

ITUEvents

ITU World Radiocommunication Seminar 2018

3-7 December 2018
Geneva, Switzerland

www.itu.int/go/ITU-R/WRS-18



Harmful Interference to Space Services

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ITU HQ Geneva,
5 December, 2018



Topics



- 1 Overview of key Regulatory Provisions and Procedures to prevent, report and resolve cases of Harmful Interference.**
- 2 The Current Situation: Typical cases affecting space services reported to BR**
- 3 ITU Activities and Initiatives to eliminate harmful interference to space services**
- 4 New Challenges**
- 5 SIRRS online application. Exercise.**

ITU Measures:



- Study Groups Activities
- Compatibility Studies
- Development of Recommendations, Reports and Handbooks

- Radiocommunication Assembly
- World Radiocommunication Conference

- Coordination and Notification of Satellite Networks and Earth Stations
- Application of the Radio Regulations
- → Provides International Recognition and Protection

- Art. 15 and Appendix 10 to RR + ITU-R SM. 2181 / REC RS. 2106:
→ To report a case of Harmful Interference to Radiocomm. Bureau

- Radio Regulations Board's Decisions

Preventive

Corrective

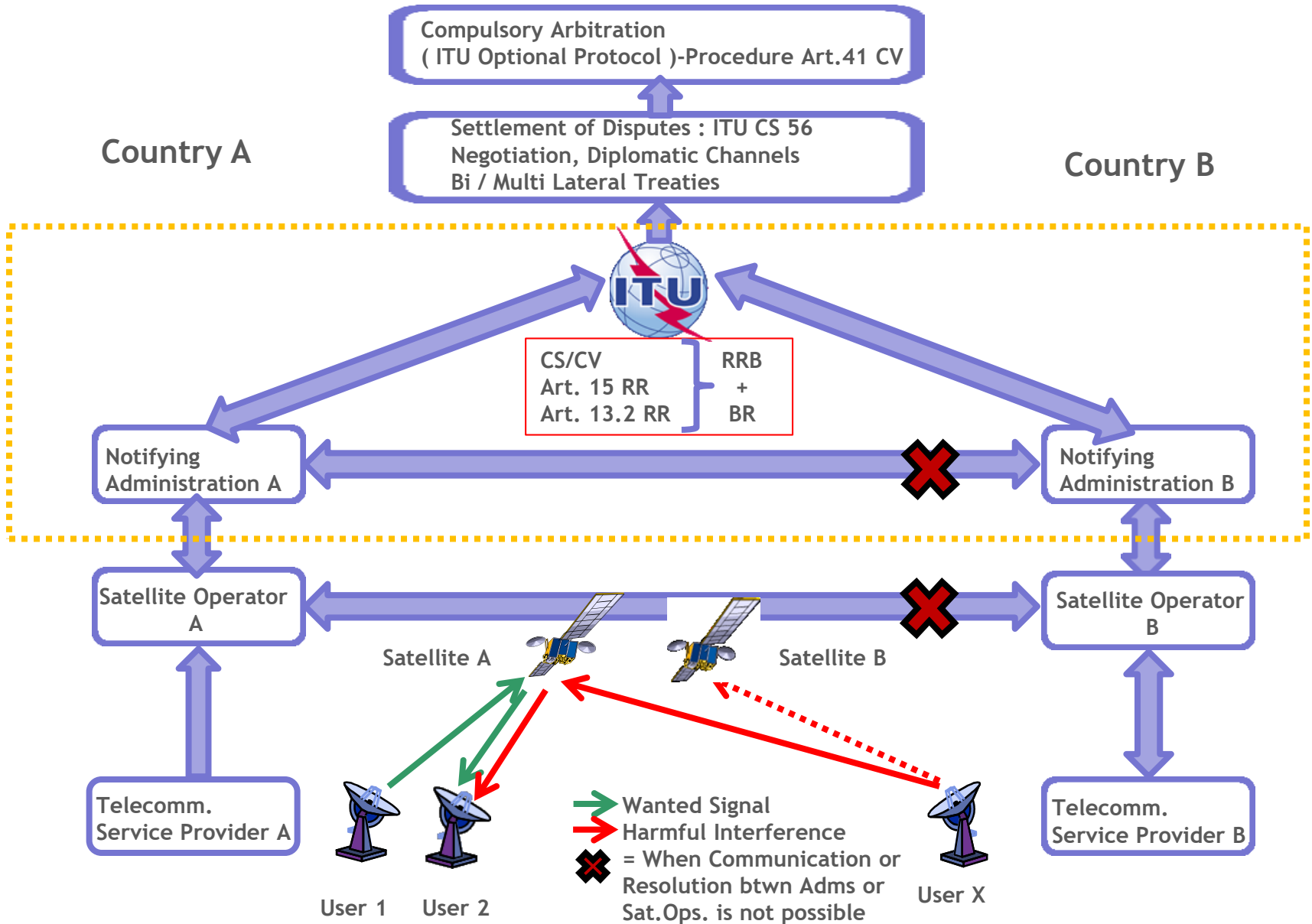
Overview of key provisions in the RR:



- Art. 5: Table of Frequency Allocations
- Art. 9: Coordination Procedure of satellite networks
- Art. 11: Notification Procedure of satellite networks
- AP 30, AP30A, AP30B: BSS and FSS plans
- Art.21: Sharing Scenario between Space and Terrestrial systems (limits on PFD , eirp, minimum elevation angle, etc)
- Art.22: Sharing scenario between GSO, NGSO (limits on epfd , station keeping, pointing accuracy, off-axis eirp density on Earth Stations)
- Art. 15: Procedure in case of Harmful Interference
- Art. 13.2: Request for assistance in case of Harmful Interference (HI)
- Art. 13.6: BR request Adms clarifications about recorded assignments
- Art. 16: International Monitoring
- Art. 18: Licensing - Identification of Stations
- AP 10 and Report ITU-R SM.2181 (submission of information)
- Specific Provisions to protect a service (e.g. No.5.340 for EESS passive)
- And more...



Schema of Actions in case of Harmful Interference



The Current Situation:

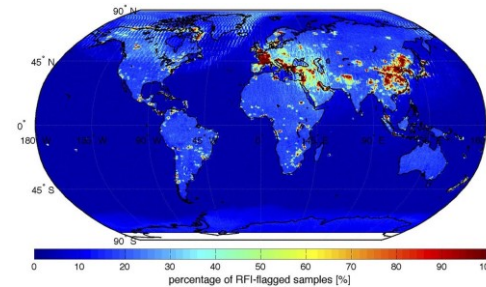
Harmful Interference Reported to BR

Affected Services:

FSS, BSS, MSS, EESS, RNSS, RAS

Affected Freq. Ranges:

- 1.2 GHz
- 1.5 / 1.6 GHz
- 2.2 GHz
- 3/4, 5/6 GHz
- 10-14 GHz
- 17/18 GHz



Satellite GSO Capacity free of Harmful Interference reported to BR = 99.97 %

Extension of the International Monitoring System (IMS)

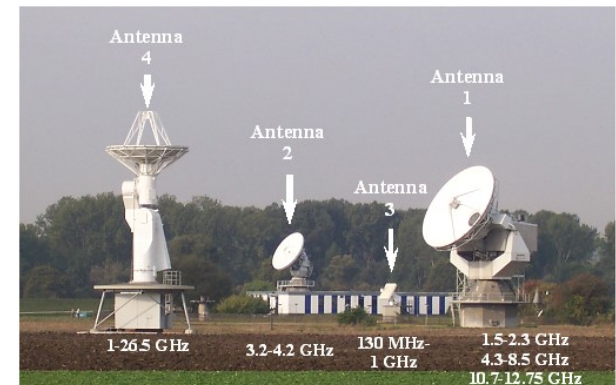


Plenipotentiary Conference Resolution 186 (Busan, 2014) instructs the Director BR:

“1 to *promote access to information*, upon request by concerned Administrations, related to *satellite monitoring* facilities, to address cases of *harmful interference* in accordance with Article 15 of the Radio Regulations, through *Cooperation Agreements* referred to under invites the Council above within the budgetary limitations of the Union in order to implement the objectives of this Resolution”.

Scope is focused on resolution of cases of Harmful Interference

- ✓ Cooperation Agreement Signed with:
Germany, Pakistan, Vietnam, Belarus,
Korea, China,
- ✓ To be signed soon: Oman, Brazil
- ✓ Under discussion:
Ukraine, Russia, Japan, Kazakhstan



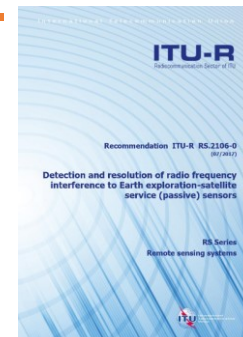
ITU-R Recommendations, Handbooks



- ❑ New Recommendation on **Detection and Resolution** of radio frequency **interference** to **Earth exploration-satellite service (passive)** sensors

ITU-R RS 2106-0 → Approved in July 2017 !!!

Free download → <https://www.itu.int/rec/R-REC-RS.2106/en>



- ❑ New Report on **Measurement Techniques and New Technologies for Satellite Monitoring**

Rep. ITU-R SM.2424-0 → Approved in June 2018 !!!

Free download → <https://www.itu.int/pub/R-REP-SM.2424-2018>



Further Activities on going in WP-1C:

- ❑ Development of Working Document towards a Preliminary Draft New Rec. ITU-R SM.[APP10] on reporting harmful interference in **Support of Appendix 10**

Annex 11 to Doc.1C/169 (WP1C Meeting Geneva June 2018) → <https://www.itu.int/md/R15-WP1C-C-0169/en>



Rec. on Carrier ID

(ITU-R S.2062-0. Sept.2014)

To facilitate rapid identification of an interference source and reduce the time required to clear the interference that occurs unintentionally.

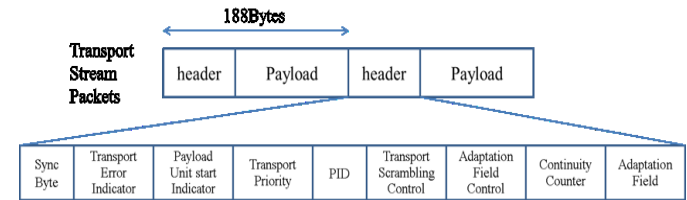
Free Download <http://www.itu.int/rec/R-REC-S.2062/en>

Rec. on Access Procedures for FSS Occasional Use, Transmissions to GSO Space Stations in 4/6 GHz and 11-12/13/14 GHz FSS Bands.

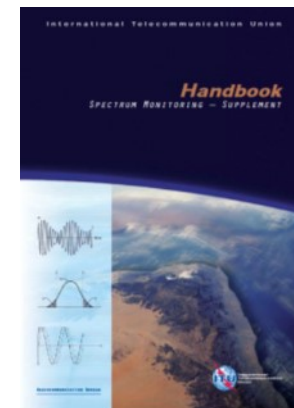
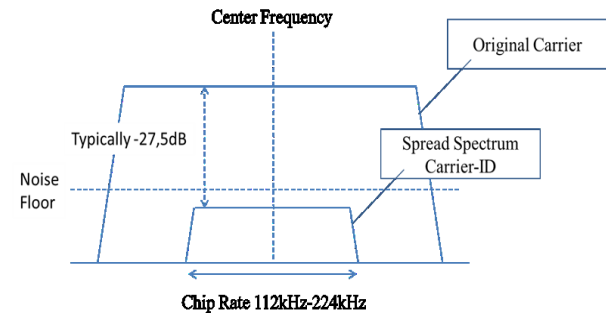
(ITU-R S.2049. Dec. 2013)

Free Download <http://www.itu.int/rec/R-REC-S.2049-0-201312-I/en>

Network Information Table (NIT)



Spread Spectrum CID



Capacity Building :



Satellite Communications

Latest Technologies

Interference prevention
and mitigation

SmallSats

Space Monitoring



<https://www.itu.int/en/ITU-R/space/workshops/2018-SmallSat/Pages/default.aspx>

New Challenges:



- ❑ Emerging of UHTS, NGSO Mega Constellation (LEO+MEO+HEO): Launch, deployment, DBIU, Freq.
- ❑ Small Satellites: some CubeSat projects are not in compliance with Art. 5 of RR neither notified to ITU
- ❑ RFI dynamics is evolving and getting more complex, Radio Regulations follows this trend.
- ❑ Risk of Harmful interference is higher
- ❑ New Role for NGSO Monitoring (more stations, to/from space) ?

Satellite Interference Reporting and Resolution System (SIRRS) - Introduction:



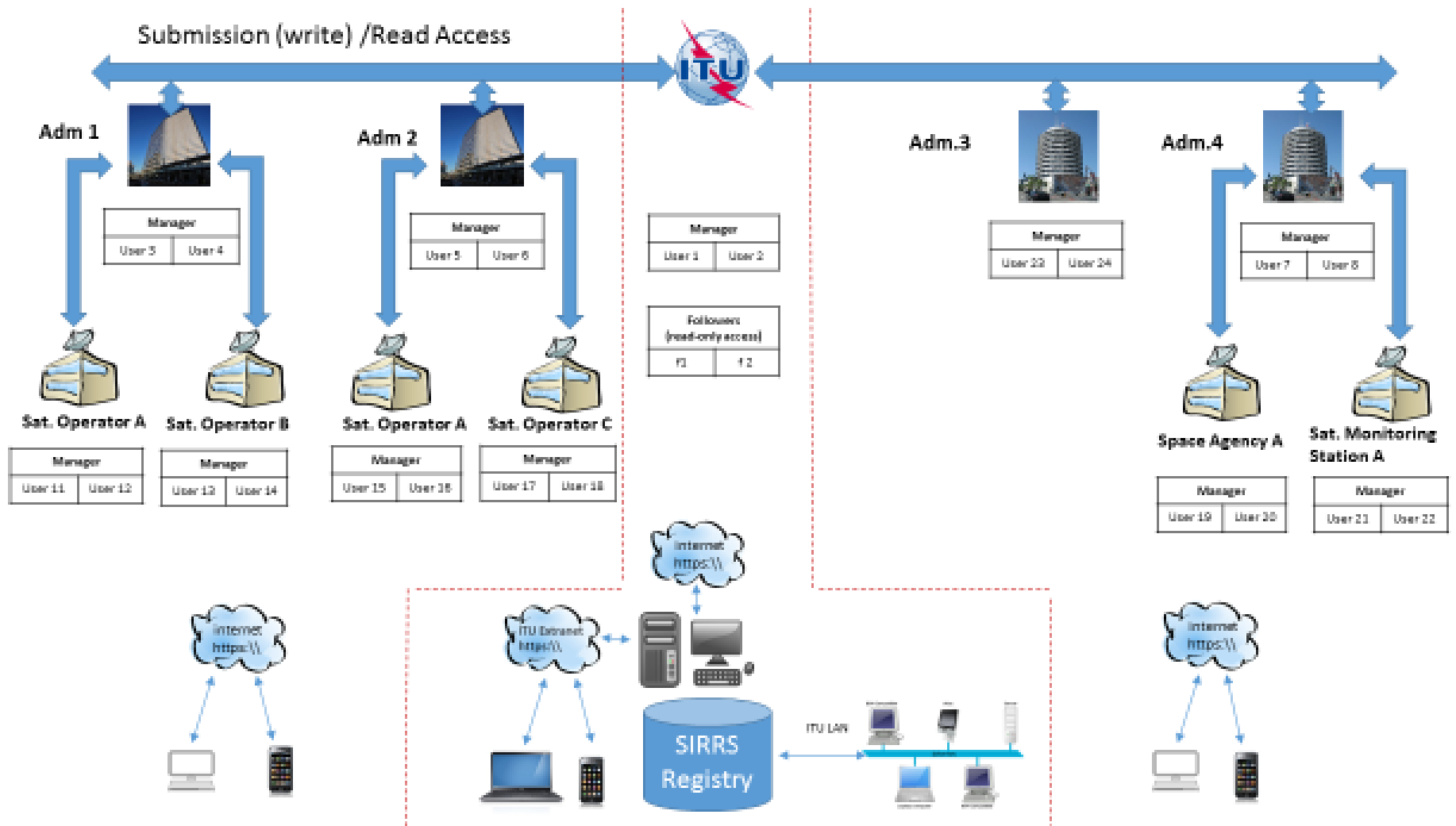
- In Response to RES 186 PP 2014
- Online Platform Connecting 193 Members States
- To Report and Record cases of Harmful Interference affecting Space Services in accordance with Article 15 RR
- To Facilitates exchange of Info among Administrations
- To Allow ITU-BR to obtain accurate information on the spectrum-orbit resource free of harmful interference
- Contributors to Administrations:
 - Satellite Operators
 - Space Agencies
 - Space Monitoring Facilities



SIRRS Architecture:

193 Member States !

RES 186 PP-2014



Submission Characteristics:



- **Appendix 10 Parameters presented in a format of typical Interfering Scenarios for Space Services**
(e.g. Uplink, Downlink, EESS(passive), RAS)

 - **Supplementary Information as attachments:**
 - Geolocation Maps
 - Spectrum Plots
 - Report ITU-R SM.2181
 - REC ITU-R RS.2106-0 (passive sensors)

 - **Flexibility to include future Recommendations, Reports or Additional Information as attachments**
-



What would you like to search for?

- Home
- ITU
- General Secretariat
- Radiocommunication
- Standardization
- Development
- ITU Telecom
- Members' Zone
- Join ITU

Space Services Department

YOU ARE HERE HOME > ITU-R > SPACE SERVICES > SIRRS

SHARE

SIRRS

Satellite Interference Reporting and Resolution System

(Release for Official Use as of 1st September 2018)

This online application has been developed by the Radiocommunication Bureau in response to Resolution 186 of ITU Plenipotentiary Conference 2014 with the aim to facilitate Administrations and space stakeholders to report a case of harmful interference affecting space services, to request assistance from the BR, to be informed in case a radio station under your jurisdiction is causing harmful interference to space services of other Administrations, and to exchange all necessary information among the concerned parties involved in the case.

In order to be able to use the system, a user account must be open as indicated below.

Nomination of Administration and Intergovernmental Satellite Organization Managers. Assignment of users.

The Administrations must nominate to the Bureau an Administration Manager role before accessing the system. The assigned manager will then add other users as administration or operator roles for their Administration.

SIRRS has 6 categories of user roles:

- (1) Administration Manager
- (2) Administration User
- (3) Operator Manager
- (4) Operator User
- (5) Intergovernmental Satellite Organization Manager
- (6) Intergovernmental Satellite Organization User

(see Circular Letter ITU-R CR. 428 for more details on roles. Intergovernmental Satellite Organization Manager and User roles have same treatment than Administration Manager and User respectively).

LOGIN I forgot my password...

References:

- Circular Letter CR/435 of 28.08.2018
- Circular Letter CR/428 of 13.03.2018
- List of Administrations' Focal Points
- Quick Guide for Submitting a Report and Response using SIRRS
- Questions & Answers about SIRRS
- Guide on User's Account Management

Support:

- SIRRS@itu.int
- TIES Services



Implemented !

Official use since 01 Sept. 2018

URL: <https://www.itu.int/en/ITU-R/space/SIRRS>

Sign Up Now !

3 Easy Steps to Start



See Circular letter CR/435 [here](#)



Create New Interference Report

← Back to drafts Save draft

***mandatory element**

Report information Ref.: Not applied

Title:

Ref. Administration:

Stations Causing Interference

+ Add Station

Stations Interfered With

Interfering Scenario:

Station type	Earth	<input type="text"/>	<input type="text"/>
Direction	TX	<input type="text"/>	<input type="text"/>

Station type	Space > Geo stationary	<input type="text"/>	<input type="text"/>
Direction	RX	<input type="text"/>	<input type="text"/>

Frequency Assignments

+ Add frequency assignment

Upload documents

Letter from Affected Administration: Browse... Upload

Interference Signal Geolocation Plot: Browse... Upload

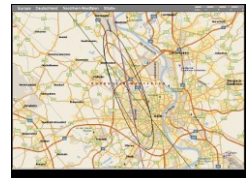
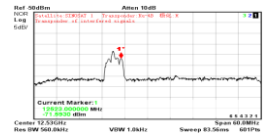
Interfered and Interfering Signal Scan Plots: Browse... Upload

Information on Passive Sensors-EESS (REC ITU-R RS. [RFI-SENSOR_REPORTING]): Browse... Upload

+ Add additional document

Steps to Follow:

- 1) Station Causing Interference
- 2) Interference Scenario (Uplink, Downlink, RAS, EESS-Passive) and Characteristics of Station Interfered with
- 3) Affected Frequency Assignment(s)
- 4) Upload Documents:
 - Correspondences
 - Scan Plot
 - Geolocation Plot
 - Other Forms, Graphs, Analysis, etc
 - Info on Passive Sensors in the Format of REC.ITU-R RS 2106-0



Steps to Follow:



Satellite Interference Reporting and Resolution System (SIRRS)

ciccoros

ARG

AdministrationManager

Home

Reports

New report

Users list

Add user

Create New Interference Report

1

Report information

Ref. Administration:

ARG

Stations Causing Interference



Add Station

Stations Interfered With

Interference Scenario:

Uplink
Downlink
Radio Astronomy

Frequency Assignments



Add frequency assignment

Upload documents

Letter from Affected Administration:*

Browse...

Upload

Interference Signal Geolocation Plot:

Browse...

Upload

Interfered and Interfering Signal Scan Plots:

Browse...

Upload

+ Add Station Causing Interference

Characteristics

Station type:*

Earth

Unknown

Name: [a]

Class of Station [g]:

Location [h]

Longitude:*

0.04558705414

Latitude:*

11.3829798470



Unknown

Description:

"The Maps including any accompanying documentation are provided "as is" without any warranties of any kind. ITU does not warrant, guarantee or make any representations (implied or expressed) regarding the use, or the results of use, of the Maps, in terms of correctness, completeness, accuracy, adequacy, reliability, merchantability or fitness for a particular purpose. ITU expressly disclaims any liability for errors or omissions in the content of the Maps, and shall not be held liable for any direct, indirect, consequential or incidental damages arising out of the use of or inability to use the Maps.

Administration(s) having jurisdiction*



Unknown

Measured Characteristics:

Frequencies [b]:*

 MHz

Class of Emission [c]:

Bandwidth [d]:

 MHz

Field Strength or Power Flux Density of Interfering Carrier [e]

Polarization [f]:

Other

Additional information

Date and Time (UTC) of Interference [b,s,e]:*

Nature of Interference [u]:

Type of carrier:*

- Analog Modulated Carrier
- Burst Signal
- CW - Clean Carrier
- Digital Modulated Carrier
- Frequency Hopping
- Frequency sweeping

Source:*

- Cross Polarization
- Co-Channel
- Intermodulation
- Unwanted emissions
- Antenna mispointing
- Adjacent Satellite Interference
- Adjacent Carrier Interference
- Malfunctioning equipment
- Insufficient cable shielding
- Reference to RR No. 15.1 (unnecessary emissions)
- Other (please specify)

Facility which made the above measurements [j,p]:

Longitude:

Latitude:

Save

Cancel

Create New Interference Report

*mandatory element

Report information

Ref.: Not applied

Title:

Ref. Administration:

Stations Causing Interference*

Stations Interfered With*

Interfering Scenario:

Station type	Earth	<input type="button" value="edit"/>	<input type="button" value="delete"/>
Direction	TX		

Station type	Space > Geo stationary	<input type="button" value="edit"/>	<input type="button" value="delete"/>
Direction	RX		

Frequency Assignments*

Upload documents

Letter from Affected Administration:*

Interference Signal Geolocation Plot:

2

+ Add Station Interfered With

Characteristics

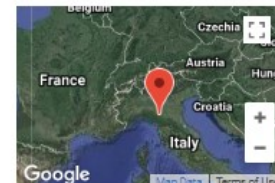
Name [j]:

Associated Administration:*

Location [o]*

Longitude:*

Latitude:*



*The Maps including any accompanying documentation are provided "as is" without any warranties of any kind. ITU does not warrant, guarantee or make any representations (implied or expressed) regarding the use, or the results of use, of the Maps, in terms of correctness, completeness, accuracy, adequacy, reliability, merchantability or fitness for a particular purpose. ITU expressly disclaims any liability for errors or omissions in the content of the Maps, and shall not be held liable for any direct, indirect, consequential or incidental damages arising out of the use of or inability to use the Maps.

+ Add Station Interfered With

Characteristics

Station type: Geo-stationary satellite Non geo-stationary satellite

Name [q,t]:

Associated Administration:*

Associated ITU Satellite Name:*

Associated Downlink Frequency: MHz

Associated Downlink Polarization:

Location [o]*



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Create New Interference Report

Report information
Ref. Administration: ARG

Stations Causing Interference
+ Add Station **3**

Stations Interfered With
Interference Scenario:
Uplink
Downlink
Radio Astronomy

Frequency Assignments
+ Add frequency assignment

Upload documents
Letter from Affected Administration:*
Browse... **4**

Interference Signal Geolocation Plot:
Browse...

Interfered and Interfering Signal Scan Plots:
Browse... Upload

+ Add Affected Frequency Assignment

Assigned frequency [k, l]:* MHz

Bandwidth [n]:* MHz

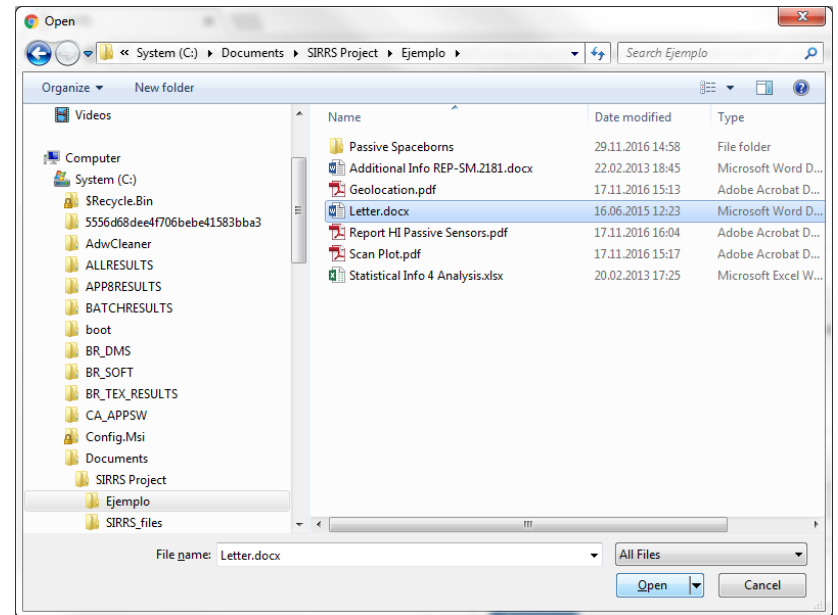
Polarization [w]: Other

Nature of Service* Select

Class of emission [m]:

Field Strength or Power Flux Density of Wanted carrier [v]:

Save Cancel



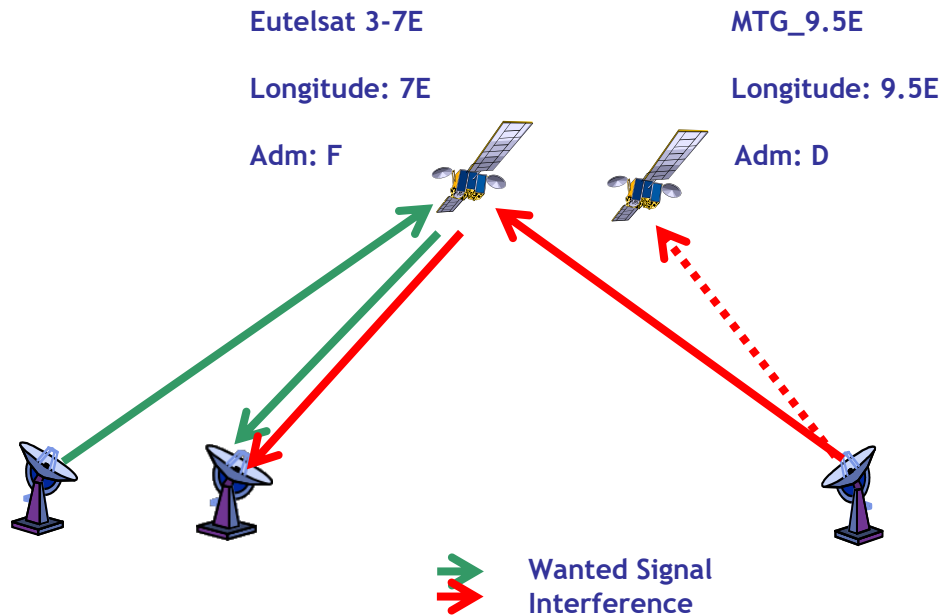


Proposed Exercises using SIRRS

(homework for tomorrow)

Exercise 1 : To Report a case

Uplink Interference due to antenna misspointing



This case and the information shown in the exercise are hypothetical with the sole purpose of getting familiar with the system .

Step 1:

Stations Causing Interference

Station type	Earth
Location	Latitud: 49.2015, Long. 9.8427
Administrations	D
Measured frequencies	14420.8 MHz
Class of Emission	3M00G7W
Bandwidth	3 MHz
Polarization	H
Date of interference	22/11/2018
Type of carrier	1.Digital Modulated Carrier
Source	1.Co-Channel 2.Adjacent Satellite Interference

Step 2:



Stations Interfered With

Interfering Scenario → Uplink

Station type	Earth
Direction	TX
Location	Lat: 45.2116, Long: 1.8447
Administration	F

Station type	Space > Geo stationary
Direction	RX
Location	7
Administration	F
Associated ITU name	EUTELSAT 3-7E
Associated Downlink Frequency	11120.8 MHz
Associated Downlink Polarization	V

Step 3:

Affected Frequency Assignments

Assigned frequency	11128 MHz
Bandwidth	36 MHz
Polarization	V
Service	FSS
Class of emission	36M0G7W

Step 4:



- a) Upload + Letter from Adm1
 - + Geolocation
 - + Spectrum Plot
- b) Type comments in Remarks and Direct Contact Details (you may enter your name)
- c) Submit requesting:
 - + To Inform Administrations
 - + ITU Assistance under No.13.2
 - + Authorize Public Access
- d) Approve and Submit → **Take note of your CASE ID**
- e) Go to Submitted Reports → Open Report → Download

Exercise 2 : To Reply to a Report received from another Administration or BR



- a) Go to Reports → Implicated In
- b) Find the CASE ID you are interested in → Open Report
- c) Click on Reply
- d) Add Additional Documents
- e) Enter Title and Description of document to Upload
- f) Browse and Upload Letter from Adm 2
- g) View Submission
- h) Approve and Submit
- i) Verify that your document was properly added (See in Reply Tab and Uploaded Docs)

Exercise 3 :



- a) Choose your Administration – Operator and Scenario (Uplink, DownLink, EESS (passive), Radioastronomy) that you wish and create your case

- b) Interact with other Administrations and ITU present in the exercise

Users Convention:



Administration	User	Password
...		
Brazil	ITU_ERSC\WRS18_B	wrs18@itu
India	ITU_ERSC\WRS18_IND	wrs18@itu
France	ITU_ERSC\WRS18_F	wrs18@itu
Germany	ITU_ERSC\WRS18_D	wrs18@itu
Malaysia	ITU_ERSC\WRS18_MLA	wrs18@itu
USA	ITU_ERSC\WRS18_USA	wrs18@itu
XXX	ITU_ERSC\WRS18_XXX	wrs18@itu

Link to Access SIRRS during WRS-18 → <https://www.itu.int/ITU-R/sirrs/external/training>

Docs in USB key:

\\Space Workshop\Day 3\Interference to Space - SIRRS\

Geolocation
Spectrum Plot
Letter Adm 1
Letter Adm 2
Letter Adm 3
Output Report Ex1



Help with the exercises or questions
about SIRRS ?

Come to Room A
Thursday 6 Dec. 16:30 hs



Thank you !

Questions: SIRRS@itu.int

**Please remember to visit
the WRS-18 Exhibition
located at the entrance of the
ITU Montbrilliant building**