

Spectrum Management

Client Procedures Circular

# **Information Requirements Relating to Advance Publication of Information on a Planned Satellite Network**

Client Procedures Circulars describe the various procedures or processes to be followed by the public when dealing with Industry Canada. The information contained in these circulars is subject to change without notice. It is therefore suggested that interested persons consult the nearest district office of Industry Canada for additional details. While every reasonable effort has been made to ensure accuracy, no warranty is expressed or implied. As well, these circulars have no status in law. Additional copies of this or other circulars in the series are available from any office of the Department.

Comments and suggestions may be directed to the following address:

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Radio Regulatory Branch  
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Ottawa, Ontario  
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Attention: DOSS

## Principle

To specify the technical characteristics required for the completion of Forms of Notice AP4-1, -2, -3 and -4 at the advance publication stage, with respect to a planned satellite network for submission to the Radiocommunication Bureau (formerly the IFRB) of the International Telecommunication Union (ITU).

## Mandate

The Department, in discharging its obligations under the Convention of the ITU and the Regulations, requires adherence to the provisions therein that apply to the international coordination and notification of satellite networks eligible for licensing in Canada.

## Policy

Before issuing a licence in accordance with the *Radiocommunication Act*, the Department will ensure that domestic licensing requirements, and domestic and international coordination requirements have been met.

## Procedure

This procedure is in compliance with the provisions of the ITU *Radio Regulations*. It is based on IFRB Circular-letter No. 839 and is intended to provide guidance regarding the technical characteristics considered essential for inclusion in the specifications for a satellite network to be submitted to the Radiocommunication Bureau of the ITU at the advance publication stage. Submission of incomplete forms to the Radiocommunication Bureau would delay the completion of the coordination/notification process that is compulsory under the ITU *Radio Regulations* for planned frequency assignments. Successful completion of this process is a prerequisite for registration of frequency assignments in the Master International Frequency Register (MIFR) and thus their protection from harmful interference.

## Introduction

Forms of Notice AP4 were developed by the Radiocommunication Bureau in accordance with the decisions of ORB-88. They are aimed at facilitating automated data capture and accurate reconstruction of the satellite links fundamental in assessing the potential for unacceptable interference among frequency-sharing satellite networks at the early stage of advance publication regarding networks in the coordination notification process.

## General

Forms of Notice AP4 are to be used in connection with advance publication regarding a satellite network. The individual forms are:

Form AP4-1	General Characteristics of the Satellite Network
Form AP4-2	Satellite Network Characteristics in the Earth-to-Space Direction
Form AP4-3	Satellite Network Characteristics in the Space-to-Earth Direction
Form AP4-4	Overall Link Characteristics

Information items/data fields on the notice forms have been organized into sections B, C, D, and E, corresponding to sections B to E of Appendix 4 of the ITU *Radio Regulations*.

Related data items are grouped together in a box, for example, Form AP4-2 contains a box labelled "Emissions and Power Characteristics" (of the associated transmitting station(s)). It is possible to specify six different emissions with their associated power characteristics in this box. If there are more emissions, additional forms of the same type may be used to provide additional data. If additional forms are used, an "X" should be placed in the box labelled "More emissions on next page". This procedure should be followed in all cases where there is too much information for the space allotted in the box.

For any one notification, one AP4-1 form should be used, with as many of the AP4-2, AP4-3 and AP4-4 forms as are necessary to provide all the relevant details for all the satellite antenna beams concerned.

When Form AP4-4 is used, the data must be indicated in two lists; the serial number will serve as a cross-reference between the two lists. If the strapping data provided in Table E1 is put in the right order, it should be possible to keep the length of the list in Table E2 to a minimum. In other words, strapping details in Table E1 should be grouped in such a way that a group applies to one earth station, with one set of values for columns a1/a2 and b1/b2 in Table E2.

Form AP4 can be used not only to provide data pertaining to a new network, but also to modify or suppress data pertaining to an existing network for which information has already been published in a Special Section AR11/A. An "X" must be placed in the relevant box

"ADD", "MOD" or "SUP" in the area labelled "Notification intended for" found in the top right-hand corner of Form AP4-1. In the case of a modification of a network about which information has already been published, and where certain data fields are to be added, modified or suppressed, *all* the data in the particular box as they would look after the change have to be provided. In addition, when the corresponding beam or associated station is being added, modified or suppressed, the information must be indicated by entering "A", "M", or "S" respectively in the field provided for this purpose at these levels.

For data items where this flag is *not* provided, when changes are to be notified, provide *all* the data in the box as they would look after the change.

Certain information has to be provided in graphical form by means of an attachment. When an attachment is necessary, its figure number should be indicated in the appropriate boxes provided on the form. Instructions for presentation of graphical data are given in CPC-2-6-05 *The Presentation of Graphical Data Required under Appendices 3 and 4 of the International Telecommunication Union Radio Regulations*.

## 1. Instructions for Completing Form of Notice AP4-1

### *Satellite Network*

#### Reference

Date (Day/Month/Year)	A date given by the notifying administration for its own use. Indicate the day, month and year, in that order, using two digits for each.
Administration serial number	A serial or reference number given by the administration for its own use.
Page 1 of ...	Use this box to indicate the total number of pages for the notification of which this is the first page.
Notifying administration	The country symbol designating the notifying administration and the symbol designating the international satellite system, if appropriate (see Tables B1 and B2 of the Preface to the IFL (International Frequency List)). If there is no symbol in Table B2 that corresponds to the international satellite system concerned, the name must be spelled out in the accompanying letter. The Bureau will issue a symbol.
RR1042 Advance publication	Enter "X" in the appropriate box to indicate why the form is being submitted.
RR1047A Request for assistance of the Radiocommunication Bureau	Enter "X" in the appropriate box to indicate why the form is being submitted.
Notification intended for ADD/MOD/SUP	Enter "X" under "ADD" if the notice relates to a new satellite network; otherwise leave blank. Enter "X" under "MOD" if the notice relates to the modification of a satellite network for which information has already been published in a Special Section AR11/A; otherwise leave blank. Enter "X" under "SUP" if the notice relates to the suppression of an <i>entire</i> satellite network for which information has already been published in a Special Section ARR11/A; otherwise leave blank.

Radiocommunication  
Bureau  
identification  
no. of network to  
be  
modified/suppressed

If "X" is entered in the box labelled "MOD" or "SUP", enter the identification number of the network on which information already published is to be modified or suppressed. In any case, the administration has to provide all the data specified in Part B in order to confirm the identification of the network.

*B. Characteristics of the Network*

- |  |   |
|--|---|
| 1. Name of the space station (identity of the satellite network)               | Enter the name of the space station, using not more than 20 characters.   |
| 2. Date of bringing into use   | Indicate the date by which the satellite network is initially expected to be operational. Indicate the day, month and year, in that order, using two digits for each.   |
| Reference to previous Special Section number AR11/A/---- (if network modified) | If applicable, enter the number of the Special Section of the weekly Circular in which the advance information was published under Section I of Article 11.   |
| 3a. Administrations in group   | Using symbols from Table B1 of the Preface to the IFL, indicate the administrations forming the group submitting the advance information.   |
| 3b. Operating agency or company  | Using symbols from Table 12A/12B of the Preface, indicate the operating agency or company, and the postal and telegraphic addresses of the administration to which urgent messages should be sent regarding interference, quality of emissions, and matters relating to the technical operation of the stations (see Article 22 of the <i>Radio Regulations</i> ). If there is no symbol in Tables B1 or 12A/12B of the Preface to the IFL corresponding to the administrations or agency concerned, spell out the name in the accompanying letter, referring to Box 3a, 3b or 3c, as applicable, and the Bureau will provide the symbol. |
| 3c. Administration responsible for the station                                 |   |



4. *Orbital Information*

4a. *For Geostationary Satellites Only*

- 4a1.                    Nominal orbital longitude                    Enter the nominal orbital longitude of the space station expressed in decimal degrees E or W: the value should not exceed 180°.
- 4a2.                    Longitudinal tolerance                    Enter the planned longitudinal tolerances in decimal degrees relative to the nominal orbital longitude. The boxes headed "To West" and "To East" should both be completed: they are provided in order to cover cases in which tolerances are not symmetrical.
- 4a3.                    Inclination excursion                    Enter the inclination excursion (expressed in decimal degrees) expected throughout the lifetime of the space station (i.e., the *maximum* angle between the plane containing the orbit and the plane of the Earth's equator).
- 4a4.                    Visibility arc                    Enter the extreme west and east longitudinal positions (expressed in decimal degrees) on the geostationary-satellite orbit that are visible from all points in the service area and that are at an elevation angle of 10° from the furthest-removed points within the service area. These two longitudes delineate a portion of the geostationary-satellite orbit arc within which a satellite will always have an angle of wave arrival on the Earth's surface of  $\geq 10^\circ$  and will thus, from a propagation point of view, be able to provide an adequate quality of service to the area. In some cases, such as service areas at high latitudes or in very large service areas, the visibility arc may be zero, since the service area may include points on the Earth's surface at which the wave arrival angle is less than 10°.
- 4a5.                    Service arc                    Enter (expressed in decimal degrees) the longitudes of the western and eastern extremes of the arc of the geostationary-satellite orbit within which the space station could provide the required service to all its associated earth stations in the service area(s).

- 4a6. Reason for service arc being less than visibility arc attached.
- This information must be attached to the form if the assignment is to a space station on board a geostationary satellite operating with earth stations and the service arc (Box 4a5) is less than the visibility arc (Box 4a4). If the attachment is provided, enter its number in the box, and provide the reasons for which the service arc is less than the visibility arc. This reason may, for example, be one of the following:
- S the space station is on board a satellite with another space station whose orbital position was established by a plan or is restricted by other conditions;
  - S the design of the space station antenna system is too complex to permit large variations in the satellite position;
  - S the time of day of the satellite eclipse is important; or
  - S specific propagation conditions may require a higher signal arrival angle at the earth station.

*4b. For Non-Geostationary Satellites Only*

- 4b1. Inclination angle
- Enter the acute angle (expressed in decimal degrees) of the inclination of the orbital plane relative to the equatorial plane of the Earth.
- 4b2. Period
- Enter the time elapsing between two consecutive passages of the satellite through a characteristic point on its orbit expressed in days and hours (symbol D), or in hours and minutes (symbol H) (see RR178).
- 4b3. Apogee  
4b4. Perigee
- Enter the altitude of the apogee (4b3) or perigee (4b4), expressed in kilometres above a specified reference surface serving to represent the surface of the Earth or of the reference celestial body (see RR179).
- 4b5. Celestial body
- Leave this blank if the attracting celestial body which primarily determines the motion of the satellite is the Earth; otherwise indicate the body concerned by using the symbols:
- L for Moon
  - J for Jupiter
  - M for Mars
  - V for Venus
  - S for Sun
- Indicate any other celestial body by describing the body in the box labelled "Remarks" on Form AP4-2, cross-referencing Box 4b5.

4b6. Number of  
satellites

Enter the total number of satellites having  
the same radio frequency characteristics and  
the same notified orbital characteristics used  
for the given service.

## 2. Instructions for Completing Form of Notice AP4-2

### C. Satellite Network Characteristics in the Earth-to-Space Direction

Separate forms are to be used for each beam. Each of these forms has to be complemented by the relevant information on Form AP4-1.

Page .. of ..                      The page number, together with the total number of pages of the notice form as given on Form AP4-1. As Form AP4-1 is page 1, the first of the Forms AP4-2 will be page 2.

### Satellite Receiving Antenna Beam Details

#### 5. Characteristics of the Beam

ADD/MOD/SUP  
of the beam                      If, in the context of a modification of data pertaining to a satellite network for which information has already been published, a beam is to be added, modified or suppressed, enter "A", "M" or "S", whichever applies.

5b.  
Receiving beam  
designation                      In the case of a space station on board a geostationary satellite, enter the receiving beam designation, using a symbol consisting of up to three characters. For practical reasons, there are different approaches to beam designation. The symbol may consist of:

(a) numbers, such as 1, 2 and 3, which refer to the number of the figure showing the corresponding antenna gain contour;

(b) numbers, such as 195, which identify a beam having a maximum gain of 19.5 dB; or

(c) up to three letters (or a letter and a figure), which is used to represent the abbreviated beam name, such as G for global, NWQ for North West Quadrant, WH for West Hemisphere, Z1 for zone 1, or O for omnidirectional.

For steerable beams, the last character shall always be the letter "R"

Old beam designation  
(if changed)                      If the receiving beam designation is changed, indicate the old beam designation.

*Antenna Characteristics*

- c1/d1/f1.                    Enter the appropriate sign (+ or -) followed  
Maximum                    by the isotropic gain ( $G_i$ : see RR154) of the  
isotropic                    antenna in the direction of maximum radiation,  
gain                            expressed in dBi.
- g.                    Polarization<sup>1</sup>            If the assignments associated with this beam  
are to a space station on board a  
geostationary satellite and polarization  
discrimination is intended to be used as a  
basis for effecting coordination with another  
administration, enter the symbol for the type  
of polarization (see symbols for the type of  
polarization in Table 9D1 of the Preface to  
the IFL).
- c2/d2.                    Provision of this attachment is obligatory if  
Antenna gain                the assignments associated with this beam are  
contours diagram            to a space station on board a geostationary  
attached.                    satellite which is operating with earth  
See Figure No.                stations. Enter a figure number identifying  
the presence of such an attachment and on this  
attachment indicate the designation of the  
satellite beam, the maximum isotropic antenna  
gain and the gain contours plotted on a map of  
all the Earth's surface visible from the  
satellite, 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 contours which correspond  
to a gain of 2, 4, 6, 10 and 20 dB below the  
maximum isotropic gain, and at 10 dB intervals  
thereafter as necessary, are also to be  
indicated. Whenever possible in the case of  
circular or elliptical contours, the gain  
contours of the space station antenna should  
also be provided by a set of numerical  
equations. The gain contours should take into  
account the antenna pointing error so that the  
worst-case interference situation may be  
identified. If the error is not included, it  
should be specified in the attachment. This  
attachment can also be used to convey  
information about service area(s).  
Instructions for the presentation of graphical  
data are given in CPC-2-6-05 *The Presentation  
of Graphical Data Required under Appendices 3  
and 4 of the International Telecommunication  
Union Radio Regulations*. The antenna gain  
contours diagram can be replaced (when  
applicable) by a statement indicating that the  
maximum antenna gain varies by less than 2 dB  
over the whole visible part of the Earth.

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<sup>1</sup> Provide this information only if available.

e/f2. Antenna radiation pattern diagram attached. See Figure No.

Provision of this attachment is obligatory if the assignments associated with this beam are to a space station on board a geostationary satellite and the antenna beam is directed towards another satellite, or if it is to a space station on board a non-geostationary satellite. If the attachment is provided, enter a figure number identifying its presence. Define the antenna radiation pattern by means of a table, a diagram or a set of numerical equations giving the isotropic gain in dBi as a function of the angular separation in all directions from the maximum beam axis. A basic distinction in presenting this data should be made regarding the maximum isotropic antenna gain and the side-lobe radiation. For high gain antennas sufficient data (say in 0.1-degree steps) should be provided for off-axis angles less than 1 degree, whereas for off-axis angles greater than 50 degrees the radiation pattern is rather flat, and a much lower definition could suffice. On the other hand, for low gain antennas less data is necessary around 1 degree, and more data may be needed for the region of off-axis angle greater than 40 degrees. In general, the radiation pattern is assumed to be rotationally symmetrical and should be an envelope of peaks for all 360 degrees in a plane; however, some antennas are designed with null in predetermined directions in order to reduce interference and this should also be indicated with sufficient clarity and identification of the plane. If available, indicate the actual measured radiation pattern (relative to isotropic), rather than the reference radiation pattern. For rotationally non-symmetrical patterns, the diagram should be presented for the most important directions, such as that of the geostationary-satellite orbit.

- h. Estimated antenna gain diagram vs orbit longitude attached.  
See Figure No.
- Provision of this attachment is obligatory if the assignments associated with this beam are to a space station on board a geostationary satellite and in a frequency band allocated for bi-directional use (i.e., Earth-to-space and space-to-Earth). If the attachment is provided, enter a figure number identifying its presence. The information to be provided is the estimated isotropic antenna gain in dBi towards the geostationary-satellite orbit, in directions which are not obstructed by the Earth, by means of a table or diagram of antenna gain against orbit longitude from 0 to 360 degrees. Instructions for the presentation of graphical data are given in CPC-2-6-05 *The Presentation of Graphical Data Required under Appendices 3 and 4 of the International Telecommunication Union Radio Regulations*.

*Information to Be Provided for this Receiving Antenna Beam*

- |   |  |
|---|--|
| 2a. Class of station  | Indicate the appropriate class of station and the nature of service using the symbols given in Tables 6A1 and 6B1 respectively of the Preface to the IFL.  |
| 2b. Nature of service   | 2b information is a basic characteristic only for stations of the fixed-satellite and mobile-satellite services.   |
| 6. Receiving system noise temperature (kelvins)                   | Enter the lowest total receiving system noise temperature, expressed in kelvins, at the output of the space station receiving antenna.   |
| Period of validity (years)  | If the assignments associated with this beam are to a space station on board a geostationary satellite, enter the period of validity of the assignment expressed in years (see Resolution No. 4 of WARC-ORB-88); otherwise leave blank.  |
| 1. Service area; or Service area diagram attached. See Figure No. | The service area can be defined either by the country symbols or geographical area symbols (see Table B1 of the Preface to the IFL), or graphically by the service area diagram in an attachment. If the attachment is provided, enter a figure number identifying the presence of the attachment. A graphical presentation of the service area can be provided on the same diagram as the antenna gain contours; in this case, the figure number would be the same for both applications. |

*3/Fb. Frequency Range Within Which the Carriers Will Be Located*

- |  |  |
|--|--|
| ADD/MOD/SUP of the frequency range   | If, in the context of a modification to data pertaining to a satellite network for which information has already been published, a frequency range is to be added, modified or deleted, enter "A", "M" or "S" as appropriate.          |
| 2. Frequency: FROM... TO...  | Enter the range's lower (FROM) and upper (TO) frequencies expressed in kHz up to 28 000 kHz inclusive, in MHz above 28 000 kHz to 10 500 MHz inclusive, and in GHz above 10 500 MHz, and enter letter "K", "M" or "G", as appropriate. |
| Radiocommunication Bureau identification number for modification/suppression | If an ADD/MOD/SUP box contains an "M" or "S", enter the Radiocommunication Bureau identification number of the satellite network on which information already published is to be modified or suppressed, as appropriate.               |



*Information Related to the Associated Transmitting Station(s):*

*Emissions and Power Characteristics*

- |         |   |   |
|---------|---|---|
| 7/4a3.  | Necessary bandwidth; or<br>Fc/G2a.                                      | Indicate the necessary bandwidth (RR146) and/or class of emission (RR133), as appropriate, in accordance with Article 4 and Appendix 6 of the <i>Radio Regulations</i> .  |
|         | Designation of emission <sup>1</sup>                                    |   |
| 4a2/4c. | Total peak power <sup>1</sup>   | Enter the appropriate sign (+ or -) and the value of the total peak envelope power (RR151) expressed in dBW for the corresponding emission.   |
| 4a1.    | Maximum power density   | Enter the appropriate sign (+ or -) followed by the value of the maximum power density per Hertz (expressed in dBW/Hz) supplied to the input of the antenna averaged over the worst 4 kHz band for carriers below 15 GHz, or averaged over the worst 1 MHz band for carriers above 15 GHz. For narrow-band carriers with a necessary bandwidth (RR146) less than the reference bandwidth (4 kHz or 1 MHz), the peak power should be averaged over the reference bandwidth to obtain this value of maximum power density. The most recent version of CCIR Report 792 should be used to the extent applicable in calculating the maximum power density per Hertz. |
| 4d.     | Minimum carrier power <sup>1</sup>                                      | Enter the appropriate sign (+ or -) followed by the value of the minimum carrier power (expressed in dBW) delivered to the antenna of the earth station for narrow-band carriers.   |
| Fd/G2b. | Space/Earth station E.I.R.P. <sup>1</sup>                               | Enter the appropriate sign (+ or -) followed by the nominal equivalent isotropically radiated power(s) (E.I.R.P.) on the beam axis, or earth station E.I.R.P. for each type of carrier associated with each type and diameter of earth station antenna, expressed in dBW.   |
| 8.      | Modulation characteristics attached. <sup>1</sup><br>See attachment No. | If available, in the case of television carriers, indicate in separate numbered attachments the characteristics of energy dispersal, such as the peak-to-peak frequency deviation (MHz) and the sweep frequency (kHz) of the energy disposal waveform. Enter attachment numbers in the boxes provided.  |

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<sup>1</sup> Provide this information only if available.

*F. Space Station*

*Characteristics of Transmitting Space Station for Space-to-Space  
Relays*

- |   |   |
|---|---|
| ADD/MOD/SUP<br>of the station   | If, in the context of a modification to data pertaining to a satellite network for which information has already been published, a station is to be added, modified or deleted, enter "A", "M" or "S" as appropriate.   |
| a. Space station<br>name  | Identify the associated transmitting space station with which communication is to be established, by providing its name if it is on board a geostationary satellite or by providing the name of the system to which it belongs if it is on board a non-geostationary satellite. |
| G2c. Telecommand<br>information<br>attached. <sup>1</sup> See<br>Attachment No. | Provide technical description and system parameters of telecommand (except for coding data) in a separate, numbered note.   |

*Earth Station*

- |  |  |
|--|--|
| ADD/MOD/SUP<br>of the station              | If, in the context of a modification to data pertaining to a satellite network for which information has already been published, a station is to be added, modified or suppressed, enter "A", "M" or "S" as appropriate. |
| Designation of<br>typical earth<br>station | Enter the designation of a typical earth station, using not more than 20 characters, identifying its standard name, for example: TYPICAL C.  |
| 4b1. Radiation<br>pattern                  | Indicate the reference radiation pattern, preferably by means of the following symbols or similar symbols not exceeding 12 characters.   |

<b>Symbol</b>	<b>Description of the radiation pattern</b>
REC-465	Current version of CCIR Recommendation 465: "Reference earth station radiation pattern for use in interference assessment in frequency range from 2 to about 30 Ghz."

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<sup>1</sup> Provide this information only if available.

REC-580	Current version of CCIR Recommendation 580: "Radiation diagrams for use as design objectives for antennas of earth stations operating with geostationary satellites."
AP28	Point 4, Annex II to Appendix 28. <b>Note:</b> This radiation diagram is identical to that in Annex III to Appendix 29.
29-25LOG(FI)	Represents a reference radiation pattern similar to that in CCIR Recommendation 465, with side-lobe radiation reduced by 3 dB.
27-25LOG(FI)	As above with side-lobe radiation reduced by 5 dB.
ND	Quasi-omnidirectional radiation pattern with the maximum isotropic gain stated in 9a.
4b2. Antenna radiation diagram attached. See Figure No.	If a reference radiation pattern cannot be indicated by one of the symbols in 4b1, or the measured radiation diagram of the antenna is available, give the relevant information under "See attachment". If such an attachment is provided, enter a figure number identifying its presence.
Remarks	This box should be used to supply any other information or remark which the notifying administration considers useful and which is not contained on the form itself or in an attachment thereto.

### 3. Instructions for Completing Form of Notice AP4-3

#### *D. Satellite Network Characteristics in the Space-to-Earth Direction*

##### *Satellite Transmitting Antenna Beam Details*

The information to be entered is essentially the same as that in Form AP4-2, but it applies to characteristics for transmission at the space station. For the relevant explanations see Section 2 of this *Publication* with the following additions on Form AP4-3.

#### *F. Space Station*

##### *Characteristics of Receiving Space Stations for Space-to-Space Relays*

G3c. Beacon and telemetry information <sup>1</sup> attached. See Attachment No.	Provide technical description and system parameters of beacon and space telemetry emissions (except for coding data) in a separate, numbered note.
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#### *Earth Station*

8a. Receiving system noise temperature (kelvins)	Enter the value of the lowest total receiving system noise temperature, expressed in kelvins, at the output of the earth station antenna under clear sky conditions. This value shall be indicated for the nominal value of the angle of elevation when the associated transmitting station is aboard a geostationary satellite and, in other cases, for the minimum value of angle of elevation.
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<sup>1</sup> Provide this information only if available.

#### 4. Instructions for Completing Form of Notice AP4-4

##### *E. Overall Link Characteristics*

The overall link characteristics are required only for geostationary space stations using simple frequency-changing transponders and operating with earth stations.

Table E1 indicates per line the strapping (connection) between the uplink and downlink frequency bands for each intended combination of receiving and transmitting beams of the space station, with the lower (FROM) and upper (TO) band limits. The serial number is to be used to relate each strapping with the following relevant information per line in Table E2 for each associated receiving earth station whose name or designation is to be entered in the last column:

a1	Lowest equivalent satellite link noise temperature, in kelvins;
a2	Transmission gain ( $\gamma$ ), in dB, associated with the value in a1.
b1	Equivalent satellite link noise temperature, in kelvins, that corresponds to the highest ratio of transmission gain ( $\gamma$ ) to equivalent satellite link noise temperature;
b2	Transmission gain ( $\gamma$ ), in dB, associated with the value in b1.
Associated receiving earth station designation	See Form AP4-3.

When the above values in Table E2 apply to several strappings in Table E1, the reference to serial number(s), is to be given by means of a range of serial numbers.

Where a modification is to be made to the overall link characteristics (implying that the box "Notification intended for ADD/MOD/SUP" on Form AP4-1 contains the indication "MOD"), the relevant indication is to be given in the box "ADD/SUP of the Strap" as follows:

- i) if a new strap is to be added, enter the symbol "A" in the box "ADD/SUP of the Strap" and provide all the details of the new strap;

- ii) if an existing strap is to be suppressed, enter the symbol "S" in the box "ADD/SUP of the Strap" and provide sufficient details to uniquely identify the strap concerned. This would mean that, for any one strap, at least the values of the uplink beam and the downlink beam designations as well as the uplink assigned frequency and the downlink assigned frequency are to be provided.

When this link to be suppressed is used by more than one associated receiving earth station it is necessary to provide in addition the name of the particular associated earth station if only the strap pertaining to *this* station is to be suppressed; otherwise it will be assumed that the suppression of the strap applies to all of the associated receiving earth stations; and

- iii) if an existing strap is to be modified it is necessary to  
) proceed by suppressing the existing version of the strap record (see (ii) above) and by adding the new version of the strap record (see (i) above).









