Radiocommunication Study Groups

Received: 7 May 2019

Subject: Guidelines for reporting harmful interference

Document 1C/195-E
9 May 2019
English only

World Broadcasting Unions - Technical Committee[1]

PROPOSED MODIFICATIONS TO THE WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW RECOMMENDATION ITU-R SM.[APP10]

Reporting Harmful Interference in support of Appendix 10 of the Radio Regulations

1 Introduction

Working Party 4A (WP 4A) (Ref: Document 1C/174) agrees with WP 1C's suggestion that "to avoid any confusion, a single Recommendation in the ITU-R SM Series to deal with resolution of interference to space radiocommunication services, both GSO and non GSO, should be considered, rather than multiple Recommendations.", with that, WP 4A will not further develop its PDNRec ITU-R S.[Guidelines Harmful Interference Reporting] (Annex 2 to Doc. 4A/675). WP 4A invites WP 1C to take into account the elements in it when developing its working document towards a PDNRec ITU-R SM.[APP10].

The WBU-TC is of the view that the elements as contained in PDNRec ITU-R S.[Guidelines Harmful Interference Reporting] (Annex 2 to Doc. 4A/675) provide detailed guidelines which is very useful for satellite users, satellite operators and Administrations to report harmful interference for cases of GSO satellite networks.

The WBU-TC agrees that a single Recommendation in the ITU-R SM Series to deal with resolution of interference to space radiocommunication services, both GSO and non GSO is a good way forward. Noting the additional data items required for reporting harmful interference for cases of GSO satellite networks and other space radiocommunication services may be different, the WBU-TC is of the view

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[1] The WBU-TC is the standing technical body of the World Broadcasting Unions and a sector member of the ITU, whose Members are:

- Asia-Pacific Broadcasting Union (ABU)
- Arab States Broadcasting Union (ASBU)
- The African Union of Broadcasting (AUB)
- Caribbean Broadcasting Union (CBU)
- European Broadcasting Union (EBU)
- International Association of Broadcasting (IAB)
- North American Broadcasters Association (NABA)

that it would be clearer and easier for Administrations to follow if there is a separate section or separate annex inside the Recommendation for cases of GSO satellite networks. The WBU-TC also believes that it would be useful and helpful to Administrations, satellite operators and satellite users if there is a short guideline outlining the procedures for reporting harmful interference in accordance with Section VI of Article 15 of the Radio Regulations (RR).

2 Proposal

The WBU-TC invites WP 1C to consider the proposal as contained in attachment 1.

Attachment 1 contains proposed modifications to the attachment of Annex 11 to Document 1C/169 The proposed modifications are largely taken from the elements contained in PDNRec ITU-R S.[Guidelines Harmful Interference Reporting] (Annex 2 to Doc. 4A/675) with an attempt to make those elements fit into the Recommendation being developed in WP 1C.

ATTACHMENT 1

WORKING DOCUMENT TOWARDS A PRELIMINARY DRAFT NEW RECOMMENDATION ITU-R SM.[APP10] ON REPORTING HARMFUL INTERFERENCE IN SUPPORT OF APPENDIX 10 OF THE RADIO REGULATIONS

Use of Appendix 10 of the Radio Regulations to convey information related to harmful interference to space radiocommunication services

(Question ITU-R 232/1)

(201x)

Scope

Administrations operating space radiocommunication systems which encounter instances of harmful interference should use the information in this Recommendation when providing the particulars relating to the harmful interference to involved administrations. The form in this recommendation should be used to supplement the format prescribed in Appendix **10** of the Radio Regulations.

Keywords

~~[TBD]~~ Harmful interference, Appendix 10

Abbreviations/Glossary

[TBD]

Definition of Harmful Interference in the ITU RR

"Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with Radio Regulations (1.169 of RR)."

Related ITU Recommendations and Reports

[TBD]

Recommendation ITU-R RS.2106 – *Detection and resolution of radio frequency interference to Earth exploration-satellite service (passive) sensors*.

Report ITU-R SM. 2181 – *Use of Appendix 10 of the Radio Regulations to convey information related to emissions from both GSO and non-GSO space stations including geo-location information*

Report ITU-R SM. 2424 –*Measurement techniques and new technologies for satellite monitoring*

The ITU Radiocommunication Assembly,

considering

a) Article **15** of the Radio Regulations (RR) describes the procedure for the resolution of cases of harmful interference;

b) that the resolution of harmful interference affecting space stations requires the cooperation and exchange of information among multiple parties, including the administrations involved, the space monitoring facility, and the ITU Radiocommunication Bureau;

c) that full particulars relating to harmful interference shall, whenever possible, be given in the form in RR Appendix **10**;

d) that RR Appendix **10** was designed with terrestrial services in mind, its applicability to emissions from space stations is limited;

e) that it would be desirable and helpful for administrations that a common reporting form for all services be established based on the current information in RR Appendix **10**;

f) that reporting harmful interference affecting certain radio services may require additional information to that contained in Appendix **10**;

g) that such dedicated form of reporting harmful interference cases should be kept minimum,

h) that the formal submissions of reports and subsequent exchange of information concerning cases of harmful interference affecting space services can be carried out through the SIRRS online application as per CR/435;

i) that this online application implemented by the Radiocommunication Bureau in response to the Resolution 186 of the ITU Plenipotentiary Conference is an open platform that can support the submission of supplementary information in the format of this Recommendation.

noting

a) that Recommendation ITU-R RS.2106 provides a reporting form and guidance for Administrations operating EESS (passive) satellite sensors which encounter instances of harmful interference, in addition to the form in Appendix **10** of the Radio Regulations;

b) that the additional necessary information in considering f) may be different for the cases of GSO satellite networks and other space radiocommunications services;

c) that providing additional necessary information in considering f) inside the existing RR Appendix 10 form for cases of GSO satellite networks is possible;

d) that descriptions and examples for noting c) would be useful for administrations to follow;

e) that standardization on format in noting c) and d) would ease administration’s efforts;

f) that information regarding the procedures in case of harmful interference and guidelines providing recommendations for noting c), d) and e) would be would be beneficial for satellite users, satellite operators and administrations.

recognizing

that obligations to eliminate harmful interference are set forth in relevant provisions of the Radio Regulations and bilateral coordination agreements,

recommends

1 that the data fields and additional information in [TBD] should be provided in addition to the form in Appendix **10** of the Radio Regulations when reporting harmful interference affecting space radiocommunications services~~.~~ except for the case of GSO satellite networks;

2 that, the set of guidelines given in Annex 1 could be used by satellite users, satellite operators and administrations to report harmful interference for cases of GSO satellite networks.

ANNEX 1

Guidelines for reporting harmful interference to GSO satellite networks

1 Introduction

Appendix **10** of the Radio Regulations (RR) is to be used for reporting harmful interference. This appendix was originally designed for terrestrial services and its applicability related to emissions from space stations is limited. This is even more problematic when graphical geo-location information has to be conveyed.

Report ITU-R SM.2181 was developed to address these shortcomings and suggests a list of additional information to be attached together with Appendix 10 of the RR when reporting cases of harmful interference related to satellite services. The list of items as suggested in Report ITU-R SM. 2181 is more detail and applicable for both GSO and NGSO cases while the guidelines in this annex suggest a simpler way for reporting harmful interference for the cases of GSO satellite networks.

These guidelines aim at introducing procedures for reporting cases of harmful interference related to GSO satellite networks and providing guidance on preparing a report on cases of harmful interference by administrations and the Radiocommunication Bureau, as appropriate. These guidelines are developed based on the procedures for resolving harmful interference as contained in Section VI of Article **15** of the Radio Regulations (RR) to maximize quality and availability of service to the user by minimizing unusable satellite capacity due to interference.

The ITU plays a leading role to ensure interference-free operations of space services. In this, Member States' cooperation and exchange of information among parties are essential. Continuous synergistic actions by all sectors of the satellite community are needed to guarantee that the level of interference is kept to a minimum.

2 Procedures in case of harmful interference

Section VI of RR Article **15** provides procedures to be followed by administrations in the case of harmful interference. The following provides the key points of these procedures:

1 The administration responsible for the affected service or satellite carrier (Administration A) shall send to the administration responsible for the station which is likely causing harmful interference (Administration B) full particulars relating to the harmful interference in the form indicated in RR Appendix **10** (RR No. **15.27**).

2 When informed that a station under jurisdiction of Administration B is likely causing harmful interference to Administration A, the former Administration shall acknowledge receipt of that information as soon as possible (RR No. **15.35**).

3 Administration B shall immediately investigate the matter and take all required measures / actions in order to eliminate the harmful interference if it is confirmed that the interfering station is located on the territory under its jurisdiction.

4 If the cooperation between Administrations A and B has not produced satisfactory results, Administration A may forward details of the case to the Radiocommunication Bureau (BR) for its information (RR No. **15.41**) and the required action, as the case may be.

5 In such a case, a request of assistance may also be sent to the Bureau with all the technical and operational details and copies of the correspondence (RR No. **15.42**).

In the cases that harmful interference that originate from Administration B cannot be resolved at operator level, the affected satellite licensed operators / earth station users can:

Step 1: Send a letter to its national administration (Administration A) together with the information to be provided when reporting harmful interference (see section 5 for description of the information to be provided) to request its help to communicate with the Administration responsible for the station suspected of causing the harmful interference (Administration B) to eliminate the interfering signal.

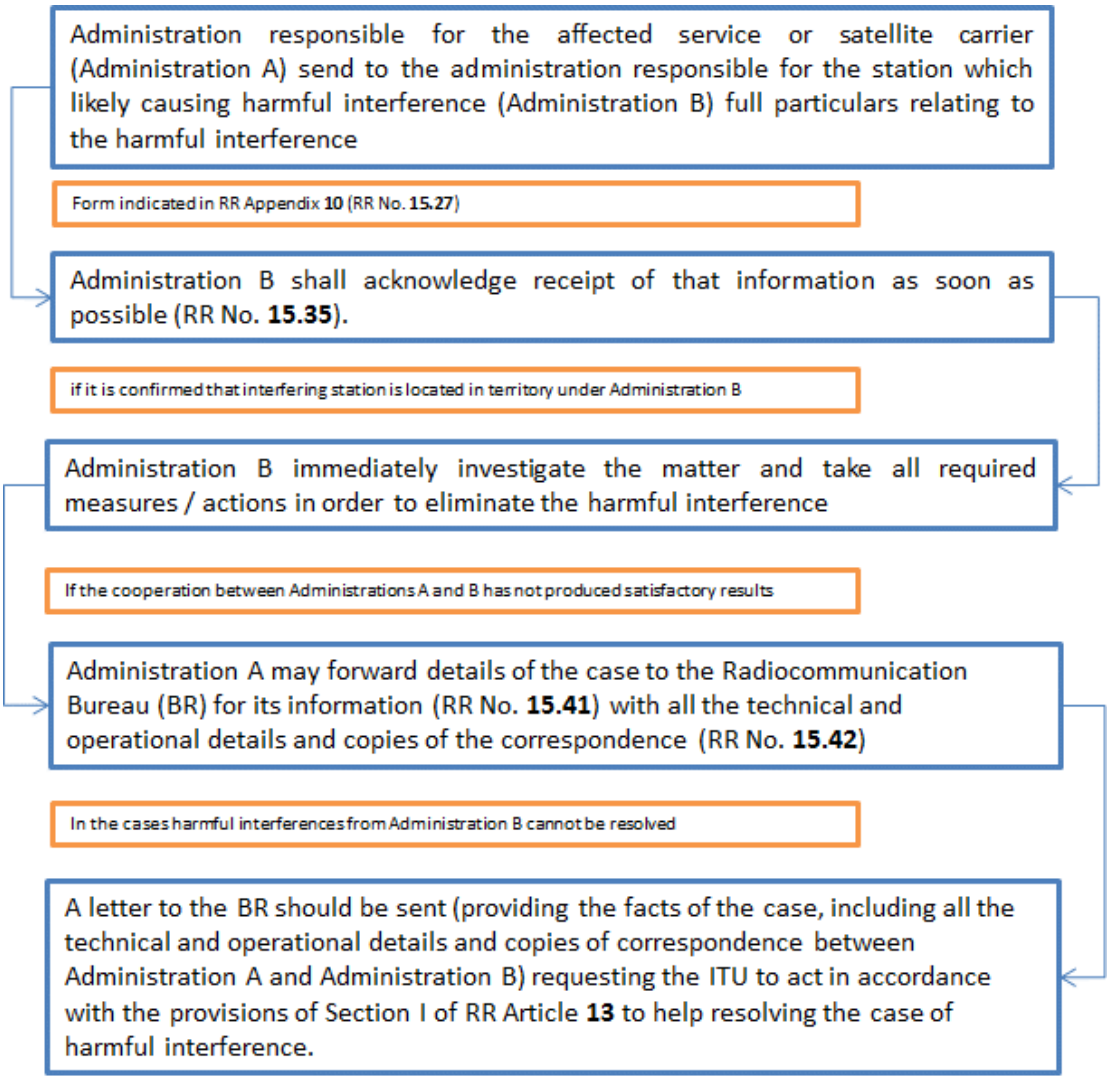
Step 2: If there is no response from Administration B or if satisfactory results cannot be reached, invite the national Administration A to send a letter to the ITU in accordance with RR No. **15.41** and RR No. **15.42**. The letter to the Radiocommunication Bureau should:

– Request the ITU-R Radiocommunication Bureau to act in accordance with the provisions of Section I of RR Article **13** to help resolving the case of harmful interference.

– Provide the facts of the cases, including all the technical and operational details and copies of correspondence between Administration A and Administration B (i.e. the correspondence associated with Step 1 above).

FIGURE 1

an outline of the process in case of harmful interference



3 Use of RR Appendix 10 to report harmful interference for cases related to satellite networks

Section 5 suggests a way forward to report harmful interference using RR Appendix **10** (where the suggested information to be filled in is more designed for satellite interference and might give more information than what was originally asked in RR Appendix **10**). Geo-location information is also added.

4 Getting geo-location results for the source of harmful interference

In case of harmful interference, the affected satellite operators / earth station users would investigate the issue to check the cause and determine if it is due to a known source and coordinate with the interfering station with relevant information / parts to see whether the harmful interference can be eliminated. If the harmful interference persists and cannot be eliminated at the level of the satellite operators, the satellite operator can prepare a report to its national administration about the case and request its administration to communicate with the administration responsible for the station likely causing the harmful interference as per the procedure. (see section 2).

The coverage of a satellite depends on its design and its operating frequencies and would normally cover multiple countries. An uplink from any location within the footprint could potentially create harmful interference to the satellite space receivers within the entire footprint. Without knowing the location of the interfering source, it would be difficult, if not impossible, to identify the responsible administration to communicate with and request for elimination of the harmful interference.

To obtain geo-location results, satellite operators and their responsible administrations may already have facilities or sources for performing the geo-location. Telecommunications regulatory authorities of some countries have their own space radio monitoring facilities and some of these stations may be able to assist other administrations to perform geo-location in cases involving satellite interference; information regarding these facilities can be found in Report ITU-R SM.2182 (http://www.itu.int/pub/R-REP-SM.2182) or http://www.itu.int/online/mms/mars/monitoring/l8_station_search.sh. In addition to monitoring/geo-location facilities of administrations, there are private companies which provide geo-location services for customers. Additional information is included in Report ITU-R SM.2424.

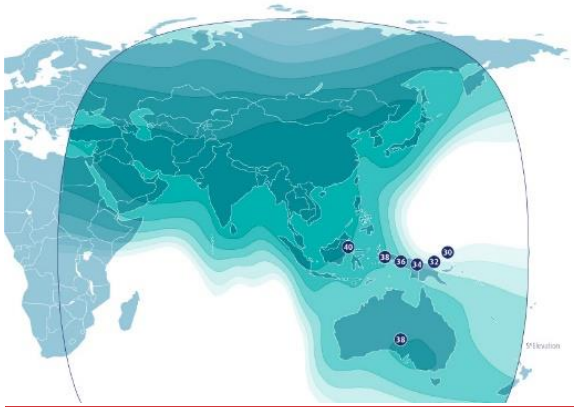
5 Information to be provided when reporting harmful interference (RR Appendix 10 + Additional geo-location information) – with description on what is to be filled in

Notes in square brackets give a brief description of what is suggested to be filled in and examples in the right-hand column marked (e.g., examples of the kind of information to fill in). The suggested information to be filled in is designed for satellite interference cases and might provide more information than what was originally asked for in RR Appendix **10**.

Report of harmful interference (AP10)

Particulars concerning the station causing the interference:	
a. Name, call sign or other means of identification [Note: This item is more designed for terrestrial services and it is possible to leave this field blank or marked as unknown.]	e.g. Unknown
b. Frequency measured [Note: The frequency range of the harmful interference.]	e.g. 5 957.658 MHz–5 957.682 MHz 3 732.658 MHz–3 732.682 MHz
Date: [Note: Date of the harmful interference spectrum plot taken. It is also possible to describe the occurrence of interference to give more information.]	e.g. Occurrence of interference: DD MMM YYYY to DD MMM YYYY/date of reporting interference
Time (UTC): [Note: Time of the spectrum plot taken. If on the above item (date), a range of date is given to describe the occurrence of interference, it is possible to specify also the exact date of the spectrum plot here.]	e.g. TT:TT-TT:TT DD MMM YYYY (Spectrum plots time)

c. Class of emission [Note: Class of emission of the interferer as defined in RR AP1, is normally difficult to classify. However, it is possible to provide a description of the interference. Where possible, please specify if the interference is either on the uplink (meaning that terrestrial emissions or Earth Stations create interference on the wanted space segment capacity) or on the downlink only (meaning that an unwanted satellite transmission or terrestrial services create interference on the Earth Stations).]	e.g. 1 Unknown. Description of the occurrence of harmful interference: Time and frequency stable signal. e.g. 2 Unknown. Description of the occurrence of harmful interference: Sweeping / drifting
d. Bandwidth (indicate whether measured or estimated) [Note: Bandwidth of the interference]	e.g. 1 24 kHz, measured e.g. 2 CW
e. Measured field strength or power flux-density [Note: Measured power flux density of the interference, it is also possible to provide spectrum plot instead] Date: [Note: Date of the measurement/spectrum plot] Time (UTC): [Note: Time of the measurement/spectrum plot]	e.g. See Attachment 1 and 2 for plots of interfering signal e.g. DD MMM YYYY e.g. TT:TT – TT:TT
f. Observed polarization [Note: Polarization of the interference]	e.g. V-pol, uplink; H-pol, downlink
g. Class of station and nature of service [Note: The class of station and nature of service is defined in Table 3 and Table 4 of the Preface in BR IFIC, the preface can be downloaded in http://www.itu.int/en/ITU-R/space/Pages/prefaceMain.aspx. The class of station and nature of service may in many cases not be possible to identify. It is then possible to leave this field blank or marked as unknown.]	e.g. Unknown
h. Location/position/area/bearing (QTE) [Note: The location of the source of interferer. It is possible to provide the geo-location result, see section 4 on how to get geo-location result.]	e.g. According to the geo-location result, the uplink interference station is located at [Latitude Longitude] near [City], [Country] (See Annex 1 for geo-location result)
i. Location of the facility which made the above measurements [Note: The location of the measurement (e.g. where the spectrum plot taken) and the location of facility for performing geo-location and monitoring dish size.]	e.g. 1. Spectrum plots (attachment 1 and 2) were taken in AsiaSat Tai Po Earth Station (22.453°N 114.189°E) in Hong Kong and monitoring antenna size was 3.7 m. 2. Geo-location were performed in Beijing, China (39.66°N 116.23°E)
Particulars concerning the transmitting station interfered with:	
j. Name, call sign or other means of identification [Note: This item is more designed for terrestrial services. It is possible to indicate the affected satellite, the NORAD ID of the satellite, the affected transponder number, satellite name in ITU (ITU filing name) and its special section reference number.]	e.g. AsiaSat 5 (NORAD ID: 35696) Transponder CXH ITU filing name: ASIASAT-E ITU Special Section number: CR/C/2056

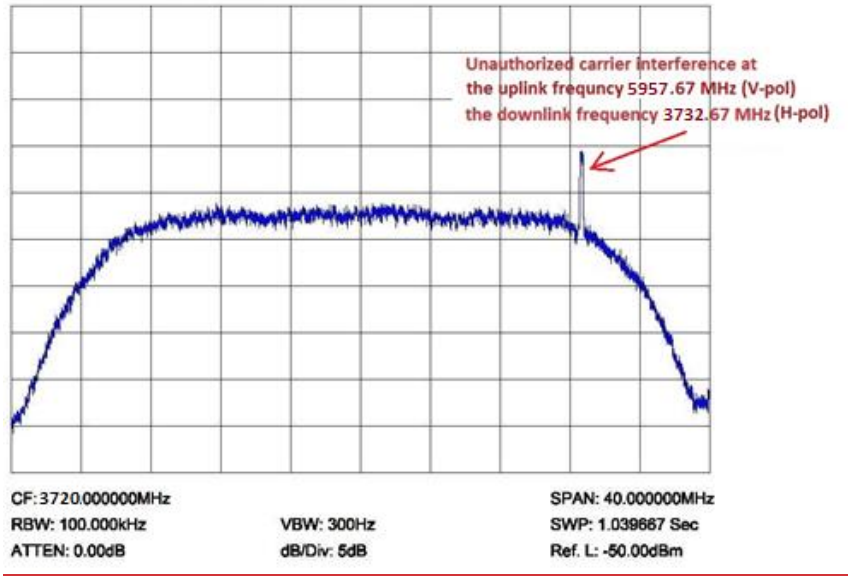
k. Frequency assigned [Note: The frequency of the wanted carrier]	e.g. 36 MHz wanted carrier: 5 927 MHz–5 963 MHz (V-pol, uplink) 3 702 MHz–3 738 MHz (H-pol, downlink)
l. Frequency measured [Note: Frequency range of the measurement/spectrum plot] Date: [Note: Date of the measurement/spectrum plot] Time (UTC): [Note: Time of the measurement/spectrum plot]	e.g. Spectrum plots: (attachment 1 and 2) 5 925 MHz–5 965 MHz (V-pol, uplink) 3 700 MHz–3 740 MHz (H-pol, downlink) e.g. DD MMM YYYY e.g. 07:24 - 07:26
m. Class of emission [Note: Class of emission of the affected carrier as defined in RR AP**1**. If unsure, it is possible to specify signal bandwidth, modulation and coding or leave it blank.]	e.g. 1 36M0G7W e.g. 2 36 MHz signal bandwidth, 8 PSK FEC 3/5 DVB-S2
n. Bandwidth (indicates whether measured or estimated, or indicate the necessary bandwidth notified to the Radio-communication Bureau) [Note: Bandwidth of the wanted carrier, it is also possible to provide both wanted and interferer carrier to make it clear.]	e.g. Wanted carrier: 36 MHz, measured Interferer carrier: 24 kHz, measured
o. Location/position/area [Note: Orbital location of affected satellite]	e.g. 100.5 deg E in the GSO arc
p. Location of the facility which made the above measurements [Note: it can be the location of where the spectrum plot is taken and monitoring dish size.]	e.g. Spectrum plots (attachment 1) were taken in AsiaSat Tai Po Earth Station (22.453°N 114.189°E) in Hong Kong and monitoring antenna size was 3.7 m.
Particulars furnished by the receiving station experiencing the interference:	
q. Name of station [Note: Affected earth station]	e.g. AsiaSat Tai Po Earth Station in Hong Kong and other receiving earth stations under the footprint of AsiaSat 5 transponder CXH
r. Location/position/area [Note: Location of the affected earth station and dish size.]	e.g. Hong Kong and other receiving earth stations under the footprint of AsiaSat 5 transponder CXH (see below for footprint). Interference present on the uplink, therefore all dish sizes are affected. 

s. Dates and times (UTC) of occurrence of harmful interference	e.g. DD MMM YYYY to the date of reporting
t. Bearings (QTE) or other particulars [Note: This item is more designed for terrestrial service and can be left blank.]	e.g. -
u. Nature of interference	e.g. 1 Unauthorized carrier interference
v. Field strength or power flux-density of the wanted emission at the receiving station experiencing the interference [Note: it is possible to provide spectrum plot for this.] Date: [Note: Date of the measurement/spectrum plot.] Time (UTC): [Note: Time of the measurement/spectrum plot.]	e.g. See Attachment 1 for the plots of wanted signal and interfering signal e.g. DD MMM YYYY e.g. TT:TT – TT:TT
w. Polarization of the receiving antenna or observed polarization [Note: Polarization of the receiving earth station.]	e.g. V-pol, uplink H-pol, downlink
x. Action requested [Note: The action you want the Administration responsible for the station causing the harmful interference to perform.]	e.g. Elimination of the interfering signal. Reduction of power level by [X] dB.

ATTACHMENT 1:

[Note: Spectrum plot regarding the interference]

e.g.



Additional information regarding the geo-location information

1 Geo-location result

[Note: Latitude Longitude near City, Country.]

e.g., 13.19°S 135.47°E near Gapuwiyak, Australia

2 Confidence level of the geo-location measurement

[Note: xx%]

e.g., 95%

3 Accuracy prediction for the time of measurement

[Note: XX km or AA x BB km (where AA and BB is the major/minor axis of the ellipse).]

e.g., 10 × 2 km

4 Plot of geo-location measurements

e.g., (Geo-location measurement example)

[Note: This is just an example showing the geo-location result and is not the real geo-location result of the interference case.]

Latitude	-13.19
Longitude	135.47
Semi-Major Axis	0.68963119
Semi-Minor Axis	0.05328662
Angle	-85.1195