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Subject: Guidelines for reporting harmful interference

World Broadcasting Unions - Technical Committee¹

GUIDELINES FOR REPORTING HARMFUL INTERFERENCE FOR CASES OF GSO SATELLITE SERVICES

1 Introduction

Appendix **10** of the Radio Regulations was designed with terrestrial services in mind. Therefore 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 by Working Party (WP) 1C to address these shortcomings and suggests a list of additional information to be attached together with RR Appendix **10** when reporting cases of harmful interference related to satellite services. The list of items as suggested in Report ITU-R SM. 2181 is however very detailed and many items may not be necessary or related to the particular case of interference. Many items were left vacant even in the two example reports annexed in the Report ITU-R SM.2181.

The WBU-TC is of the view that developing step-by-step guidelines to report harmful interference for cases of GSO satellite services would be helpful to administrations, satellite operators and satellite users. The guidelines should suggest a way to report harmful interference using Appendix **10** to better convey some of the necessary additional information recommended in Report ITU-R SM.2181 but at the same time avoid filling in the very detailed list as described in that Report. The guidelines attached in the Annex were developed for the WBU-TC by the WBU's International

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)
- Organización de Telecomunicaciones Iberoamericanas (OTI)

Media Connectivity Group (WBU-IMCG). In addition to broadcasters, membership of the WBU-IMCG includes satellite and fibre optic carriers, transmission service providers and other invited participants associated with the broadcasting industry.

On the same topic, WBU-TC notes:

- The new Recommendation ITU-R RS.2106-0 recently approved by Study Group 7 on "*Detection of radio frequency interference to earth exploration-satellite service (passive) sensors*".
- The working document towards a Preliminary Draft New Recommendation ITU-R SM.[APP10] on '*Reporting harmful interference in support of Appendix 10 of the RR*' that WP 1C started in its meeting in June 2017 (Annex 18 of the Chairman's report Document [1C/106](#)).

2 Proposal

The WBU-TC proposes that WP 4A considers the WBU-TC guidelines for reporting harmful interference for cases of GSO satellite services in order to develop:

- an ITU-R Report regarding guidelines for reporting harmful interference for cases of GSO satellite services which provide a step-by-step guidelines for administrations and/or;
- an ITU-R Recommendation on reporting harmful interference for cases of GSO satellite services using RR Appendix 10 to better convey some of the necessary additional information recommended in Report ITU-R SM.2181 but at the same time avoid filling in the very detail list as described in that Report.

A draft liaison statement from WP 4A to WP 1C is also attached for consideration by WP 4A in order to inform WP 1C of the development of the above-mentioned Report on Guidelines and/or Recommendation for reporting harmful interference for cases of GSO satellite services.

Attachments: 2

ATTACHMENT 1

Guidelines for reporting harmful interference for cases of GSO satellite services

1 Introduction

These guidelines aim at introducing procedures for reporting cases of harmful interference related to GSO satellite services and giving guidance on preparing a report on cases of harmful interference to national administrations and the ITU, 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).

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 suspected of causing the 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 its jurisdiction is suspected of causing harmful interference, Administration B shall acknowledge receipt of that information as soon as possible (RR No. 15.35).
3. Administration B shall investigate the matter and take action in order to eliminate the harmful interference if it is confirmed that the interfering station is located on its territory.
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).
5. In such a case, a request of assistance may also be sent to the BR with all the technical and operational details and copies of the correspondence (RR No. 15.42).

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

RR Appendix 10 was designed with terrestrial services in mind. Therefore its applicability related to emissions from space stations is limited. This is even more problematic when graphical geolocation information has to be conveyed. Report ITU-R SM.2181 (<http://www.itu.int/pub/R-REP-SM.2181>) was developed to address these shortcomings and suggests a list of additional information (e.g. geolocation information) to be attached together with RR Appendix 10 when reporting cases of harmful interference related to satellite services. The list of items as suggested is however very detailed and many items may not be necessary or related to the particular case of interference. Many items were left vacant even in the two example reports in the Report ITU-R SM.2181.

To better convey some of the necessary additional information recommended in Report ITU-R SM.2181 and to avoid filling in the detailed list as described in Report ITU-R SM.2181, these guidelines suggest a way (see section 6) 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) and a simple list of additional geolocation information. Section 7 shows an example report of harmful interference as per the way suggested in section 6.

4 Getting geolocation results for the source of harmful interference

In case of harmful interference, the responsible satellite operator would investigate the issue to check if it is due to a known source and coordinate with relevant parties to see if the harmful interference can be eliminated. If the harmful interference persists and cannot be eliminated at the level of 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 suspected of causing the harmful interference as per the procedure in case of harmful interference (see section 2).

The coverage of a satellite depends on its design and its operating frequencies and would normally cover multiple countries. Taking AsiaSat-5 C-band as an example, its C-band footprint covers more than 53 countries spanning from Russia to New Zealand and from Japan to the Middle East and parts of Africa. An uplink from any location within the footprint could potentially create harmful interference to the satellite 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 geolocation results, satellite operators and their responsible administrations may already have facilities or sources for performing the geolocation. Telecommunications regulatory authorities of some countries like China, Germany, USA, Korea, Japan, Ukraine, Kazakhstan have their own space radio monitoring facilities and some of these stations may be able to assist other administrations to perform geolocation in cases involving satellite interference; the information of 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/18_station_search.sh. In addition to monitoring/geolocation facilities of administrations, there are private companies which provide geolocation services for customers.

5 Steps in reporting harmful interference

In cases of harmful interference that cannot be resolved at satellite operator level, the affected satellite operators/satellite 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 6 for description on the information to be provided and section 7 for an example) 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 your national Administration to send a letter to the ITU in accordance with RR No. 15.41 and RR No. 15.42, the letter to the ITU 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 fact 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)

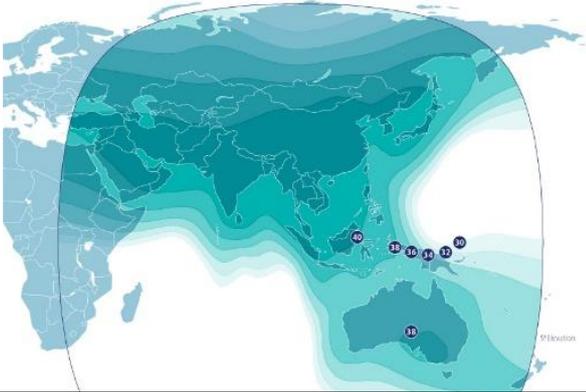
6 Information to be provided when reporting harmful interference (ITU RR Appendix 10 + Additional geo-location information) – with description on what to be filled in

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

Report of harmful interference (AP10)

Particulars concerning the station causing the interference:	
<p><i>a.</i> 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.]</p>	<p>e.g. Unknown</p>
<p><i>b.</i> Frequency measured [Note: The frequency range of the harmful interference.]</p> <p>Date: [Note: Date of the harmful interference spectrum plot taken. It is also possible to describe the occurrence of interference to give more information.]</p> <p>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.]</p>	<p>e.g. 5957.658MHz–5957.682MHz 3732.658MHz–3732.682MHz</p> <p>e.g. Occurrence of interference: DD MMM YYYY to DD MMM YYYY/date of reporting interference</p> <p>e.g. TT:TT-TT:TT DD MMM YYYY (Spectrum plots time)</p>
<p><i>c.</i> 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).]</p>	<p>e.g. 1 Unknown. Description of the occurrence of harmful interference: Time and frequency stable signal.</p> <p>e.g. 2 Unknown. Description of the occurrence of harmful interference: Sweeping / drifting</p>
<p><i>d.</i> Bandwidth (indicate whether measured or estimated) [Note: Bandwidth of the interference]</p>	<p>e.g. 1 24KHz, measured</p> <p>e.g. 2 CW</p>

<p><i>e.</i> Measured field strength or power flux-density [Note: Measured power flux density of the interference, it is also possible to provide spectrum plot instead]</p> <p>Date: [Note: Date of the measurement/spectrum plot]</p> <p>Time (UTC): [Note: Time of the measurement/spectrum plot]</p>	<p>e.g. See Attachment 1 and 2 for the plot of interfering signal</p> <p>e.g. DD MMM YYYY</p> <p>e.g. TT:TT – TT:TT</p>
<p><i>f.</i> Observed polarization [Note: Polarization of the interference]</p>	<p>e.g. V-pol, uplink; H-pol, downlink</p>
<p><i>g.</i> 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.]</p>	<p>e.g. Unknown</p>
<p><i>h.</i> 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.]</p>	<p>e.g. According to the geo-location result, the uplink interference station is located at [Latitude Longitude] near [City], [Country] (See Annex 1 for geolocation result)</p>
<p><i>i.</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.]</p>	<p>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 3.7m. 2. Geolocation were performed in Beijing, China (39.66°N 116.23°E)</p>
<p>Particulars concerning the transmitting station interfered with:</p>	
<p><i>j.</i> 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 and the affected transponder number.]</p>	<p>e.g. AsiaSat 5 (Norad ID: 35696) Transponder CXH</p>
<p><i>k.</i> Frequency assigned [Note: The frequency of the wanted carrier]</p>	<p>e.g. 36MHz wanted carrier: 5927MHz–5963MHz (V-pol, uplink) 3702MHz–3738MHz (H-pol, downlink)</p>
<p><i>l.</i> Frequency measured [Note: Frequency range of the measurement/spectrum plot]</p> <p>Date: [Note: Date of the measurement/spectrum plot]</p> <p>Time (UTC): [Note: Time of the measurement/spectrum plot]</p>	<p>e.g. Spectrum plots: (attachment 1 and 2) 5925MHz–5965MHz (V-pol, uplink) 3700MHz–3740MHz (H-pol, downlink)</p> <p>e.g. DD MMM YYYY</p> <p>e.g. 07:24 - 07:26</p>

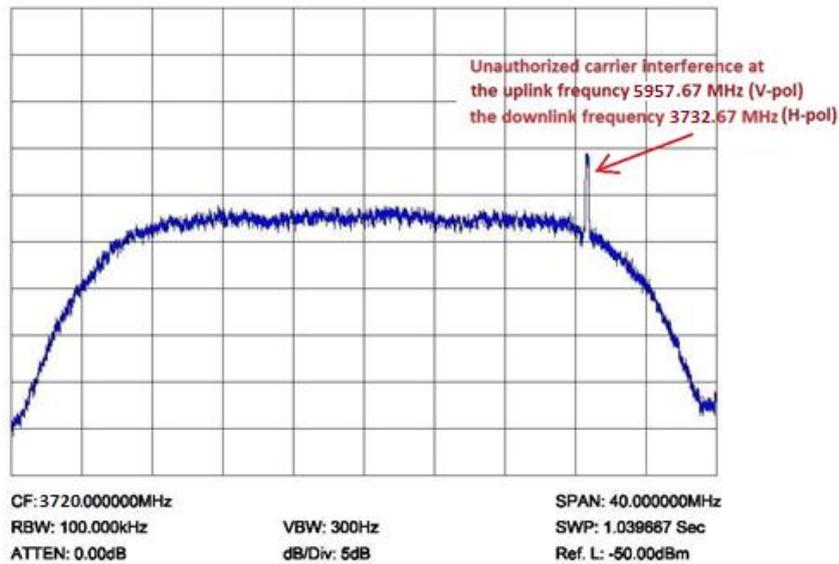
<p><i>m.</i> Class of emission [Note: Class of emission of the affected carrier as defined in RR AP1. If unsure, it is possible to specify signal bandwidth, modulation and coding or leave it blank.]</p>	<p>e.g. 1 36M0G7W e.g. 2 36 MHz signal bandwidth, 8 PSK FEC 3/5 DVB-S2</p>
<p><i>n.</i> Bandwidth (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.]</p>	<p>e.g. Wanted carrier: 36MHz, measured Interferer carrier: 24kHz, measured</p>
<p><i>o.</i> Location/position/area [Note: Orbital location of affected satellite]</p>	<p>e.g. 100.5 deg E in the GSO arc</p>
<p><i>p.</i> 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.]</p>	<p>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 3.7m.</p>
<p>Particulars furnished by the receiving station experiencing the interference:</p>	
<p><i>q.</i> Name of station [Note: Affected earth station]</p>	<p>e.g. AsiaSat Tai Po Earth Station in Hong Kong and other receiving earth stations under the footprint of AsiaSat 5 transponder CXH</p>
<p><i>r.</i> Location/position/area [Note: Location of the affected earth station and dish size.]</p>	<p>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.</p> 
<p><i>s.</i> Dates and times (UTC) of occurrence of harmful interference</p>	<p>e.g. DD MMM YYYY to the date of reporting</p>
<p><i>t.</i> Bearings (QTE) or other particulars [Note: This item is more designed for terrestrial service and can be left blank.]</p>	<p>e.g. -</p>
<p><i>u.</i> Nature of interference</p>	<p>e.g. 1 Unauthorized carrier interference</p>
<p><i>v.</i> 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.]</p>	<p>e.g. See Attachment 1 for the plots of wanted signal and interfering signal</p>

Date: [Note: Date of the measurement/spectrum plot.]	e.g. DD MMM YYYY
Time (UTC): [Note: Time of the measurement/spectrum plot.]	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.



ANNEX 1

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 geolocation 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 x 2 km

4. Plot of geolocation measurements:

e.g. (Geolocation 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



7 Information to be provided when reporting harmful interference (RR Appendix 10 + Additional geo-location information) – An example

Report of harmful interference (AP10)

Particulars concerning the station causing the interference:	
<i>a.</i> Name, call sign or other means of identification	Unknown
<i>b.</i> Frequency measured	5957.658MHz–5957.682MHz 3732.658MHz–3732.682MHz
Date:	Occurrence of interference: 1 Jan 2017 to DD MMM YYYY/date of reporting interference
Time (UTC):	00:00-00:02 1 Jan 2017 (Spectrum plots time)
<i>c.</i> Class of emission	Unknown. Description of the occurrence of harmful interference: Time and frequency stable signal.
<i>d.</i> Bandwidth (indicate whether measured or estimated)	24KHz, measured
<i>e.</i> Measured field strength or power flux-density	See Attachment 1 and 2 for the plot of interfering signal
Date:	1 Jan 2017
Time (UTC):	00:00-00:02
<i>f.</i> Observed polarization	V-pol, uplink; H-pol, downlink
<i>g.</i> Class of station and nature of service	Unknown
<i>h.</i> Location/position/area/bearing (QTE)	According to the geo-location result, the uplink interference station is located at [Latitude Longitude] near [City], [Country] (See Annex 1 for geolocation result)
<i>i.</i> Location of the facility which made the above measurements	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 3.7m. 2. Geolocation were performed in Beijing, China (39.66°N 116.23°E)
Particulars concerning the transmitting station interfered with:	
<i>j.</i> Name, call sign or other means of identification	AsiaSat 5 (Norad ID: 35696) Transponder CXH
<i>k.</i> Frequency assigned	36MHz wanted carrier: 5927MHz–5963MHz (V-pol, uplink) 3702MHz–3738MHz (H-pol, downlink)
<i>l.</i> Frequency measured	Spectrum plots: (attachment 1 and 2) 5925MHz–5965MHz (V-pol, uplink) 3700MHz–3740MHz (H-pol, downlink)
Date:	1 Jan 2017
Time (UTC):	00:00 – 00:02
<i>m.</i> Class of emission	36M0G7W
<i>n.</i> Bandwidth (indicates whether measured or estimated, or indicate the necessary bandwidth notified to the Radio-communication Bureau)	Wanted carrier: 36MHz, measured Interferer carrier: 24KHz, measured
<i>o.</i> Location/position/area	100.5 deg E in the GSO arc
<i>p.</i> Location of the facility which made the above	Spectrum plots (attachment 1 and 2) were taken in AsiaSat

measurements	Tai Po Earth Station (22.453°N 114.189°E) in Hong Kong and monitoring antenna size was 3.7m.
Particulars furnished by the receiving station experiencing the interference:	
<i>q.</i> Name of station	AsiaSat Tai Po Earth Station in Hong Kong and other receiving earth stations under the footprint of AsiaSat 5 transponder CXH
<i>r.</i> Location/position/area	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. 
<i>s.</i> Dates and times (UTC) of occurrence of harmful interference	1 Jan 2017 to the date of reporting
<i>t.</i> Bearings (QTE) or other particulars	-
<i>u.</i> Nature of interference	Unauthorized carrier interference
<i>v.</i> Field strength or power flux-density of the wanted emission at the receiving station experiencing the interference	See Attachment 1 and 2 for the plot of wanted signal and interfering signal
Date:	1 Jan 2017
Time (UTC):	00:00 - 00:02
<i>w.</i> Polarization of the receiving antenna or observed polarization	V-pol, uplink H-pol, downlink
<i>x.</i> Action requested	Elimination of the interfering signal

ANNEX 1

Additional information regarding the geo-location information:

1. Geo-location result:

XX°N YY°E near [City], [Country]

2. Confidence level of the geolocation measurement:

95%

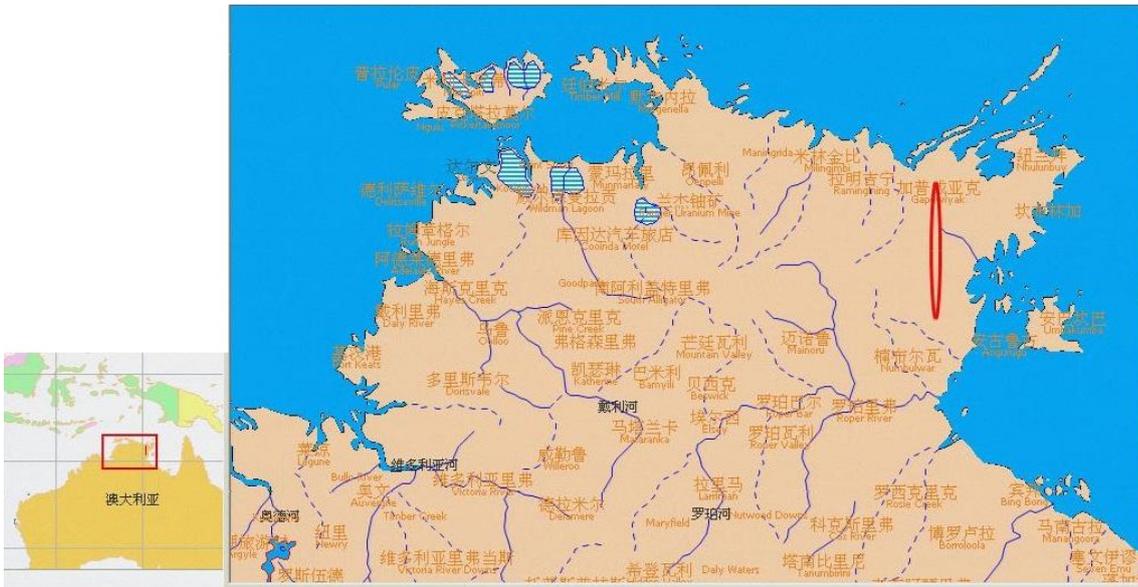
3. Accuracy prediction for the time of measurement

10 km x 2 km

4. Plot of geolocation measurements:

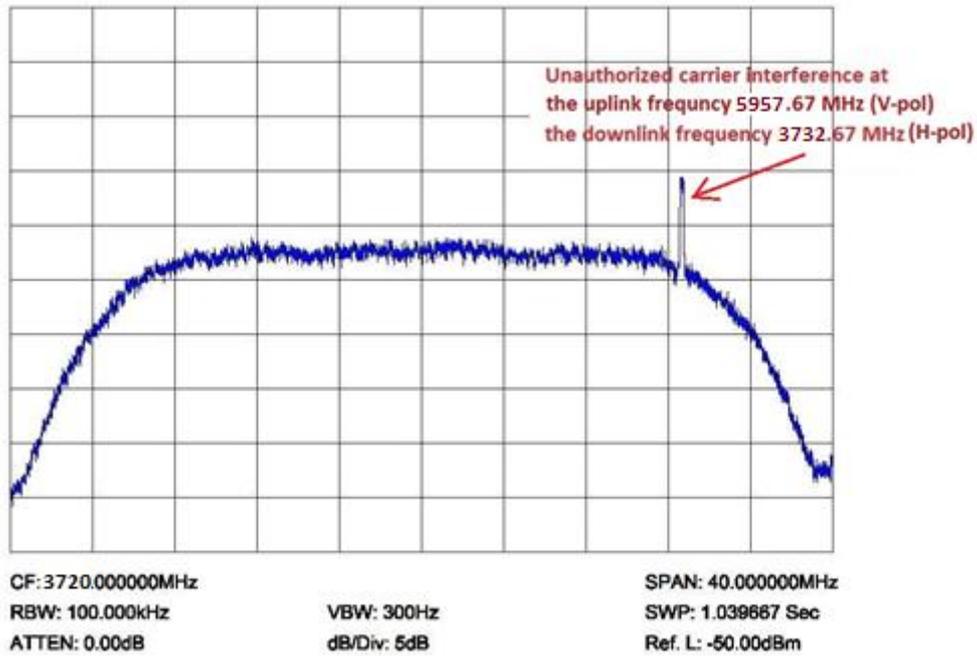
[Note: this is just an example showing the geo-location result and is not the real geo-location result of the interference case]

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



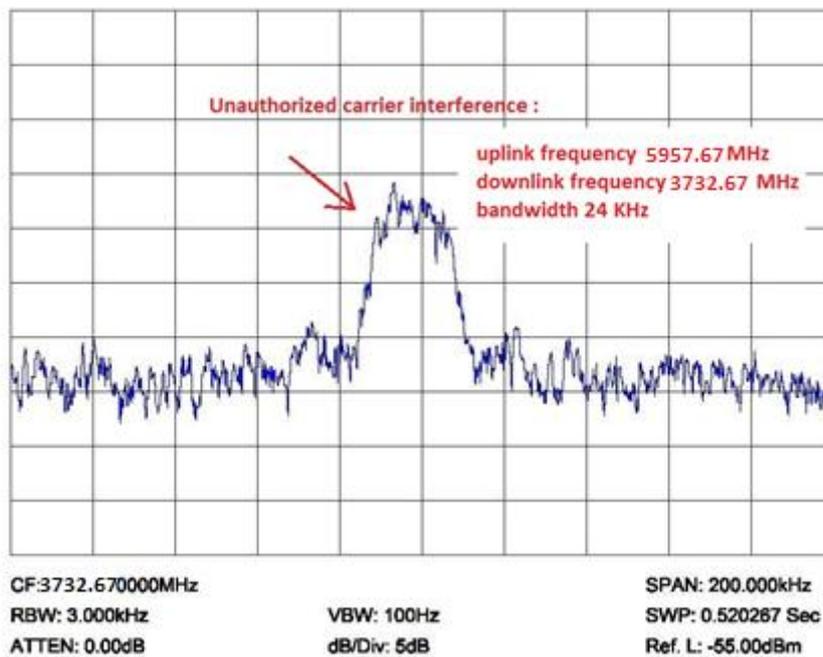
ATTACHMENT 1 TO ANNEX 1

Downlink plot of A5-CXH (100.5 deg E) full transponder



ATTACHMENT 2 TO ANNEX 1

Downlink plot of A5-CXH (100.5 deg E) centered at 3732.67 MHz



ATTACHMENT 2

Annex Y to Working Party 4A Chairman's Report

WORKING PARTY 4A

DRAFT LIAISON STATEMENT TO WORKING PARTY 1C

Guidelines for reporting harmful interference for cases of GSO satellite services

[Editor Note: to be carried forward to the Feb 2018 WP 4A meeting as the next WP 1C meeting is after the Feb 2018 WP 4A meeting.]

At its October 2017 Meeting, Working Party 4A decided to initiate work on guidelines for reporting harmful interference for cases of GSO satellite services. This includes step-by-step guidelines for administrations and suggestions for ways to report harmful interference using Appendix 10 of the Radio Regulations (RR) to better convey some of the necessary additional information recommended in Report ITU-R SM.2181 without having to fill in the very detailed list as described in that Report.

WP 4A notes that WP 1C is developing a working document towards a PDN Recommendation ITU-R SM.[APP10] on reporting harmful interference in support of Appendix 10 of the RR.

Working Party 4A invites Working Party 1C to consider WP 4A's preliminary [draft new Report/Recommendation] in the development of the new Recommendation and provide its views on this working document.

Status: For Action

Deadline:

Contact:

E-mail:
