

ANNEX 8

MOD (Title)

Technical Data Used in Establishing the Provisions and Associated Regions 1 and 3 Plan and Which Should Be Used for their Application

MOD



MOD

FIGURE 2

Rain-climatic zones in Regions 1 and 3

It should be noted that extensive measurements of attenuation due to rainfall have not been carried out in the tropical countries, especially in the African region.

3.2 *Polarization*

MOD 3.2.1 For the planning of the broadcasting-satellite service, circular polarization shall be used in Regions 1 and 3 [1].

MOD [1] The Administration of the Islamic Republic of Iran expressed a reservation regarding the adoption of circular polarization for planning the broadcasting-satellite service in Region 3 and stated its intention to use linear polarization.

3.7 *Receiving antennae*

3.7.1 *Minimum diameter of receiving antennae*

For planning the broadcasting-satellite service the minimum diameter of receiving antennae considered is such that the half-power beamwidth φ_0 is:

MOD *a)* for individual reception: 2°;

MOD *b)* for community reception: 1°.

3.7.2 *Receiving antenna reference patterns*

The co-polar and cross-polar reference patterns of receiving antennae are given in Figs. 4 and 5.

a) The relative antenna gain (dB) is given by the curves in Fig. 4 for:

MOD

– individual reception:

  – Curve A for the co-polar component;

  – Curve B for the cross-polar component;

– community reception:

MOD

  – Curve A′ up to the intersection with Curve C, then Curve C, for the co-polar component;

MOD

  – Curve B for the cross-polar component.

SUP Paragraph *b)*

3.8 *Necessary bandwidth*

The necessary bandwidths considered are as follows for:

MOD

– 625-line systems: 27 MHz;
– 525-line systems in Region 3: 27 MHz;

3.9.2 For the planning of the broadcasting-satellite service, the guardbands necessary to protect the services in adjacent frequency bands are shown in the table below.

MOD

Regions	Guardband at the lower edge of the band (11.7 GHz)	Guardband at the upper edge of the band (12.2/12.5 GHz)
1	14 MHz	11 MHz
3	14 MHz	11 MHz

MOD These guardbands assume maximum beam centre e.i.r.p. values of 67 dBW for Regions 1 and 3 (values relating to individual reception), and a filter roll off of 2 dB/MHz. If smaller e.i.r.p. values are assumed, the guardbands can be reduced in width by 0.5 MHz for each decibel decrease in e.i.r.p.

3.16 *Power flux-density at edge of coverage area*

The value of the power flux-density at the edge of the coverage area for 99% of the worst month is:

MOD – 103 dB(W/m^2) for individual reception;

SUP –

MOD – 111 dB(W/m^2) for community reception.

SUP Figure 5

ANNEX 9

Criteria for Sharing Between Services

NOC 2.2 *(MOD) in French text only.*

MOD 2.3 Hence it does not appear appropriate, for antenna diameters greater than 100 λ, to specify a minimum antenna diameter for receiving earth stations in the fixed-satellite service sharing the band 11.7 - 12.2 GHz. It may be useful to consider a 4.5 m antenna having an efficiency of 60% and an on-axis gain of 53 dB as typical for the purpose of planning the sharing of this band.

9. *Action on Resolutions and Recommendations of WARC-79*

SUP	RESOLUTION No. 31	Relating to the Application of Certain Provisions of the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, to Take into Account Changes Made by the World Administrative Radio Conference, Geneva, 1979 to the Table of Frequency Allocations for Region 2 in the Band 11.7 - 12.7 GHz
SUP	RESOLUTION No. 100	Relating to the Coordination, Notification and Recording in the Master International Frequency Register of Assignments to Stations in the Fixed-Satellite Service with Respect to Stations in the Broadcasting-Satellite Service in Region 2
SUP	RESOLUTION No. 503	Relating to the Coordination, Notification and Recording in the Master International Frequency Register of Frequency Assignments to Stations in the Broadcasting-Satellite Service in Region 2
SUP	RESOLUTION No. 504	Relating to the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, with Respect to Region 2
SUP	RESOLUTION No. 700	Relating to Sharing Between the Fixed-Satellite Service in Regions 1 and 3 and the Broadcasting-Satellite Service in Region 2 in the Band 12.2 - 12.7 GHz
SUP	RESOLUTION No. 701	Relating to the Convening of a Regional Administrative Radio Conference for the Detailed Planning of the Broadcasting-Satellite Service in the 12 GHz Band and Associated Feeder Links in Region 2

FINAL PROTOCOL *

At the time of signing the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, the undersigned delegates take note of the following statements made by signatory delegations.

No. 1

For the Eastern Republic of Uruguay:

In signing the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, the Delegation of the Eastern Republic of Uruguay states:

1. that it does not accept the planned spillover produced by the beams providing a service to the northern part of Argentina (ARGNORT) which cover the entire territory of the Eastern Republic of Uruguay or that of the beams providing a service to the southern part of Brazil (BOOSU) which cover large areas of the same territory;

2. that it reserves the right of its Govermment to:

a) insist on strict compliance with the provisions of No. 2674 of the Radio Regulations;

b) adopt any measures which it may consider necessary to secure its national territory against any outside interference and safeguard its broadcasting services;

c) to take any steps it may consider necessary to ensure the proper functioning of its satellite-broadcasting service;

d) to take any action it may consider necessary to protect its interests in the event that one or more Members of the Union should enter reservations which might affect the sovereign rights of the Eastern Republic of Uruguay.

No. 2

For Ecuador:

The Republic of Ecuador is signing the Final Acts of the Regional Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, subject to the following reservation:

Ecuador declares that it does not consider itself bound by its participation in the Conference or its signature of the Final Acts by the resolutions, agreements or decisions of the Regional Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, concerning the location of geostationary satellites of other countries in the orbital segments which correspond to its own mainland and offshore territory. The location of such satellites in those segments will require its prior authorization or approval. Futhermore, the Government of Ecuador reserves the right to adopt such measures as it considers appropriate to safeguard its interests in accordance with its own legislation and with international law should any of the reservations entered by other States affect the telecommunication services of Ecuador or the exercise of its sovereign rights.

No. 3

For the Republic of Bolivia:

In signing the Final Acts of the Regional Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, the Delegation of the Republic of Bolivia states that the Government of Bolivia reserves the right to take any action it may consider appropriate to safeguard its broadcasting-satellite services should the reservations entered by other countries jeopardize the interests of the Republic of Bolivia and in particular its broadcasting services.

* *Note by the General Secretariat:* The texts of the Final Protocol are shown in the chronological order of their deposit. In the Table of Contents these texts are grouped in the alphabetical order of country names.

No. 4

For the Republic of Colombia:

In signing the Final Acts of the Regional Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, the Delegation of Colombia declares that Colombia does not consider itself bound by the acts, agreements or resolutions of this Conference if they imply the assignment to other countries of orbital positions in the Colombian geostationary orbital segment, which require the prior express authorization of Colombia in accordance with its rights as stated at the XXXth General Assembly of the United Nations in 1975 and spelled out in the Declarations of Bogota (1976) and Quito (1982).

The rights of the equatorial countries have already been recognized by the Space Conference (Vienna, 1982) approved by the United Nations, and in the new Articles 10 and 33 of the International Telecommunication Convention (Nairobi, 1982) and were supported by the Group of 77 at the Nairobi and Vienna Conferences, as well as by the non-aligned countries at their meeting in New Delhi (1983).

The Delegation of Colombia reserves the right of its Government to adopt such measures it considers necessary in accordance with its domestic legislation and with international law to safeguard its national interests in the event that reservations entered by representatives of other States may affect the telecommunication services of Colombia or encroach upon its sovereign rights, or should the application or interpretation of any of the resolutions or agreements of the Conference make it necessary to do so.

No. 5

For the Republic of Colombia and Ecuador:

The Delegations of Colombia and Ecuador jointly and expressly reserve their rights over the geostationary orbit and reiterate what they stated in their respective national reservations.

Furthermore, they wish to state they have always upheld equitable access to that limited natural resource which should be placed in the peaceful service of mankind with respect for the needs and interests of the developing countries and particularly the equatorial countries which, like Colombia and Ecuador, have requested prior authorization or agreement for placing satellites in the orbital segment corresponding to their respective territories.

No. 6

For the Federative Republic of Brazil:

In signing the Final Acts of this Conference, subject to ratification by the National Congress, the Delegation of the Federative Republic of Brazil wishes to reiterate the content of the statement (No. 62) it made on signing the Final Acts of the World Broadcasting-Satellite Administrative Radio Conference (Geneva, 1977):

> "The Conference has adopted a Plan for the allotment of frequencies and positions in the geostationary satellite orbit for the broadcasting-satellite service for Regions 1 and 3. The Delegation of the Federative Republic of Brazil draws the attention of the Conference to the fact that this Plan and its associated sharing criteria do not make adequate provision for the needs of the fixed-satellite and broadcasting-satellite services in some countries in Region 2 and that the sharing criteria do not provide the protection required under paragraphs 117 and 428A of the Radio Regulations.
>
> Furthermore, this Plan and its sharing criteria may preclude the successful development of a plan for Region 2 countries in 1982. The Brazilian Administration therefore reserves the right to operate its systems in accordance with the provisions of the International Telecommunication Convention and the Radio Regulations and to claim the protection thus afforded."

As mentioned in the basic document submitted by Brazil to the Conference (see pages 4, 5, 6, 7 and 8 of Document No. 20), the Brazilian Administration has since the requirement definition stage given due consideration to the aspects of interregional coordination.

During the Conference, although efforts have been made in the planning process to ensure respect for the appropriate limits in Appendix 30 to the Radio Regulations, it appears that in some cases those limits have not been met in the Plan adopted for the broadcasting-satellite service in Region 2.

If in the final examination of interregional sharing aspects of the Plan, to be carried out by the IFRB after the Conference, it is found that any Brazilian assignments affect the systems of countries in Regions 1 and 3, the Delegation of Brazil wishes to state its intention to seek appropriate agreements with those countries and assets that those countries will recognize that the Plan adopted by WARC-77 does not guarantee due protection to the different Brazilian radiocommunication systems in the band in question. In particular, attention is drawn to the power flux-density values contained in Annex 11 to Appendix 30 of the Radio Regulations and produced by space stations of the broadcasting-satellite service in Region 1 in Brazilian territory, where the 40 highest PFD values exceed the limit of -138 dB(W/m^2) and the worst case corresponds to a value of -127.77 dB(W/m^2).

No. 7

For the Federative Republic of Brazil:

In signing the Final Acts of this Conference, subject to ratification by the National Congress, the Delegation of the Federative Republic of Brazil reserves the right of its Government to adopt such measures as it deems necessary for protecting its interests should they be jeopardized by failure to observe the provisions adopted by this Conference.

No. 8

For Chile:

In signing the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, the Delegation of Chile declares:

1. that it does not accept any technically avoidable spillover on its territory as a result of the assignments in the Plan, subsequent modifications thereto or assignments in accordance with Resolution No. 2 of this Conference, and reserves the right of its Government to take whatever steps it considers necessary to ensure that as far as possible Chile remains free from broadcasting-satellite service emissions from other administrations;

2. that whenever the Final Acts, the Annexes thereto or documents of any kind mention or refer to "Antarctic territories" as dependencies of any State, those mentions and references neither can nor do include the Chilean Antarctic sector situated between longitudes 53° and 90° West, which is an integral part of Chile's national territory over which Chile has indefeasible rights.

No. 9

For Peru:

In signing the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, the Delegation of Peru wishes to state that the Plan worked out is not entirely satisfactory since it does not adequately meet the needs of its Administration which were submitted at the appropriate time.

The Delegation of Peru further reserves the right of its Government to take such decisions and measures as it considers appropriate for safeguarding its broadcasting-satellite and telecommunication services should the Final Acts and associated Plan be in conflict with its Constitution and laws or should its interests be affected by the decisions of this Conference or by reservations submitted by other administrations.

No. 10

For Belize:

Belize notes that calculations performed in developing the Plans indicate that its assignment at −116° could be substantially affected by a Plan assignment of the United States of America, and it accordingly reserves its position thereon in anticipation of a resolution of the difficulty between the two Administrations before implementation.

No. 11

For the Federative Republic of Brazil:

The procedures and the associated Plans adopted in this Conference for Region 2 provide the flexibility which was considered necessary to adequately fulfil the needs of the Region with respect to the broadcasting-satellite service.

This principle also lead the Technical Committee (Committee 4) to conclude for the convenience of not establishing criteria to protect the fixed-service in as much as these would impose restrictions to the development of systems of the broadcasting-satellite service in Region 2.

Having regard to the impossibility to modify the present allocation of the frequency band 12.2 - 12.7 GHz this Conference adopted the text of paragraph 5 of Annex 1 of Part I.

The Administration of Brazil wishes to draw the attention of Region 2 administrations to the advantages of not imposing any intra-regional constraints, to the broadcasting-satellite service in Region 2, by the terrestrial services sharing the same frequency band and requests Region 2 administrations to give priority to the broadcasting-satellite service regardless of the provision of paragraph 5, Annex 1, Part I.

No. 12

For the United States of America:

As part of its requirements submitted to this Conference, the Administration of the United States indicated a need to be able to operate its broadcasting-satellite down-link and feeder link channel assignments using either sense of polarization (i.e. either "direct" or "indirect" polarization). This requirement was duly presented to and noted by the appropriate Committee of the Conference. Owing to a deficiency in the ability of the computer software at the Conference to analyse such a situation in a manner satisfactory to that Committee, a decision was reached to disregard this duly presented requirement of our Administration. Therefore, the Administration of the United States of America reserves the right to operate its assignments within the Region 2 Plan using either sense of polarization. When implementing assignments using a sense of polarization opposite to that specified in the Plan, the United States will take all practicable measures to minimize the impact of such operation on the assignments of other administrations in the Plan.

No. 13

For the United States of America:

In as much as the Conference has elected to base the Broadcasting-Satellite Service Plan for Region 2 on an edge of coverage area power flux-density of -107 dBW per square metre for 99 per cent of the worst month, and considering that the Delegation of the United States believes that the planning of the service based upon this power will place significant constraints upon the future development of this service, including the introduction of enhanced services, the Administration of the United States of America reserves the right to adjust the e.i.r.p. of its assignments specified within the Plan so as to produce a power flux-density of -105 dBW per square metre at the edge of coverage area for 99 per cent of the worst month. In the application of this power level, the United States will take all practicable measures to minimize the impact of such operation on the assignments of other administrations in the Plan.

No. 14

For the Republic of Venezuela:

The Delegation of the Republic of Venezuela declares that it reserves the right of its Administration to take whatever measures it may deem appropriate to ensure the satisfactory development of its broadcasting-satellite service and other telecommunication services in the band 12.2 - 12.7 GHz, should its interests be adversely affected by the decisions of this Conference, especially as a result of the possible future use of provisional systems.

It also declares that its Administration reserves the right to use the value of -105 dB(W/m^2) for the power flux-density parameter within the limit of the coverage area for 99% of the time in the least favourable month, should it consider this to be necessary for the installation of new television services, especially improved quality, high-definition systems. In applying this value, the Administration of the Republic of Venezuela will endeavour by all technical means to avoid adversely affecting the assignments of other Administrations contained in the Plan approved by this Conference and its annexes, in conformity with the rules expressed therein.

No. 15

For the Republic of Venezuela:

The Delegation of the Republic of Venezuela wishes to point out that in the course of a planning exercise carried out during this Conference, for the purpose of attempting a change in the orbital position corresponding to the beam VEN 11 VEN, the beam VEN 02 VEN was tentatively withdrawn in order to finish a prior planning exercise and was not reinstated as expected. The Delegation therefore considers that this beam should be reincorporated in the Plan within the assignments of the Republic of Venezuela, as indicated in the list of its requirements, at least as a down-link only, supplied from the coverage area of the feeder link VEN 11 VEN. This incorporation should not be understood to be a modification of the Plan.

No. 16

For the Republic of Venezuela:

The Delegation of the Republic of Venezuela wishes to express its concern at the fact that it has not been possible in the course of this Conference to satisfy the requirements of INTELSAT with regard to the fixed-satellite service.

No. 17

For the Argentine Republic:

A

In exercising its sovereign rights over the Malvinas Islands, the South Georgia Islands, the South Sandwich Islands and the Antarctic sector between longitudes 25° and 74° West of Greenwich and South of latitude 60° South, the Delegation of the Argentine Republic declares that:

1. Its Government does not recognize the requirements set out by the United Kingdom of Great Britain and Northern Ireland in Document No. 16 of this Conference or the assignments entered on behalf of that country in the Plans worked out at this Conference for services in those territories.

2. Since those submissions and assignments in no way affect the indefeasible and inalienable sovereign rights of the Argentine Republic over those territories, the Argentine Government enters an express reservation with regard to them and declares that it does not recognize any right of the United Kingdom of Great Britain and Northern Ireland to notify the introduction of those assignments or to effect any installation on the said territories.

3. The occupation of the said Islands by the United Kingdom of Great Britain and Northern Ireland through acts of force constitutes an illegal situation which the Argentine Republic has never accepted. The United Nations General Assembly adopted Resolutions 2065(XX), 3160(XXVIII), 31/49 and 37/9 recognizing that there is a dispute concerning sovereignty over the archipelago and urging the Argentine Republic and the United Kingdom of Great Britain and Northern Ireland to negotiate a peaceful and definitive solution to the dispute as soon as possible through the good offices of the Secretary-General of the United Nations who is to inform the General Assembly on the progress made.

4. Furthermore, the Argentine Government reserves the right to apply such measures as it considers appropriate to ensure the satisfactory development of broadcasting-satellite services and their associated feeder links in the territories mentioned should the interests of its country be affected by the decisions of this Conference or by the reservations entered by other countries.

B

The Argentine Government further reserves the right to adopt throughout its territory such measures as it considers necessary to ensure the provision of the services planned at this Conference should the interests of its country be affected by decisions taken at the Conference or by the reservations of other countries.

C

Lastly, the Argentine Government declares that it reserves its right to enter any other reservation until such time as necessary.

No. 18

For Mexico:

The Delegation of Mexico declares that its Administration reserves the right to adopt whatever measures it may deem appropriate to ensure the satisfactory development of its telecommunication services in the bands 11.7 - 12.7 GHz and 17.3 - 18.1 GHz, should its interests be adversely affected by the decisions of this Conference.

It also reserves the right to establish its broadcasting-satellite service, using the power flux-density required for convenient coverage of its service areas, while offering the protection laid down in the Final Acts of this Conference to the telecommunication services of other administrations.

No. 19

For Mexico:

Having examined the Plan for Region 2 prepared by this Conference, the Delegation of Mexico wishes to make the following declaration.

The Plan is not satisfactory for the Mexican Administration because in general the Administration's assignments in the Plan show negative protection margins.

Moreover, owing to problems that arose during the preparation of the Plan, two of the orbital positions assigned to Mexico are not provided with due solar eclipse protection.

The Mexican Administration wishes to call upon the administrations of Region 2 to make every effort, when they come to establish their broadcasting-satellite systems, to ensure that the systems are based on technical parameters such as will improve the negative protection margins which now appear in the Plan.

No. 20

For Jamaica:

In signing the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, the Delegation of Jamaica, reserves for its Government, the right to take whatever action it deems necessary to safeguard its interests, should these interests be jeopardized by the failure of other countries or administrations or agencies to observe the provisions contained in the Final Acts and the Annexes thereto, as adopted by this Conference.

No. 21

For Guyana:

In signing the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva 1983, the Delegation of the Cooperative Republic of Guyana reserves its Government's right to take such measures as they may deem necessary to safeguard their interests should any administration fail in any way to observe the provisions of the Final Acts or should the reservations or any action taken by any other administration jeopardize the telecommunication services or be liable to infringe upon the sovereign rights of Guyana.

No. 22

For Cuba:

In signing the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, the Delegation of the Republic of Cuba reserves the right of its Government to take whatever action may be necessary to ensure the proper functioning of its telecommunication services should any country fail to comply with the provisions adopted by the Conference or the Associated Plan.

No. 23

For Canada, Denmark, the United States of America, France, the Kingdom of the Netherlands and the United Kingdom of Great Britain and Northern Ireland:

The above-mentioned Delegations, referring to the reservations made by the Republics of Colombia and Ecuador, in statements Nos. 2, 4 and 5 consider that, in as much as these statements refer to their respective national reservations, which in turn refer to the Bogota Declaration of 3 December 1976 by equatorial countries and to the claims of those countries to exercise sovereign rights over segments of the geostationary-satellite orbit, the claims in question cannot be recognized by this Conference. Further, the above-mentioned Delegations wish to reaffirm the declarations made on behalf of their Administrations in this regard when signing the Final Acts of the World Administrative Radio Conference (Geneva, 1979) and of the Plenipotentiary Conference (Nairobi, 1982).

No. 24

For the Federative Republic of Brazil:

In view of the various declarations made at this Conference on questions related to the implementation of broadcasting-satellite systems, the Delegation of Brazil considers it necessary to declare that the provisions and the associated Plan as well as the other decisions adopted at this Conference are fully in conformity with the principle of an orderly arrangement of the use of the geostationary-satellite orbit by the international community and with the principles and standards laid down in the International Telecommunication Conventions of Malaga-Torremolinos, 1973, and Nairobi, 1982, and the relevant provisions of the Radio Regulations. This being so, Brazil declares that, in implementing its broadcasting-satellite systems in conformity with the Plan and the associated procedures, no other agreement or coordination within Region 2 is required.

No. 25

For the Argentine Republic:

The Delegation of the Argentine Republic to the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, declares that:

1. Argentina does not accept within its territory any overspill arising from the assignments in the Plans or in any Plans which may be implemented in the future when such overspill is technically avoidable. In this connection its country reserves the right to take any steps it may consider necessary to exercise its rights in accordance with the standards of applicable international law and of the International Telecommunication Convention and the Regulations annexed thereto;

2. in bringing into service its assignments under the Plans, Argentina need only submit the notices provided for in Article 5 of Parts I and II of the Final Acts, request the application of Article 3 of Parts I and II or, where appropriate, fulfil the requirements of Resolution No. 2(Sat-R2) and that it does not accept that any other requirement, condition, authorization or agreement can be requested of it or imposed on it in bringing into service its assignments;

3. reiterates that its Government retains the right to make any declaration or submit any reservation up to such time as is appropriate.

No. 26

For the Argentine Republic:

With reference to point 2 of Declaration No. 8 of the Final Acts, the Government of the Argentine Republic declares that it does not accept the declaration contained therein insofar as it relates to the Antarctic sector between longitudes 25° and 74° West of Greenwich and South of latitude 60° South, these being territories over which the Argentine Republic exercises indefeasible and inalienable sovereign rights.

No. 27

For the United Kingdom of Great Britain and Northern Ireland

1. Referring to statement No. 17 for the Argentine Republic touching on title to the Falkland Islands, the Falkland Island Dependencies and certain Antarctic lands, the Government of the United Kingdom of Great Britain and Northern Ireland have no doubt as to United Kingdom sovereignty over the Falkland Islands, the Falkland Island Dependencies and the British Antarctic Territory, in respect of which last the United Kingdom Delegation draws attention to Article 4 of the Antarctic Treaty which freezes territorial claims and to which both the Argentine Government and the British Government are parties.

2. The United Kingdom Government considers the present Conference to have acted ultra vires in deciding to include in the Plans certain requirements of the Argentine Republic relating to the territories in question. As the country recognized as the administration for these territories, the United Kingdom has sole right to submit requirements in respect of them, so that

a) its assignments prepared in the plans of this Conference are not open to question; and

b) other assignments, insofar as they relate to these territories, entitle the United Kingdom alone to demand or waive protection for, institute modifications to or implement the pertinent provision made in the decisions of this Conference.

3. The position of the United Kingdom on negotiations about the Falkland Islands is well known. Argentina stands condemned by the United Nations for its aggression in 1982 and has refused to declare a definitive cessation of hostilities or to renounce the use of force.

No. 28

For Belize and the United Kingdom of Great Britain and Northern Ireland

Noting that various statements hitherto made foresee departures from agreements properly reached at this Conference, the Delegation of the United Kingdom of Great Britain and Northern Ireland, on behalf additionally of Belize, reserves for its Government and the Government of Belize the right to take appropriate action should the interests of either be jeopardized by the failure of other parties to observe the provisions contained in the Final Acts and the Annexes thereto.

No. 29

For the United Kingdom of Great Britain and Northern Ireland

Whereas statement No. 8 for Chile makes reference to Antarctic territories, the Government of the United Kingdom of Great Britain and Northern Ireland do not accept any reservation therein insofar as it disputes the sovereignty of Her Majesty's Government over the British Antarctic Territory. The Delegation draws attention to Article 4 of the Antarctic Treaty which freezes territorial claims and to which both the Chilean Government and Her Majesty's Government are parties.

(The signatures follow)

(The signatures following the Final Protocol are the same as those shown on pages 2 and 3)

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RESOLUTION No. 1(Sat-R2)

Relating to the Period Between 1 January 1984 and the Entry into Force of the Final Acts of the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985 (WARC-ORB (1))

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that the provisions and the associated Plans prepared by the present Conference are subject to formal adoption and incorporation into the Radio Regulations by the First Session of the World Aldministrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985 (WARC-ORB (1));

b) that, during the period between 1 January 1984 and the date of entry into force of the Final Acts of the WARC-ORB (1), administrations of countries in Region 2 may wish to bring into use assignments appearing in the Plan or to modify them or to bring them into use as interim systems;

c) that, in accordance with Resolution Nos. **31**, **503** and **504** of the World Administrative Radio Conference, Geneva, 1979 (WARC-79) and No. **839** of the Radio Regulations, pending the entry into force of the Final Acts of WARC-ORB (1), the provisions of Resolution No. **33** of WARC-79 and Articles **11**, **13** and **14** of the Radio Regulations shall apply to stations of the broadcasting-satellite and fixed-satellite services;

further considering

that there is a need for procedures to be applied by administrations of Region 2 and the IFRB during the above period;

resolves

1. that, during the period between 1 January 1984 and the date to be adopted by WARC-ORB (1) on which the provisions and the associated Plans established by the present Conference will apply to all countries of Region 2, the following procedures shall be applied:

1.1 the Board shall consider any notification of an assignment to a station of the broadcasting-satellite service in the band 12.2 - 12.7 GHz which is in conformity with the Broadcasting-Satellite Plan:

- as having been agreed to in accordance with Article **14** of the Radio Regulations by countries participating in the Conference and by other countries which have agreed to apply the provisions of this Resolution;
- as having been coordinated among the same countries in accordance with sections A and B of Resolution No. **33** of WARC-79;

1.2 the Board shall consider any notification of an assignment to a station of the fixed-satellite service in the band 17.3 - 17.8 GHz which is in conformity with the feeder links Plan as having been coordinated among the same countries in accordance with Article **11** of the Radio Regulations;

1.3 that the IFRB and administrations wishing to modify their assignments in the above Plans or to bring into use interim systems shall apply the provisions of Article 4 of Part I (except those of paragraph 4.2.9) or of Article 4 of Part II (except those of paragraph 4.2.10) or of Annex to Resolution No. **2**(Sat-R2) (except those of paragraphs 6 and 9) of these Final Acts, as appropriate;

2. on the date of entry into force of the Final Acts of WARC-ORB (1), for the modifications to the Plan and on a date to be decided by the said Conference for the interim systems, the IFRB shall publish modifications to the Plans and interim uses resulting from *resolves* 1 above, in a special section of its weekly circular in order to enter them in the Plan or in the Interim List referred to in paragraphs 6 and 11 of Annex to Resolution No. **2**(Sat-R2);

urges the administrations not present at this Conference

to accept that the provisions of the present Resolution be applied to them within the framework of the procedures contained in Articles **11** and **14** of the Radio Regulations and of Resolution No. **33** of WARC-79 and to so inform the IFRB as soon as practicable to this effect;

recommends the WARC-ORB (1)

to consider and adopt the draft Resolution contained in the Annex to this Resolution in order to permit the application to all countries of Region 2 of the provisions and associated Plans for the broadcasting-satellite service and for their feeder links prior to the entry into force of its Final Acts;

request the IFRB

to communicate to the administrations not participating in the Conference the provisions governing the use of the broadcasting-satellite service and the fixed-satellite service for their feeder links and the associated Plans indicating the assignments entered in the Plan on their behalf and outlining the benefit to them of accepting the application of these provisions during the period preceding the WARC-ORB (1) as indicated in the present Resolution.

ANNEX TO RESOLUTION No. 1(Sat-R2)

DRAFT RESOLUTION

Relating to the Provisional Uses of Parts I and II of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of the Space Services Utilizing It (First Session, Geneva, 1985),

considering

a) that the present Session has decided to incorporate in the Radio Regulations the provisions and associated Plans for the broadcasting-satellite service and fixed-satellite service for feeder links in Region 2;

b) that during the period preceding the date of entry into force of the Final Acts of the present Session, administrations of countries in Region 2 may wish to bring into use assignments appearing in the Plan or to modify them or to bring them into use as interim systems;

further considering

that there is a need for procedures to be applied by the administrations of Region 2 and the IFRB during the interim period referred to above;

resolves

1. that during the period preceding the date of entry into force of the Final Acts of the present Session, administrations and the IFRB shall apply the provisions of Parts I and II of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, on a provisional basis;

2. that on the date of entry into force of the Final Acts of the present Session, the IFRB shall publish modifications to the Plans introduced in application of *resolves* 1 above, in a special section of its weekly circular in order to enter them in the Plans.

RESOLUTION No. 2(Sat-R2)

Relating to Interim Systems

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that it has prepared a Plan for the broadcasting-satellite service in Region 2 in the band 12.2 - 12.7 GHz and a Plan for the associated feeder links in the band 17.3 - 17.8 GHz on the basis of the requirements submitted by administrations and of the technological information available to it;

b) that in the implementation of their assignments in the Plans, the administrations may find it more appropriate to adopt a phased approach and initially to use characteristics different from those appearing in the Plans;

c) that some administrations may cooperate in the joint development of a space system with a view to covering two or more service areas from the same orbital position or to using a beam which would encompass two or more service areas;

d) that some administrations may cooperate in the joint development of a space system with a view to covering two or more feeder-link service areas from the same orbital position or to using a beam which encompasses two or more feeder-link service areas;

e) that there may be some advantage in using interim systems as a phased approach to implementing the assignments in the Plans on condition that the use of such systems does not lead to a degradation of the service rendered by the assignments in the Plans unless coordinated between the administrations concerned and affected;

f) that interim systems shall not adversely affect the Plans nor hamper the implementation and evolution of the Plans;

g) that the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the appropriate Plan which are to be suspended;

h) that an interim system shall not be introduced without the agreement of all the administrations whose space and terrestrial services are considered to be affected;

resolves

that the administrations and the IFRB shall apply the procedure contained in the Annex to this Resolution;

recommends the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985

1. to consider and adopt the *resolves* part of this Resolution in order to apply it to all countries of Region 2;

2. to instruct the IFRB to publish the interim uses introduced in application of Resolution No. 1(Sat-R2) in a special section of its weekly Circular in order to enter them in the Interim List referred to in paragraph 11 of the Annex to this Resolution.

ANNEX TO RESOLUTION No. 2(Sat-R2)

1. An administration or a group of administrations may, after successful application of the procedure contained in this Annex, use an interim system during a specified maximum period not exceeding 12 years in order:

1.1 *for an interim system in the broadcasting-satellite service*

a) to use an increased e.i.r.p. in any direction relative to that appearing in the Plan provided that the power flux-density does not exceed the limits given in Annex 5 to Part I of the present Final Acts;

b) to use modulation characteristics [1] different from those appearing in the Annexes to the Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;

c) to change the coverage area by displacing boresight, or by increasing the major or minor axis or by rotating them;

d) to use a coverage area appearing in the Plan or a coverage area encompassing two or more coverage areas appearing in the Plan from an orbital position which shall be one of the corresponding orbital positions appearing in the Plan;

e) to use a polarization different from that in the Plan.

1.2 *for an interim feeder-link system*

a) to use an increased e.i.r.p. in any direction relative to that appearing in the Plan;

b) to use modulation characteristics [1] different from those appearing in the Annexes to the Plan and resulting in an increased probability of harmful interference or in a wider assigned bandwidth;

c) to change the feeder-link beam area by displacing boresight, or by increasing the major or minor axis or by rotating them;

d) to use a feeder-link beam area appearing in the Plan or a feeder-link beam area encompassing two or more feeder-link beam areas appearing in the Plan in relation to an orbital position which shall be one of the corresponding orbital positions appearing in the Plan;

e) to use a polarization different from that in the Plan.

[1] For example, modulation with sound channels frequency-multiplexed within the bandwidth of a television channel, digital modulation of sound and television signals, or other pre-emphasis characteristics.

2. In all cases, an interim system shall correspond to assignments in the Plan(s); the number of assignments to be used in an interim system shall not in any case exceed the number of assignments appearing in the Plan(s) which are to be suspended. During the use of an interim system, the use of the corresponding assignments in the Plan(s) is suspended; they shall not be brought into use before the cessation of use of the interim system. However, the suspended assignments, but not the interim system's assignments, of an administration shall be taken into account when other administrations apply the procedure of Article 4 of Part I or Part II of these Final Acts, as appropriate, in order to modify the Plan(s) or the procedure of this Annex in order to bring an interim system into use.

3. When an administration proposes to use an assignment in accordance with paragraph 1, it shall communicate to the IFRB the information listed in Annex 2 to Part I or Part II of these Final Acts as appropriate nor earlier than five years but, preferably, not later than twelve months before the date of bringing into use. The administration shall also indicate:

a) the maximum specified period during which the interim assignment is intended to remain in use;

b) the assignment(s) in the Plan(s) the use of which will remain suspended for the duration of use of the corresponding interim assignment;

c) the names of the administrations with which an agreement for the use of the interim assignment has been reached, together with any comment relating to the period of use so agreed and the names of administrations with which an agreement may be required but has not yet been reached.

4. An administration is considered to be affected:

4.1 *for an interim system in the broadcasting-satellite service*

a) if any overall equivalent protection margin of one of its assignments in the Plan, calculated in accordance with Annex 5 to Part I of these Final Acts, including the cumulative effect of all interim uses during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignment(s) (paragraph 3*b*), becomes negative or a former negative value is made more negative;

b) if it has a frequency assignment in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coodinated under the provisions of No. **1060** of the Radio Regulations, or which has been published in accordance with No. **1044** of the Radio Regulations or of paragraph 7.1.3 of Part I of these Final Acts and the appropriate limits of Annex 1 to Part I of these Final Acts are exceeded;

c) if, although having no frequency assignment in the broadcasting-satellite service in the channel concerned, it nevertheless would receive on its territory a power flux-density value which exceeds the limits given in Annex 1 to Part I of these Final Acts as a result of the proposed interim assignment;

d) if in countries of Region 1 having a frequency assignment to a space station in the broadcasting-satellite service with a necessary bandwidth any portion of which falls within the necessary bandwidth of the proposed assignment, and which is in accordance with the Plan contained in Appendix **30** to the Radio Regulations or in respect of which modifications have been published by the Board in accordance with the provisions of that Appendix and the appropriate limits of Annex 1 to Part I of these Final Acts are exceeded;

e) if it has a frequency assignment to a space station in the broadcasting-satellite service in the band 12.5 to 12.7 GHz in Region 3 with a necessary bandwidth any portion of which falls within the necessary bandwidth of the proposed assignment, and which:

– is recorded in the Master Register; *or*

– has been coordinated or is being coordinated under the provisions of Resolution No. **33** of the World Administrative Radio Conference, Geneva, 1979; *or*

– appears in a Region 3 plan to be adopted at a future administrative radio conference, taking account of modifications which may be introduced subsequently in accordance with the Final Acts of that Conference,

and the appropriate limits of Annex 1 to Part I of the present Final Acts are exceeded.

4.2 *for interim feeder-link systems*

a) if any overall equivalent protection margin of one of its assignments in the Plan, calculated in accordance with Annex 3 to Part II of these Final Acts, including the cumulative effect of all interim uses during the maximum specified period of use of the interim system, but excluding the corresponding suspended assignment(s) (paragraph 3.*b*), becomes negative or a former negative value is made more negative;

b) if it has a frequency assignment in the fixed-satellite service which is recorded in the Master Register or which has been coordinated or is being coordinated under the provisions of No. **1060** of the Radio Regulations and the appropriate limits of Annex 1 to Part II of these Final Acts are exceeded;

c) if it has a frequency assignment in the band 17.7 - 17.8 GHz to a terrestrial station, in use or intended to be brought into use within three years of the projected date of bringing into use of the feeder-link earth station, which is located within the coordination area of the feeder-link earth station concerned and the appropriate limits of Annex 1 to Part II of these Final Acts are exceeded;

5. The Board shall publish in a special section of its weekly circular the information received under paragraph 3, together with the names of the administrations it has identified in application of paragraph 4.

6. When the Board finds that the suspended assignment of an administration having an interim system is not affected, it shall examine the projected interim system with respect to the interim system of that administration and if there is an incompatibility, it shall request the two administrations concerned to adopt any measures that may enable the new interim system to be operated.

7. The Board shall send a telegram to the administrations listed in the special section of the weekly circular drawing their attention to the information it contains and shall send them the results of its calculations.

8. Any administration not listed in the special section which considers that its planned interim assignment may be affected shall so inform the administration responsible for the interim system and the Board, and the two administrations shall endeavour to resolve the difficulty before the proposed date of bringing the interim assignment into use.

9. An administration which has not sent its comments either to the administration seeking agreement or to the Board within a period of four months following the date of the weekly circular referred to in paragraph 5 shall be understood as having agreed to the proposed interim use.

10. On the expiry of four months following the date of publication of the weekly circular referred to in paragraph 5, the Board shall review the matter and, depending on the results obtained, shall inform the administration proposing the interim assignment that:

a) it may notify its proposed use under Article 5 of Part I or Part II of these Final Acts, as appropriate, if no agreement is required or the required agreement has been obtained from the administrations concerned. In this case the Board shall update the Interim List;

b) it may not bring into use its interim system before having obtained the agreement of the administrations affected, either directly or by applying the procedure described in Article 4 of Part I or Part II of these Final Acts, as appropriate, as a means of obtaining that agreement.

11. The Board shall include all the interim assignments in an Interim List in two parts, one each for the broadcasting-satellite service and the feeder-link assignments, and shall update it in accordance with this Annex. The Interim List shall be published together with the Plans but does not constitute part of them.

12. One year prior to the expiry of the interim period, the Board shall draw the attention of the administration concerned to this fact and request it to notify in due time the deletion of the assignment from the Master Register and the Interim List.

13. If, notwithstanding the reminders by the Board, an administration does not reply to its request sent in application of paragraph 12, the Board shall, at the termination of the interim period:

a) enter a symbol in the Remarks Column of the Master Register to indicate the lack of response and that the entry is for information only;

b) not take into account that assignment in the Interim List;

c) inform the administrations concerned and affected of its action.

14. Where an administration confirms the termination of the use of the interim assignment, the Board shall delete the assignment concerned from the Interim List and the Master Register. Any corresponding assignment in the Plan(s), suspended earlier, may then be brought into use.

15. An administration which considers that its interim system may continue to be used after the expiry of the interim period may extend it by not more than two years and to this effect shall apply the procedure described in this Annex.

16. Where an administration applies the procedure in accordance with paragraph 15, but was unable to obtain the agreement of one or more affected administrations, the Board shall indicate this situation by inserting an appropriate symbol in the Master Register. Upon receipt of a complaint of harmful interference, the administration shall immediately cease operation of the interim assignment.

17. Where an administration, having been informed of a complaint of harmful interference, does not cease transmission within a period of thirty days after the receipt of complaint, the Board shall apply the provisions of paragraph 13.

RESOLUTION No. 3(Sat-R2)

Relating to the Determination and Publication of Inter-System Interference Levels Associated with the Region 2 Broadcasting-Satellite Plan and its Associated Feeder-Link Plan

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that the Region 2 broadcasting-satellite Plan in Article 10 of Part I of these Final Acts specifies the frequencies, orbit positions, power levels, and beam characteristics of broadcasting-satellite service assignments;

b) that the feeder links associated with those broadcasting-satellite service assignments are similarly specified in Article 9 of Part II of these Final Acts;

c) that the technical data associated with these assignments are described in Annex 5 to Part I and Annex 3 to Part II of these Final Acts in sufficient detail to determine the individual and total interference levels between systems in the Plan;

d) that the set of computer programs used by the Conference is able to determine these interference levels;

e) that these interference levels take on a very significant role in the administration of the Plan, because the acceptability of non-standard systems and of modifications to the Plan depends on the interference levels caused by those systems;

f) that these interference levels are not explicitly a part of the Plans and their associated provisions;

g) that knowledge of these interference levels is required by administrations to develop their broadcasting-satellite systems and to determine the effect of systems of other administrations on their assignments;

resolves

1. that the IFRB provide administrations with the overall equivalent protection margins at each test point associated with the assignments of their service areas;

2. that the IFRB also identify to administrations assignments interfering with each of their assignments and related individual margins and their assignments individually causing interference to the assignments of other administrations and related individual margins [1];

3. that the IFRB shall use to that effect the technical parameters adopted by this Conference and the computer routines used at this Conference and modified to take into account the decisions of the Conference to calculate protection margins.

RESOLUTION No. 4(Sat-R2)

Relating to the Compatibility of the Plan for the Broadcasting-Satellite Service in Region 2 in the Band 12.2 - 12.7 GHz with Appendix 30 to the Radio Regulations

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that it has adopted a Plan for the broadcasting-satellite service in Region 2 in the band 12.2 - 12.7 GHz;

b) that Appendix **30** to the Radio Regulations stipulates that the Region 2 Plan adopted by this Conference shall not degrade the protection afforded to the frequency assignments in the Regions 1 and 3 Plan below the limits specified in Appendix **30** to the said Regulations (see footnote to paragraph 4.3.1.2);

c) that Resolution No. **700** of the World Administrative Radio Conference, Geneva, 1979 (WARC-79) stipulates that in the drawing-up of a plan (and any associated modification procedure) for the broadcasting-satellite service in Region 2, the requirements for satisfactory future operation of the fixed-satellite service in Regions 1 and 3 shall be observed and that, if contraints on the fixed-satellite service are considered necessary to ensure that no harmful interference is caused either to the fixed-satellite or the broadcasting-satellite services involved, they should not in any case be greater than those imposed on the fixed-satellite service in Region 2 by Appendix **30** to the Radio Regulations (see *resolves* 2 of Resolution No. **700**);

d) that Resolution No. **701** of WARC-79 stipulates that planning shall take into account the pertinent provisions of Appendix **30** to the Radio Regulations, in particular those contained in Annexes 4 and 5, as well as other decisions of the above-mentioned Conference (see *resolves* 2 of Resolution No. **701**);

e) that due to the limited time available to it, this Conference could not identify the incompatibilities, if any, with broadcasting-satellite stations in Regions 1 and 3 with regard to considering *b)* above or with other services in these Regions;

f) that during the elaboration of the Region 2 broadcasting-satellite service Plan, consideration was duly given to the need for protecting the systems of Regions 1 and 3;

[1] In order to minimize costs, administrations will be provided only with individual margins at a level of less than 15 dB for down-link assignments and 25 dB for feeder-link assignments.

g) that in the cases where it was not possible exactly to meet the limits specified in Appendix **30** to the Radio Regulations, the Region 2 administrations concerned stated their intention to seek the agreement of the countries of Regions 1 and 3 which may be affected;

h) that atmospheric absorption was not taken into account by this Conference in the analysis of the Region 2 Plan;

taking note

a) that during the World Broadcasting-Satellite Administrative Radio Conference, Geneva, 1977, the power flux-densities produced at territories of Region 2 countries from space stations of Regions 1 and 3 were calculated only with respect to one test point in Region 2 (35° W, 8° S);

b) that the results of such calculations show that there are 40 beams where the value of power flux-densities at that test point exceed the limit of -138 dB(W/m^2), the worst case being one where the calculated power flux-density was -127.77 dB(W/m^2);

resolves to request the IFRB

1. to modify the computer programs used by this Conference in order to include in them the atmospheric attenuation parameters in the bands 12.2 - 12.7 GHz and 17.3 - 17.8 GHz (see Resolution No. **9**(Sat-R2));

2. to communicate to each administration the details of calculations relating to its test points in the Region 2 Plan;

3. to publish a document indicating the overall equivalent protection margins to be used for the application of Article 4 of Part I;

4. to identify the countries of Regions 1 and 3 which may be affected by the assignments in the Region 2 Plan in accordance with the limits specified in Appendix **30** to the Radio Regulations;

5. to calculate, on request, and for information purposes, the power flux-density from the broadcasting-satellite space stations of Regions 1 and 3 produced at given test points in the territory of the administration(s) concerned of Region 2;

6. to communicate to administrations of Region 2 concerned and to the administrations of Regions 1 and 3 so identified the results of its calculations and to invite them to resolve the problem and to communicate to the IFRB the results of their negotiations;

7. to send at regular intervals reminders to those administrations which have not yet communicated the results of their negotiations;

8. to prepare for communication to the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985 (WARC-ORB (1)) a report containing the list of cases which have been identified, together with the indication of those which have been resolved;

recommends to WARC-ORB (1)

1. to consider the results obtained by the IFRB in application of this Resolution and, where an agreement cannot be reached, to apply the following provisional procedure to the countries affected in Regions 1 and 3:

   – to enter a remark against the Region 2 assignment concerned to indicate that this assignment should be brought into use only when such agreement is reached or adequate measures are adopted to reduce the power flux-density over Regions 1 and 3 to conform to limits specified in the Radio Regulations; and

2. to instruct the IFRB to delete this remark upon being informed that agreement has been reached.

RESOLUTION No. 5(Sat-R2)

Relating to the Review of the Use of the Band 12.2 - 12.7 GHz by the Terrestrial Services in Region 2

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) No. **844** of the Radio Regulations;

b) that the Conference had no information relating to terrestrial services which would permit it to determine the compatibility between existing and planned terrestrial services and the broadcasting-satellite service;

resolves

1. that all administrations using or intending to use frequency assignments to terrestrial stations in the band covered by the Plan shall decide, as soon as possible, (if necessary, with the assistance of the IFRB) whether or not these assignments will affect frequency assignments in conformity with the Plan;

2. that, if it is found that existing or planned broadcasting-satellite stations having frequency assignments in conformity with the Plan may be subject to interference, administrations shall inform the IFRB of the measures they intend to take to ensure the protection of the frequency assignments concerned before the date of entry into force of the Final Acts of the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985;

3. that administrations may continue to use frequency assignments which are not compatible with the Plan, provided that agreement is reached with the administrations whose broadcasting-satellite stations are affected;

4. that the administrations seeking agreement shall inform the IFRB of the terms of the agreement reached;

5. that, upon receipt of such information, the IFRB shall insert a symbol in the Remarks column of the Master Register indicating the duration specified in the agreement. The duration specified shall also be published in a special section of its weekly circular;

invites the IFRB

to assist administrations in implementing the provisions of this Resolution;

urges the administrations of Region 2

that, in addition to applying the procedure of Article 6 of Part I, of these Final Acts when planning new stations in the terrestrial services, administrations should give due consideration to their implementation in a manner which will not impose contraints on future modifications to the broadcasting-satellite systems by other administrations.

RESOLUTION No. 6(Sat-R2)

Relating to the Coordination Between Feeder-Link Earth Stations for the Broadcasting-Satellite Service and Receiving Fixed-Satellite Earth Stations in the Band 17.7 - 17.8 GHz

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that the band 17.7 - 18.1 GHz is allocated to the fixed-satellite service in both the Earth-to-space (feeder links for the broadcasting-satellite service) and the space-to-Earth directions (bi-directional use);

b) that Annex 4 to Part II of these Final Acts has utilized the latest CCIR studies together with Appendix **28** to the Radio Regulations in establishing a coordination area around a feeder-link earth station;

c) that the latest CCIR propagation data were used in the preparation of Annex 3 to Part I and Annex 4 to Part II of these Final Acts;

noting

a) that Resolution No. **60** of the World Administrative Radio Conference, Geneva, 1979 (WARC-79) invited the CCIR to study the propagation data in Appendix **28** to the Radio Regulations;

b) that neither Appendix **28** nor the related CCIR texts deal with the bi-directional sharing of a frequency band by earth stations in the fixed-satellite service;

c) that only a world administrative radio conference dealing with the fixed-satellite service appears competent to add to the Radio Regulations provisions dealing with bi-directional sharing procedures for fixed-satellite service earth stations;

invites the CCIR

to study sharing between earth stations of the fixed-satellite service in those frequency bands which are allocated on a bi-directional basis;

resolves

that Annex 4 to Part II of these Final Acts should be revised accordingly whenever provisions are added to the Radio Regulations dealing with bi-directional sharing between fixed-satellite service earth stations or whenever changes are made under Resolution No. **60** of WARC-79;

requests

that the Administrative Council then place on the agendas of the competent world administrative radio conferences the revisions to Annex 4 to Part II of these Final Acts referred to in *resolves* above.

RESOLUTION No. 7(Sat-R2)

Relating to the Sharing of the Band 17.7 - 17.8 GHz Between the Space and Terrestrial Services in Region 2

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that the 17.3 - 17.8 GHz band is allocated to the fixed-satellite service (Earth-to-space) for the exclusive use of feeder links to the broadcasting-satellite service;

b) that it adopted a feeder-link Plan in the band 17.3 - 17.8 GHz based on the recording in the Plan of the area in which the feeder-link earth stations may be located;

c) that the 17.7 - 17.8 GHz is also allocated on a primary basis to the fixed-satellite service (space-to-Earth) and to the terrestrial services;

d) that the equality of rights among services sharing the band 17.7 - 17.8 GHz should be reflected in the procedures adopted by this Conference;

e) that it was not possible to base the feeder-link Plan in the band 17.7 - 17.8 GHz on the exact locations of the feeder-link earth stations using characteristics given in Annex 3 to Part II of these Final Acts;

f) that administrations planning to use the terrestrial stations or the earth stations in the fixed-satellite service (space-to-Earth) should have the means to evaluate the interference that might be caused to their planned stations;

resolves to request the IFRB

1. to invite administrations to communicate the geographical coordinates of their planned feeder-link earth stations and any other technical characteristics that they may consider appropriate in the band 17.7 - 17.8 GHz;

2. to prepare a report to the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985 on this matter.

RESOLUTION No. 8(Sat-R2)

Relating to the Incorporation in the Radio Regulations of the Provisions and Associated Plan for the Broadcasting-Satellite Service in the Band 12.2 - 12.7 GHz in Region 2

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that the provisions and associated Plan prepared by this Conference are applicable in Region 2 subject to their adoption and their incorporation in the Radio Regulations by the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985 (WARC-ORB (1));

b) that it may be useful if the provisions relating to the broadcasting-satellite service in the three Regions were contained in the same Appendix to the Radio Regulations;

c) that for lack of time, this Conference was not able to prepare a consolidated text of Appendix **30** to the Radio Regulations incorporating the provisions and associated Plan for the broadcasting-satellite service in the band 12.2 - 12.7 GHz in Region 2 in the corresponding provisions and associated Plans for the broadcasting-satellite service in the band 11.7 - 12.5 GHz in Region 1 and the band 11.7 - 12.2 GHz in Region 3;

instructs the Secretary-General

1. to prepare in the appropriate form a draft consolidated text containing the provisions and associated Plans for the broadcasting-satellite service in the band 11.7 - 12.5 GHz for Region 1 and in the band 11.7 - 12.2 GHz for Region 3 as appearing in Appendix **30** to the Radio Regulations and the provisions and associated Plan for the broadcasting-satellite service in the band 12.2 - 12.7 GHz for Region 2 as appearing in the Final Acts of this Conference;

2. to send this draft consolidated text to all administrations not later than twelve months before the opening of WARC-ORB (1), inviting them to give their comments on the text as prepared;

3. to publish as a conference document of WARC-ORB (1) at least six months before the opening of that Conference the text as prepared along with any comments on that text which may have been received from administrations.

RESOLUTION No. 9(Sat-R2)

Relating to Consideration of the Use of Atmospheric Absorption

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that Annexes 1 and 4 to Appendix **30** to the Radio Regulations contain criteria for interregional coordination which are to be met assuming free space propagation attenuation;

b) that this Conference has developed interregional criteria based upon the principle of reciprocity and contained particularly in Annexes 1 and 4 to Parts I and II of the Final Acts;

c) that these Annexes specify that calculations should be based on clear sky atmospheric conditions;

d) that CCIR Report 719-1 provides information on atmospheric absorption;

and noting

a) that atmospheric absorption can provide additional interregional protection;

b) that this Conference is not competent to amend Appendix **30** to the Radio Regulations;

resolves

1. that the next world administrative radio conference competent to modify Appendix **30** to the Radio Regulations shall consider the matter of including the effects of atmospheric absorption;

2. that until then, in Annexes 1 and 4 to Parts I and II of the Final Acts of this Conference, free space propagation attenuation shall be assumed as a general rule;

3. that until then, the administrations in Regions 1 and 3 are encouraged to use atmospheric absorption on a basis of reciprocity with Region 2 countries for calculations related to interregional coordination;

requests the IFRB

to make the above suggestion to the administrations concerned and to draw their attention to the additional interregional protection than can be afforded by the consideration of atmospheric absorption.

RECOMMENDATION No. 1(Sat-R2)

Relating to the Incorporation into the Radio Regulations of the Provisions and Associated Plans for the Broadcasting-Satellite Service in the Band 12.2 - 12.7 GHz and for Associated Feeder Links in the Band 17.3 - 17.8 GHz in Region 2 and the Recording of the Assignments contained in the Plans in the Master International Frequency Register

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that the provisions and associated Plans prepared by the present Conference are applicable in Region 2 subject to their adoption and their incorporation into the Radio Regulations by the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985 (WARC-ORB (1));

b) that it may be useful that provisions relating to the broadcasting-satellite service in the three Regions be contained in the same Appendix to the Radio Regulations;

recommends the WARC-ORB (1)

1. to incorporate into the Radio Regulations in the appropriate form the provisions and associated Plans prepared for the broadcasting-satellite service in the band 12.2 - 12.7 GHz and for associated feeder links in the band 17.3 - 17.8 GHz in Region 2 without modifying them;

2. to instruct the IFRB to record in the Master International Frequency Register the assignments appearing in the two Plans;

3. to consider the possibility of combining the Annexes to Appendix **30** to the Radio Regulations with those to Part I of these Final Acts.

RECOMMENDATION No. 2(Sat-R2)

Relating to the Application to Regions 1 and 3 of the Limits Adopted for Region 2 with a View to the Application of Articles 11 and 13 of the Radio Regulations to the Fixed-Satellite Service in the Band 17.7 - 17.8 GHz

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that it has adopted, in Article 7 of Part II of these Final Acts, provisions for the application of Articles **11** and **13** of the Radio Regulations to the fixed-satellite service in Region 2 in the band 17.7 - 17.8 GHz with limits different from those appearing in Appendix **29** to the Radio Regulations;

b) that it would simplify the coordination procedures among countries of the three Regions if the same criteria were applied in the three Regions;

recommends the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985

to adopt the draft Resolution annexed to this Recommendation.

ANNEX TO RECOMMENDATION No. 2(Sat-R2)

DRAFT RESOLUTION

Relating to the Application to Regions 1 and 3 of the Limits Adopted for Region 2 with a View to the Application of Articles 11 and 13 of the Radio Regulations to the Fixed-Satellite Service in the Band 17.7 - 17.8 GHz

The World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of the Space Services Utilizing It (First Session, Geneva, 1985),

considering

a) that the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983, has adopted, in Article 7 of Part II of its Final Acts, provisions for the application of Articles **11** and **13** of the Radio Regulations to the fixed-satellite service in Region 2 in the band 17.7 - 17.8 GHz with limits different from those appearing in Appendix **29** to the Radio Regulations;

b) that it would simplify the coordination procedures among countries of the three Regions if the same criteria were applied to the three Regions;

resolves

that administrations and the IFRB shall apply to stations in the fixed-satellite service in the band 17.7 - 17.8 GHz the procedures contained in Articles **11** and **13** of the Radio Regulations and in Appendix **30** to the Radio Regulations together with those in Annex 4 to Part II of the Final Acts of the Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983.

RECOMMENDATION No. 3(Sat-R2)

Relating to Interregional Problems of Sharing Between Region 2 Broadcasting-Satellite Service Space Stations and Certain Terrestrial Services in Region 1 East of 30° East Longitude in the Band 12.2 - 12.7 GHz

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that the present Conference considered the matter of interregional sharing criteria and adopted appropriate values where possible;

b) that regarding the possibilities of sharing between the Region 2 broadcasting-satellite service and certain fixed terrestrial services in the eastern part of Region 1, the CCIR Report to the Conference included proposed power flux-density limits, identified geographical areas where these limits could not be met without the use of special techniques and recommended bilateral discussions between the administrations most directly concerned;

c) that the question could not be resolved, since not all the parties most directly affected attended this Conference;

requests the IFRB

to draw the attention of the administrations concerned in Region 1 to the above-mentioned problems of sharing with some administrations in Region 2 in the band 12.2 - 12.7 GHz;

recommends

1. that the administrations concerned initiate and continue discussions of the problems on a bilateral basis with a view to their solution;

2. that the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985 (WARC-ORB (1)) take such action on the matter as may be necessary;

invites the CCIR

to continue its study of this question as a matter of urgency with a view to including appropriate conclusions in the Conference Preparatory Meeting Report to the WARC-ORB (1).

RECOMMENDATION No. 4(Sat-R2)

Relating to the Limitation of Power and the Direction of Maximum Radiation for Stations of the Fixed and Mobile Services in the Band 17.3 - 17.8 GHz

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that the band 17.3 - 17.8 GHz has been used for the planning of feeder links for the broadcasting-satellite service by the present Conference;

b) that, unlike the maximum values of equivalent isotropically radiated power (e.i.r.p.) specified for frequency bands between 1 and 10 GHz (No. **2502** of the Radio Regulations) and those between 10 and 15 GHz (No. **2503** of the Radio Regulations), there are no restrictions as to the direction of maximum radiation in the frequency bands above 15 GHz;

c) that No. **2504.1** of the Radio Regulations nevertheless specifies that when the CCIR makes a Recommendation as to the need for restrictions in frequency bands specified in No. **2511** of the Radio Regulations, administrations should as far as practicable observe them;

d) that Resolution No. **101** of the World Administrative Radio Conference, Geneva, 1979 recognizes the need for study and determination, as a matter of urgency by the CCIR, of suitable criteria applicable to sharing between the fixed and mobile services and the feeder links to broadcasting satellites;

noting

a) that this Conference did not have sufficient data to adopt a definite limit of the e.i.r.p. for stations of the fixed and mobile services directed towards the geostationary-satellite orbit;

b) that this Conference can adopt regulations of this nature applicable only to countries in Region 2 but has no authority to adopt similar values applicable to countries in Regions 1 and 3;

c) that nevertheless there is a distinct possibility of stations in the fixed and mobile services in Regions 1 and 3 directing their transmissions towards that part of the geostationary-satellite orbit for which plans have been adopted by this Conference;

d) that only a competent world administrative radio conference can resolve this question on a world-wide basis;

recommends that the CCIR

continue its study on an urgent basis with a view to recommending a definite value for consideration by the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985.

RECOMMENDATION No. 5(Sat-R2)

Relating to Protection Ratios Between Television Systems of Different Standards and Bandwidths

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that in planning the broadcasting-satellite service and its associated feeder links, account must be taken of the protection ratios between television systems of different standards and bandwidths;

b) that technical data will be required to enable the First and Second Sessions of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It to revise the Radio Regulations;

c) the studies being pursued by the CCIR under the appropriate Questions and Study Programmes;

invites the CCIR

1. to continue the study of the protection ratios for television systems and, in particular, to provide further information on the protection ratios between television systems of different standards and bandwidths;

2. to submit as much information as possible on this item to the First and Second Sessions of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It.

RECOMMENDATION No. 6(Sat-R2)

Relating to the Need for Additional Propagation Studies in High-Rainfall Zones of Region 2

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

a) that the propagation of radio waves at frequencies above 10 GHz plays an important role in planning broadcasting-satellite services;

b) that information on rain attenuation is mostly based on propagation data from CCIR texts;

c) that the CCIR is carrying out studies on rain attenuation at frequencies above 10 GHz;

d) that there is a need for studies and propagation measurements in some parts of Region 2, particularly in rain climatic zones M, N and P, which could result in an improvement of the method for calculating rain attenuation;

taking into account

that Annex 5 to Part I and Annex 3 to Part II of these Final Acts indicate, on the basis of the relevant CCIR Recommendations, the method to be used for calculating the rain attenuation exceeded for 1% of the worst month;

invites the CCIR

to accelerate its studies on rain attenuation in tropical and equatorial zones of Region 2, including the relationship between worst month and annual distributions, and extend them, in particular, to zones with the greatest rain intensity;

recommends administrations of Region 2

1. to participate actively and collaborate in the proposed studies and to make available their observations;

2. to make use of the latest available method and data in estimating rain attenuation in setting up their broadcasting-satellite systems with a view to ensuring that satellite transmission powers are no higher than necessary for achieving effective coverage of their respective service areas at the service quality levels laid down in the Plans and their annexes, at the same time meeting the requirements of the other parameters and objectives contained in the Region 2 Plans.

RECOMMENDATION No. 7(Sat-R2)

Relating to the Interpretation of Terms "Allotment" and "Assignment"

The Regional Administrative Conference for the Planning of the Broadcasting-Satellite Service in Region 2, Geneva, 1983,

considering

that a number of difficulties have been encountered in interpreting Nos. **18** and **19** of Article 1 of the Radio Regulations concerning the terms "allotment" and "assignment" respectively, with regard to their application to plans produced by regional or world conferences;

recommends

that the First Session of the World Administrative Radio Conference on the Use of the Geostationary-Satellite Orbit and the Planning of Space Services Utilizing It, Geneva, 1985, should interpret the terms "allotment" and "assignment" clearly and unequivocally.

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