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Harmful interference

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Co-Organizers:



Overview

- **Introduction**
 - **Definitions of interference**
 - **Measures against harmful interference**
 - **Causes of harmful interference**
 - **Procedures to resolve harmful interference**
 - **Conclusions**
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Introduction

- **Radio frequency spectrum 8.3 kHz - 3 000 GHz**
 - **Limited natural resource**
 - **All countries have equal rights**
 - **Some 40 radio services in the table of frequency allocations to be operated free of interference**
 - **Various measures in ITU Constitution and Radio Regulations to prevent harmful interference**
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Definitions

- **Permissible interference**
 - Observed or predicted interference which complies with interference and sharing criteria
 - **Accepted interference**
 - Interference at a higher level than permissible interference
 - **Harmful interference**
 - Interference to radionavigation or safety services or seriously affect other services
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Measures against interference (CS)



Role of the ITU

To allocate frequency bands, register assignments ... in order to avoid harmful interference (CS 11)

To coordinate efforts to eliminate harmful interference ...(CS 12)

Role of ITU Members

To apply the CS, CV and RR in stations operated by them or authorized by them and which are capable of causing harmful interference (CS 37, 38, 197 and 198)

Measures against interference (RR)



Preamble to the RR

Nos. 07-08

- to ensure the availability and protection from harmful interference of the frequencies provided for distress and safety purposes
- to assist in the prevention and resolution of cases of harmful interference

Measures against interference (RR)



Two main concepts

Frequency block allocations intended for use by defined services (Table of frequency allocations) supplemented by plans

Voluntary or obligatory regulatory procedures (Rules for assignments, international recognition, notification, etc.)

Measures against interference (RR)



General rules for assignments

Article 4

- Assignments are to be made in accordance with the Table of Frequency Allocations and other provisions of the RR
- Any new assignment or any change shall be made in such a way as to avoid causing harmful interference
- Administrations shall not assign any frequency in derogation, except on the condition no harmful interference and no protection from harmful interference

Measures against interference (RR)



Frequency allocations Table

Article 5

- **Common frequency allocations to mutually compatible services**
- **Primary and secondary services**
 - Secondary service shall not cause harmful interference to primary services
 - Secondary service shall not claim protection from primary services
 - But can claim protection from the same or other secondary services
- **Allocations subject to a plan or a coordination procedure**

RR5-54

CHAPTER II – Frequencies

410-460 MHz		
Allocation to services		
Region 1	Region 2	Region 3
410-420	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268	
420-430	FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271	
430-432 AMATEUR RADIOLOCATION 5.271 5.274 5.275 5.276 5.277	430-432 RADIOLOCATION Amateur 5.271 5.276 5.278 5.279	
432-438 AMATEUR RADIOLOCATION Earth exploration-satellite (active) 5.279A 5.138 5.271 5.276 5.277 5.280 5.281 5.282	432-438 RADIOLOCATION Amateur Earth exploration-satellite (active) 5.279A 5.271 5.276 5.278 5.279 5.281 5.282	
438-440 AMATEUR RADIOLOCATION 5.271 5.274 5.275 5.276 5.277 5.283	438-440 RADIOLOCATION Amateur 5.271 5.276 5.278 5.279	
440-450	FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286	
450-455	FIXED MOBILE 5.286AA 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E	
455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	455-456 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.209 5.286A 5.286B 5.286C	455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E
456-459	FIXED MOBILE 5.286AA 5.271 5.287 5.288	
459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	459-460 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.209 5.286A 5.286B 5.286C	459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E

Measures against interference (RR)



Status of assignments

Article 8

- Rights and obligations
- International recognition
- Assignments notified under No. 4.4
- Application of No. 8.5

Measures against interference (RR)



Article 11

Notification and recording of assignments

- Any assignment shall be notified :
- if capable of causing harmful interference
- if used for international radiocommunication
- if subject to the coordination procedure
- to obtain international recognition
- if an administration wishes to register a non-conforming assignment, for information

Measures against interference (RR)



Interference from Radio Stations

Article 15

- **Unnecessary transmissions**
- **Transmitting stations limited to necessary power**
- **Minimum radiation in unnecessary directions**
- **No interference on distress and safety frequencies**

Measures against interference (RR)



Licences

Article 18

No transmitting station may be established or operated by a private person or by any enterprise **without a licence**... (No. 18.1)

Measures against interference (RR)



Broadcasting service

Article 23

Broadcasting stations using frequencies below 5 060 kHz or above 41 MHz **shall not employ power exceeding that necessary** to maintain ... national service of good quality within the frontiers of the country concerned (No. 23.3)

Procedure in a case of harmful interference



It is essential that Member States exercise the **utmost goodwill and mutual assistance** in the application of the provisions of Article 45 of the Constitution and Article 15 of the RR to the settlement of problems of harmful interference (No. 15.22)

Article 15
section VI

Procedure in a case of harmful interference



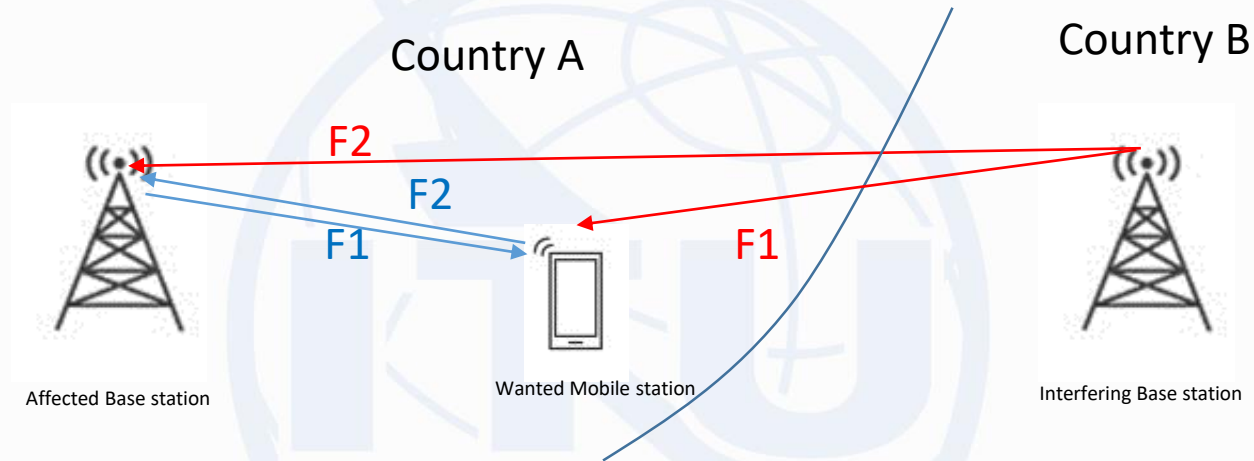
- **Cooperation between administrations**
 - **Direct contact between monitoring stations or operating agencies concerned**
 - **If necessary, inform the BR**
 - **If bilateral action failed, request BR assistance**
 - **The BR help in identifying the source of the interference and seek the cooperation of the responsible administration to resolve the matter and, if necessary, prepare a report to RRB**
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Causes of harmful interference



- **Out of band operations**
 - **Operation of non-coordinated frequencies**
 - **Non-observance of limits of frequency tolerances or maximum permitted power levels for spurious emissions**
 - **Non-observance of limitation within the band allocated**
 - **Operating with technical parameters different from those notified**
 - **Unnecessary transmissions**
 - **Unauthorised emissions**
-

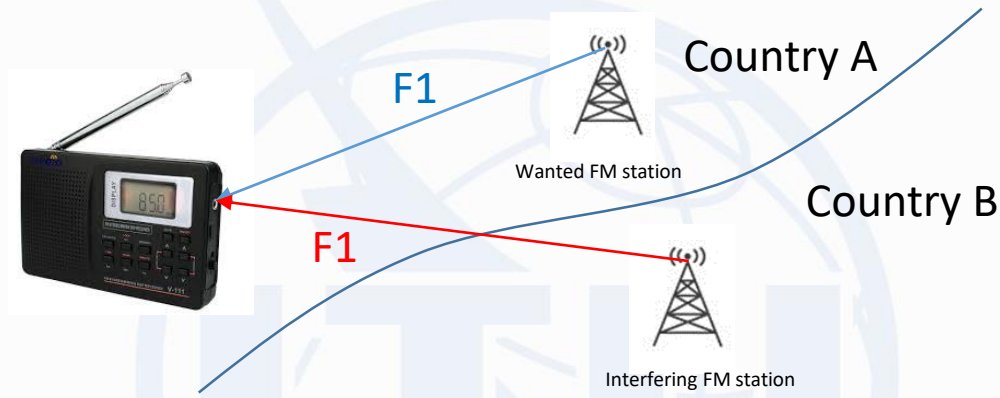
Example of non-coordinated frequencies (Mobile)



Status derived from the conformity with the Table of Frequency Allocations and other provisions of the RR

Assignments recorded in the MIFR with a favourable finding under No. 11.31 has right to international recognition

Example of operation with different technical parameters (Broadcasting)



FINAL ACTS
of the
Regional Administrative Conference
for the Planning
of VHF Sound Broadcasting
(Region 1 and part of Region 3)
Geneva, 1984

Status derived from the application of the procedures associated with the plan

Assignments recorded in the MIFR with a favourable finding under No. 11.34 has right to international recognition

Harmful interference statistics

> 1000 Appendix 10 Reports in 2018

- 1079 broadcasting service
 - 17 land mobile service
 - 13 aeronautical mobile service
 - 2 fixed service
 - 2 amateur service
 - 1 maritime mobile service
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Final remarks

- **All stations must be established and operated in such a manner as not to cause harmful interference**
 - **Any assignment that could cause harmful interference shall be notified to the ITU**
 - **Spectrum monitoring is an essential component of a National Spectrum Management System**
 - **Radio waves do not stop at borders, it is necessary to coordinate with your neighbours**
 - **Coordination agreements including a procedure for resolving harmful interference**
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Thank you



Report of harmful interference

(See Article 15, Section VI)

Particulars concerning the station causing the interference:

a Name, call sign or other means of identification

b Frequency measured

Date:

Time (UTC):

c Class of emission¹

d Bandwidth (indicate whether measured or estimated)

e Measured field strength or power flux-density²

Date:

Time (UTC):

f Observed polarization

g Class of station and nature of service

h Location/position/area/bearing (QTE³) (WRC-07)

i Location of the facility which made the above measurements

Particulars concerning the transmitting station interfered with:

j Name, call sign or other means of identification

k Frequency assigned

l Frequency measured

Date:

Time (UTC):

m Class of emission⁴

n Bandwidth (indicate whether measured or estimated, or indicate the necessary bandwidth notified to the Radiocommunication Bureau)

o Location/position/area

p Location of the facility which made the above measurements

Particulars furnished by the receiving station experiencing the interference:

q Name of station

r Location/position/area

s Dates and times (UTC) of occurrence of harmful interference

t Bearings (QTE⁵) or other particulars (WRC-07)

u Nature of interference

v Field strength or power flux-density of the wanted emission at the receiving station experiencing the interference⁶

Date:

Time (UTC):

w Polarization of the receiving antenna or observed polarization

x Action requested

NOTE – For convenience and brevity, telegraphic reports shall be in the format above, using the letters in the order listed in lieu of the explanatory titles, but only those letters for which information is provided should be used. However, sufficient information shall be provided to the administration receiving the report, so that an appropriate investigation can be conducted.

¹ The class of emission shall contain the basic characteristics listed in Appendix 1. If any characteristic cannot be determined, indicate the unknown symbol with a dash. However, if a station is not able to identify unambiguously whether the modulation is frequency or phase modulation, indicate frequency modulation (F).

² When measurements are not available, signal strengths according to the QSA scale should be provided.

³ See the most recent version of Recommendation ITU-R M.1172. (WRC-07)

⁴ See footnote 1.

⁵ See footnote 3.