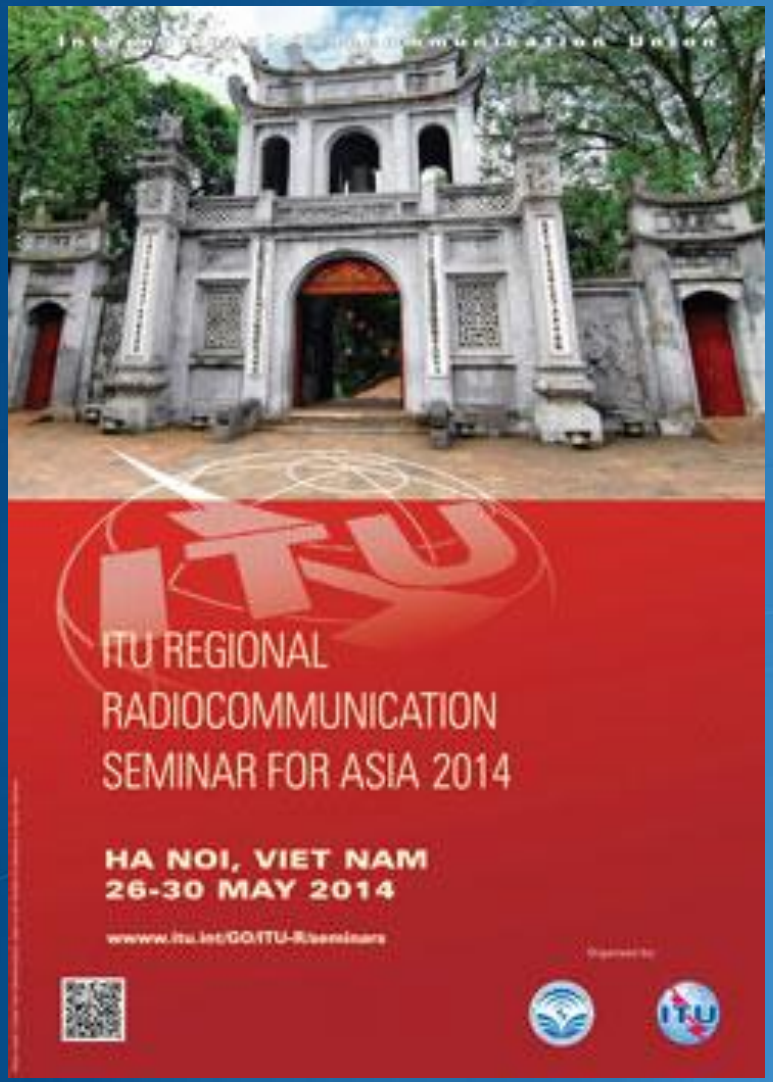

International Monitoring

ITU – Radiocommunication Bureau
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Overview of the Presentation

- Introduction to spectrum monitoring;
- ITU-R Activities on monitoring:
  - Background and History;
  - International Monitoring System;
  - List VIII Monitoring Stations;
  - Regular and Special Programmes;
  - Use of Monitoring Data by the Radiocommunication Bureau (BR);
  - Study Group.
- Final Remarks.

Introduction - Spectrum monitoring

The purpose of spectrum monitoring is to support the spectrum management process in general, including frequency assignment and spectrum planning activities.

Monitoring is closely associated with inspection and compliance in that it enables to:

- Assist in the resolution of electromagnetic spectrum interference, whether on a local, regional or global scale;
- Detect and identify illegal transmitters;
- Verify the proper technical and operational characteristics of emissions;
- Assist in ensuring an acceptable quality of radiocommuncation services, especially for security services;
- Provide valuable monitoring data to an administration's electromagnetic spectrum management process concerning:
  - The actual use of frequencies and bands (e.g., channel occupancy and band congestion);
  - The effectiveness of spectrum management policies.
- Provide valuable monitoring information for programmes organized by the Bureau by participating in the International Monitoring System (IMS).

ITU-R activities relative to spectrum monitoring – Historical background

- Historically, it was the intensive use of the HF bands, which led to the installation of numerous international monitoring stations:
  - In 1930, the first regional monitoring station was opened in Brussels (predecessor of the European Broadcasting Union - EBU);
  - At the 1947 Atlantic City Conference, Article 18 of the Radio Regulations (RR) laid down the foundation of the international monitoring system;
  - In 1998, it became Article 16 of the RR
- Monitoring of the HF bands is still an important task but special attention should also be paid to the VHF, UHF and SHF bands, in view of the constant increase in the demand for the use of these bands.

ITU-R activities relative to spectrum monitoring – International Monitoring System (IMS)

- Article 16 of the RR contains the provisions governing the establishment and operation of the IMS.
- The IMS comprises of monitoring stations and centralizing offices voluntarily designated by administrations.
- The characteristics of these monitoring stations are notified to the ITU and published in List VIII (Article 20 of the RR).
- Participating stations may be operated by an administration, a public or private agency, a monitoring service established jointly by several countries or by an international organization.
- In addition to Article 16, No. 3.14 of the RR urges administrations to arrange for frequent checks to be made of the emissions of stations under their jurisdiction, to ensure that these stations comply with the RR at the national level.

ITU-R activities relative to spectrum monitoring – International Monitoring System (IMS)

- One of the main conditions for successful operation of the IMS is *uniform coverage* of all parts of the world by monitoring stations adequately equipped and participating in ITU monitoring programmes.
- Taking into consideration that there are still wide areas of the world where the facilities available to the IMS are inadequate or non-existent, Resolution ITU-R 23-2 (2012) resolves to:
  - Urge the participating administrations to continue to participate in the IMS;
  - Urge non-participating administrations to establish monitoring stations and/or take part in the IMS;
  - Encourage cooperation and data exchange among stations of different administrations;
  - Invite administrations that have more advanced systems to train officials from other administrations.
- In accordance with this Resolution, the BR prepares and publishes summaries of monitoring data, supplied by the stations participating in the IMS, pursuant to Article 16 of the RR.

ITU-R activities relative to spectrum monitoring – List VIII – Monitoring Stations

- Monitoring station details are notified to the ITU and, in accordance with Article 20 of the RR, published by the ITU in List VIII.
- It contains particulars of monitoring stations participating in international monitoring, together with the addresses of the centralizing offices and includes information on the measurements that each monitoring station is able to perform.
- It is essential that those administrations already having terrestrial and/or space monitoring facilities, which participate in the IMS, notify the BR of the particulars of their monitoring stations for inclusion into this List.
- Monitoring stations contained in List VIII may help in the detection and elimination of harmful interference or infringements.
- Issued every 4 to 5 years and information for updating this List is published in the ITU Operational Bulletin.
- A free online search functionality of List VIII - Monitoring Stations is available at: http://www.itu.int/online/mms/mars/monitoring/l8_station_search.sh

ITU-R activities relative to spectrum monitoring – List VIII – Monitoring Stations (cont.)

- The new format of List VIII, Edition 2013 (Circular-Letter CR/348 of 10 May 2013):
  - Preface in form of a booklet: contains explanations concerning the contents of the publication in Arabic, Chinese, English, French, Russian and Spanish;
  - Summary Listings:
    - List of administrations and their terrestrial monitoring stations;
    - List of administrations and their space monitoring stations.
  - Information concerning monitoring stations carrying out measurements related to stations of Terrestrial services:
    - Centralizing offices;
    - Particulars and contact information of monitoring stations;
    - Map of monitoring stations.

- Additional information is available at:

http://www.itu.int/en/ITU-R/terrestrial/monitoring/listVIII/Pages/Internationalmonitoringstations.aspx

List of administrations and their terrestrial monitoring stations (Table 1A)

TABLE 1A

Symbol	Name of the Station
CLM	El Caribe (Barranquilla-Atlántico)
	El Cerrito (Funza-Cundinamarca)
	El Mirador (Cúcuta-N. Santander)
	La Sultana (Candelaria-Valle)
	Llano Grande (Rionegro-Antioquia)
	Los Comuneros (Bucaramanga-Santander)
CLN	Kadirana
CME	Douala-Deido
COD	Kinshasa
	Lubumbashi
CTI	Abidjan
CUB	Cuatro Caminos (IMS)
CZE	Brno
	Ceske Budejovice
	Hradec Kralove
	Jihlava
	Karlovice
	Plzen
	Praha
	Tehov
	Usti nad Labem
D	Berlin (IMS)
	Darmstadt (IMS)
	Itzehoe (IMS)
	Konstanz (IMS)
	Krefeld (IMS)
	Leipzig (IMS)
	München (IMS)
E	El Casar
	La Esperanza
	Rozas
EGY	Giza
EQA	Calderón
	Quito
	Riobamba
	Taura
	Turi
EST	Kohtla-Järva
	Kuressaare
	Pärnu
	Suurpalu
	Tallinn
	Tallinn DF1
	Tallinn DF2
	Tartu
F	Favières (IMS)
	Rambouillet (IMS)

Symbol	Name of the Station
FIN	Helsinki
	Jokioinen
G	Baldock (IMS)
GRC	Athens, Airport (IMS)
	Athens, Aspra Chomata (IMS)
	Athens, Marousi (IMS)
	Athens, Penteli (IMS)
	Heraklion, Airport (IMS)
	Mobile station
	Rhodes, Paradisi (IMS)
	Thessaloniki, Psili Korifi (IMS)
	Thessaloniki, Water Tower (IMS)
HND	Miraflores (IMS)
HNG	Tárnok (IMS)
HOL	Amersfoort (AT_EZ-Nera) (IMS)
I	Monza (IMS)
	Roma (IMS)
	Sorrento (IMS)
IND	Chennai (IMS)
	Kolkata (IMS)
	Mumbai (IMS)
	Nagpur (IMS)
	New Delhi (IMS)
INS	Cangkudu
	Kupang
	Medan
	Merauke
	Samarinda
	Surabaya
IRN	Ali Abad
	Mashhad
	Tehran
ISR	Tel Aviv
J	Ishigaki
	Kumamoto
	Osaka
	Sapporo
	Suzu
	Tokyo (IMS)
KEN	Garissa
	Kabete
	Kahawa
	Kitale
	Mazeras
	Mobile station
	Mombasa City
	Railways

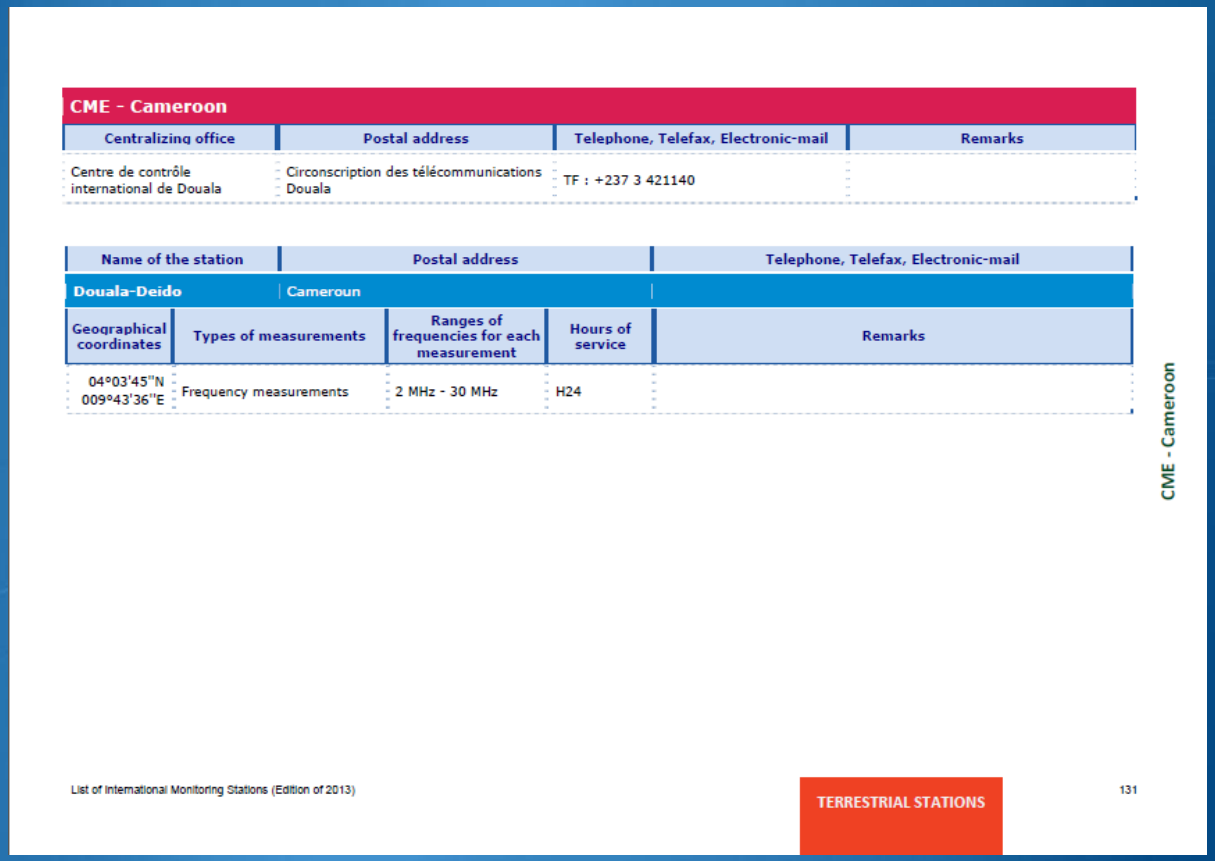
List of administrations and their space monitoring stations (Table 1B)

TABLE 1B

ADMINISTRATIONS AND THEIR MONITORING STATIONS IN THE SPACE RADIOCOMMUNICATION SERVICES
(IN ALPHABETICAL ORDER OF SYMBOLS)

Symbol	Name of the Station
ARG	Benavídez ARSAT earth station
	Buenos Aires (IMS)
CHN	Beijing (IMS)
D	Leeheim
J	Tokyo (IMS)
KAZ	GCC Akkol
KOR	Icheon
PAK	Wani-II
RUS	Belgorod (IMS)
	Khabarvosk
	Smolensk (IMS)
UKR	Kyiv
USA	Columbia, Maryland
VTN	Viet Tri

Information concerning monitoring stations carrying out measurements related to stations of Terrestrial services



CME - Cameroon

Centralizing office	Postal address	Telephone, Telefax, Electronic-mail	Remarks
Centre de contrôle international de Douala	Circonscription des télécommunications Douala	TF : +237 3 421140	

Name of the station	Postal address	Telephone, Telefax, Electronic-mail
Douala-Deido	Cameroun	

Geographical coordinates	Types of measurements	Ranges of frequencies for each measurement	Hours of service	Remarks
04°03'45"N 009°43'36"E	Frequency measurements	2 MHz - 30 MHz	H24	

CME - Cameroon

List of International Monitoring Stations (Edition of 2013)

TERRESTRIAL STATIONS

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ITU-R activities relative to spectrum monitoring – Regular and special programmes

- Regular monitoring programme in the HF bands (2 850 – 28 000 kHz)
  - Objectives:
    - Indicate the spectrum occupancy;
    - Identify stations whose emissions are not in conformity with the RR;
    - Share data with administrations not having HF monitoring facilities.
  - Submission
    - Data format and report submission procedure are described in CR/159 (2001).
  - Summaries and full data are available on the ITU website at: http://www.itu.int/en/ITU-R/terrestrial/monitoring/Pages/Regular.aspx

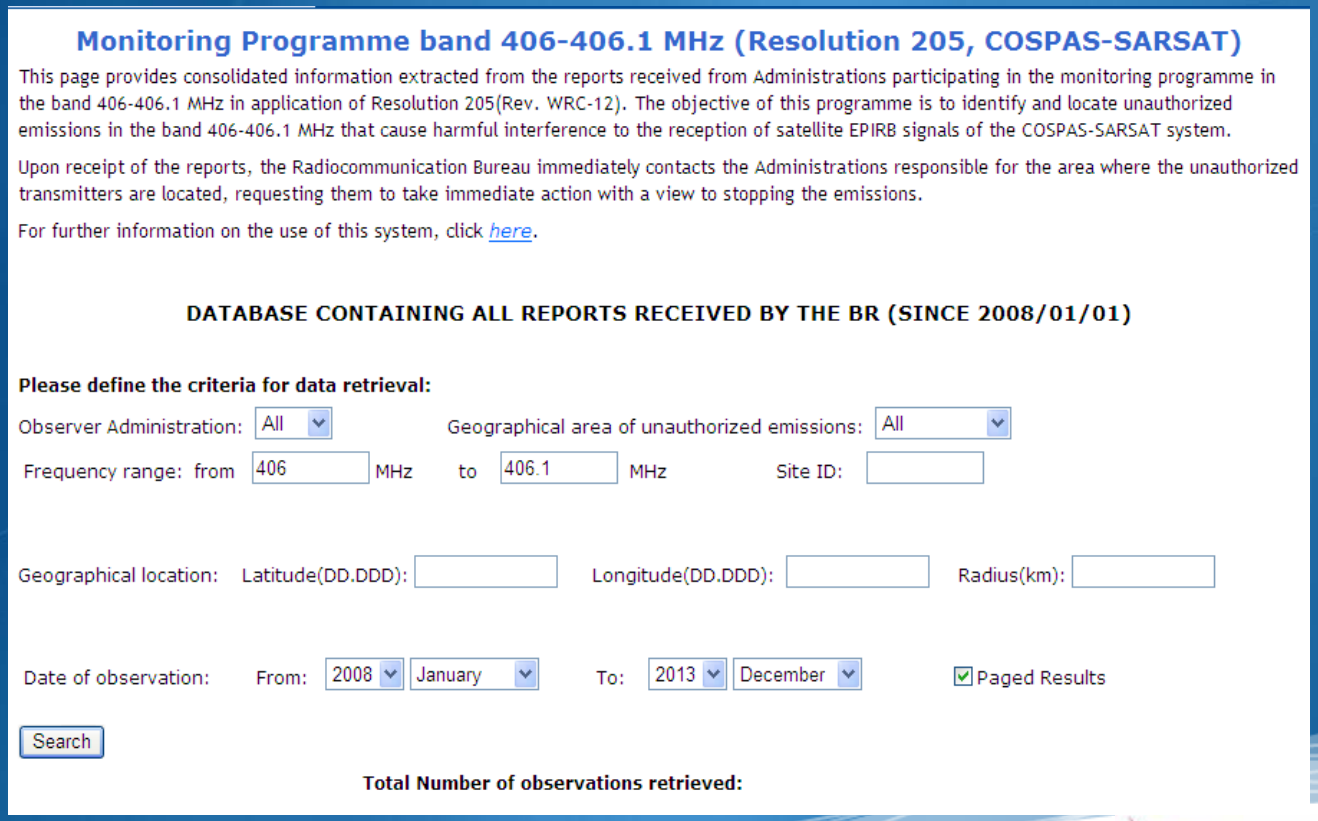
ITU-R activities relative to spectrum monitoring – Regular and special programmes

- Special programme:
  - Pursuant to Resolution 205 (Rev. WRC-12), a special monitoring campaign has been in progress since 1987 in the 406-406.1 MHz band allocated exclusively to satellite emergency position-indicating radio beacons (EPRIBs) used in the COSPAS/SARSAT programme;
  - Statistics on the number of interfering emissions that have been detected and subsequently suppressed are published in the BR annual reports and also at:

    http://www.itu.int/en/ITU-R/terrestrial/monitoring/Pages/Res205.aspx

ITU-R activities relative to spectrum monitoring – Regular and special programmes

- An online database query facility for the consolidated data relative to Resolution 205 can be found at: http://www.itu.int/net4/ITU-R/terrestrial/res205/default.aspx



Monitoring Programme band 406-406.1 MHz (Resolution 205, COSPAS-SARSAT)

This page provides consolidated information extracted from the reports received from Administrations participating in the monitoring programme in the band 406-406.1 MHz in application of Resolution 205(Rev. WRC-12). The objective of this programme is to identify and locate unauthorized emissions in the band 406-406.1 MHz that cause harmful interference to the reception of satellite EPIRB signals of the COSPAS-SARSAT system.

Upon receipt of the reports, the Radiocommunication Bureau immediately contacts the Administrations responsible for the area where the unauthorized transmitters are located, requesting them to take immediate action with a view to stopping the emissions.

For further information on the use of this system, click here.

DATABASE CONTAINING ALL REPORTS RECEIVED BY THE BR (SINCE 2008/01/01)

Please define the criteria for data retrieval:

Observer Administration: All Geographical area of unauthorized emissions: All

Frequency range: from 406 MHz to 406.1 MHz Site ID:

Geographical location: Latitude(DD.DDD): Longitude(DD.DDD): Radius(km):

Date of observation: From: 2008 January To: 2013 December Paged Results

Search

Total Number of observations retrieved:

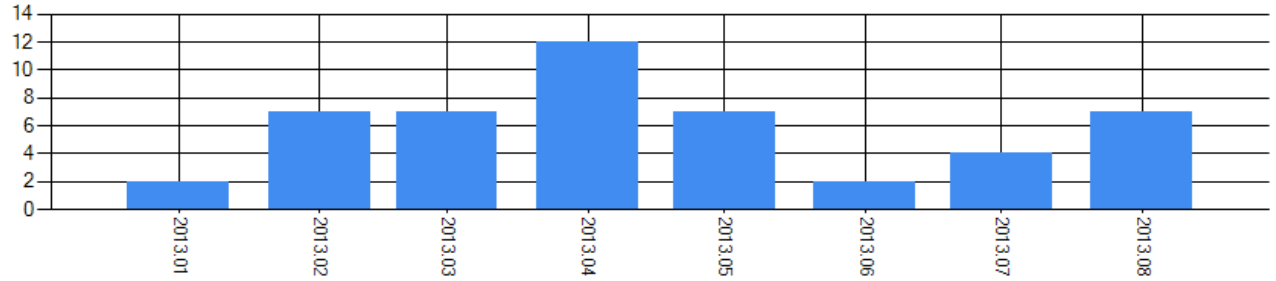
Date of observation: From: 2013 January To: 2013 September Paged Results

Search

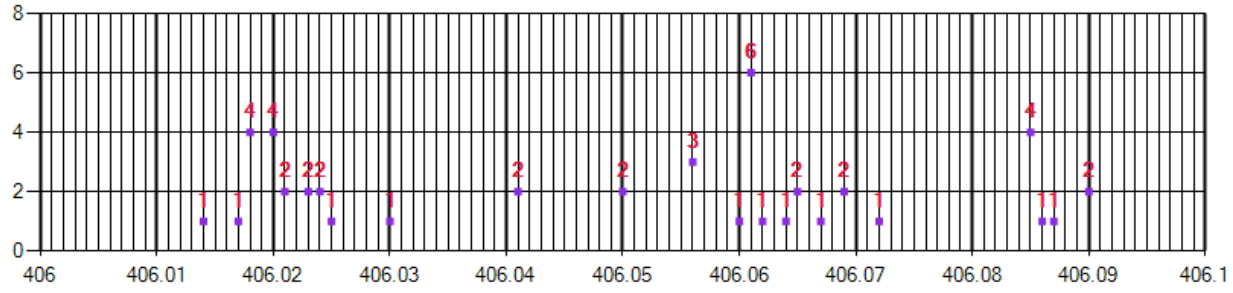
Total Number of observations retrieved: 48

	Observer	SiteID	Country	City	Direction	Distance	Latitude	Longitude	Frequency (MHz)	Observations	Monthly Ratio	First Date	Last Date
1	TUR	271009109	LBN	Bayrut	W	43.6	33.14	35.37	406.04064	23	0.01	20130102	20130820
2	I	247000041	IRQ	AS SULAYMANIYAH	ENE	5	35.58	45.5	406.056	10		20130418	20130830
3	I	247000046	RUS	KALININGRAD	WSW	28	50.73	20.08	406.03			20130707	20130709
4	I	247000047	ISR	ARAD	SE	11	31.21	35.21	406.067	11		20130806	20130829
5	I	247000048	RUS	TULA	NNW	9	54.3	37.6	406.087	73		20130805	20130817
6	I	247000033	ALG	PALESTRO	E	16	36.55	3.77	406.056	11		20130102	20130126
7	I	247000034	RUS	KURSK	E	10	51.74	36.33	406.02	25		20130124	20130131
8	CAN	316018806	CAN	Medicine Hat, Alberta	SSE	58.7	50.26	-111.42	406.09016	25	0.03	20130218	20130228
9	I	247000035	RUS	TEYKOVO	SW	18	56.71	40.45	406.02	18		20130214	20130215
10	I	247000036	E	MADRID	E	22	40.39	-3.39	406.085	33		20130204	20130226

1 2 3 4 5



Number of emissions reported per month



Number of emissions reported per frequency (MHz)

ITU-R activities relative to spectrum monitoring – Use of the monitoring data by the Bureau

Assistance to administrations in cases of harmful interference:

- Pursuant to Article 15 of the RR, an administration may seek the assistance of the Bureau in resolving cases of harmful interference;
- The Bureau may request the cooperation of appropriate administrations or specially designated stations of the International Monitoring System that may be able to help in identifying the source of harmful interference;
- After having analysed the results of the monitoring, the Bureau will recommend - to the concerned administrations - actions to be taken.

ITU-R activities relative to spectrum monitoring – Use of the monitoring data by the Bureau

Preparation for radiocommunication conferences:

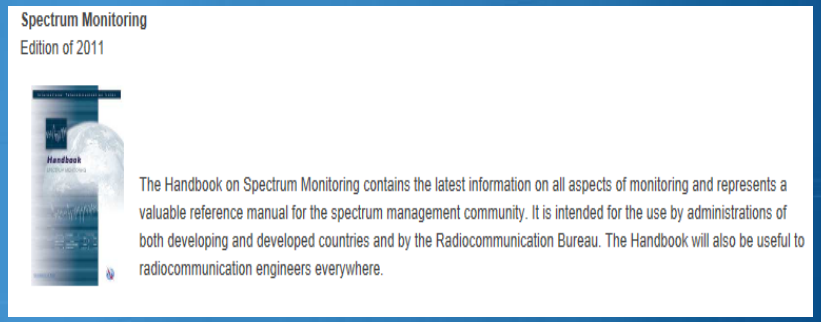
- During preparations for a radiocommunication conference, and in view of changes to the Table of Frequency Allocations, the Bureau may organize special monitoring campaigns designed to supplement the data in the Master Register.
  Results are submitted to the Conference in the form of a report so that it may evaluate the impact of the proposed changes in spectrum use.

- Equally, a radiocommunication conference may instruct the Bureau to organize special monitoring campaigns in order to obtain data concerning the use of a specific part of the spectrum and/or to support studies concerning interference caused to safety communications, to be further analysed by a subsequent conference.

ITU-R activities relative to spectrum monitoring – Study Groups

Study Group 1: “Spectrum management”

- WP 1C - Spectrum monitoring
- Next meeting in June 2014 in Geneva
- http://www.itu.int/ITU-R/go/rwp1c/en
- Handbook on Spectrum Monitoring
- Online access free of charge for TIES users
- Available at http://www.itu.int/pub/R-HDB-23



Study Group 4: “Satellite Services”

- WP 4C – Efficient orbit/spectrum utilization for MSS and RDSS
  - Continue studies for the special programme
  - Next meeting in June 2014 in Geneva
  - http://www.itu.int/ITU-R/go/rwp4c

Final Remarks

- As demands on spectrum increase through the introduction of new services, so increases the importance of spectrum monitoring.
- The BR continues to organize the regular HF band monitoring programme as well as the special 406-406.1 MHz band programme.
- Administrations not yet participating in these monitoring programmes are encouraged to take part in these programmes in accordance with No. 16.5 of the RR.
- Join ITU-R WP 1C to participate in the technical studies related to spectrum monitoring.

Thank you for your attention!

ITU – Radiocommunication Bureau
Questions to brmail@itu.int or brtpr@itu.int