Radio Regulations

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Radiocommunication Bureau
Radio Regulations (RR)

1. RR: Organization and Main concepts
2. International Table of Frequency Allocations (ITFA)
3. Rules of Procedure
4. Master International Frequency Register, MIFR, and BR IFIC
5. RR and National Spectrum Management
Radio Regulations (RR)

1. RR: Organization and Main concepts
2. International Table of Frequency Allocations (ITFA)
3. Rules of Procedure
4. Master International Frequency Register, MIFR, and BR IFIC
5. RR and National Spectrum Management
**RR 1.3: “Telecommunication: Any transmission, emission or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems.**

**RR 1.5: Radio waves (or hertzian waves): Electromagnetic waves of frequencies arbitrarily lower than 3000 GHz, propagated in space without artificial guide.”**
SPECTRUM AS NATURAL RESOURCE

- **Natural Resource**: phenomena of nature
- **Non replicable**: cannot be reproduced (as agriculture)
- **Scarce**: quantity of information (Mbps per MHz) that can be transmitted is limited
- Need to be “shared” by stations using same frequency
- **Spectrum Management and Regulation** aim to guarantee and **efficient and rational** use of Spectrum, both and **national and international levels**

**Main goal**: prevent and control **Interferences**: maximize sharing while minimize prejudicing
Spectrum cannot be limited to a given territory; international coordination is necessary.

ITU Radio Regulations (RR) is an International Treaty, elaborated and revised by administrations and membership, during World Radio Conferences (WRC); RR has a binding nature for ITU Member states.

ITU acts as depositary of RR

Last version: RR-16 (as revised during WRC-15)

RR can be downloaded, free of charge, for the general public, in the 6 UN Languages, at:

http://www.itu.int/pub/R-REG-RR-2016
Principles in the Preamble to the Radio Regulations:

“No. 0.3 In using frequency bands for radio services, Members shall bear in mind that radio frequencies and the geostationary-satellite orbit are limited natural resources and that they must be used rationally, efficiently and economically, in conformity with the provisions of these Regulations, so that countries or groups of countries may have equitable access to both, taking into account the special needs of the developing countries and the geographical situation of particular countries (No. 196 of the Constitution).”

“No. 0.4 All stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Members or of recognized operating agencies, or of other duly authorized operating agencies which carry on a radio service, and which operate in accordance with the provisions of these Regulations (No. 197 of the Constitution).”
VOLUME 1: Articles (60)

VOLUME 2: Appendices (23)

VOLUME 3: Resolutions (160) and Recommendations (24)

VOLUME 4: ITU-R Recommendations incorporated by reference (40)

MAPS: Set of Maps for App. 27

* Non consecutive numbering, some with number and letters
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<tr>
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<td><strong>Radio Regulations Volume 3 (last version: 2016)</strong></td>
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</tr>
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<td><strong>RECOMMENDATION Number (WRC-year)</strong></td>
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<td><strong>RECOMMENDATION 724 (WRC-07): Use by civil aviation of frequency allocations on a primary basis to the fixed-satellite service</strong></td>
<td><strong>RECOMMENDATION ITU-R SM.2103-0 (09/2017): Global harmonization of short-range devices categories</strong></td>
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**16.2 The international monitoring system ..... in accordance with Resolution ITU-R 23 and the most recent version of Recommendation ITU-R SM.1139.....**

**1.14 Coordinated Universal Time (UTC): Time scale, based on the second (SI), as described in Resolution 655 (WRC-15).**

**5.548 In designing systems for the inter-satellite service in the band 32.3-33 GHz, ........... bearing in mind the safety aspects of the radionavigation service (see Recommendation 707).**
ITU-R Recommendations Incorporation

List and the end of Vol. 4

Compulsory (by incorporation):
- Linked by the expression: “shall”
- Version explicitly indicated;
- No automatic update*;
- Solely applies to the pertinent item, otherwise is voluntary

Voluntary:
- Linked by the expression: “should” or any other text than “shall”
- Version is NOT indicated;
- Automatic update (“most recent version of”)
- Apply to all Recommendations not explicitly cited on the list and item

- TIP: NO version = Reference; “-version”: incorporation
## Recommendation P.525

Approved in 2016-11  
Managed by R00-SG03

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Status</th>
<th>Questions</th>
</tr>
</thead>
</table>
| P.525-3 (11/2016) | Calculation of free-space attenuation  
Note - A previous version of this Recommendation is incorporated by reference in the Radio Regulations. | In force (Main) | N/A       |

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Status</th>
<th>Questions</th>
</tr>
</thead>
</table>
| P.525-2 (08/94) | Calculation of free-space attenuation  
Note - This version of the Recommendation is incorporated by reference in the Radio Regulations. | Superseded   | N/A       |

* WRC-19 a.i. 2: to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations communicated by the Radiocommunication Assembly, in accordance with Resolution 28 (Rev.WRC-15), and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with the principles contained in Annex 1 to Resolution 27 (Rev.WRC-12)
Voluntary:
16.6 Administrative ..... of the international monitoring system should be in accordance with the most recent version of Recommendation ITU-R SM.1139.

21.2.2 Information on this subject is given in the most recent version of Recommendation ITU-R SF.765

Incorporated:
19.102 3) The types of maritime mobile service identities shall be as described in Annex 1 of Recommendation ITU-R M.585-7.

Be careful!:
19.108A The maritime identification...... Furthermore, as indicated in the most recent version of Recommendation ITU-R M.585, some maritime....

25.6 2) Administrations shall verify ..... Guidance for standards of competence may be found in the most recent version of Recommendation ITU-R M.1544.
Services and Stations:

**RR, No. 1.3 Telecommunication:** Any transmission, emission or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems.

**RR, No. 1.4 radio:** A general term applied to the use of radio waves.

**RR, No. 1.5 Radio waves (or hertzian waves):** Electromagnetic waves of frequencies arbitrarily lower than 3000 GHz, propagated in space without artificial guide.

**RR, No. 1.19 Radiocommunication service:** A service involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes. In these Regulations, unless otherwise stated, any radiocommunication service relates to terrestrial radiocommunication.

**RR, No. 1.61 Station:** One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radio astronomy service.
1.116 public correspondence: Any telecommunication which the offices and stations must, by reason of their being at the disposal of the public, accept for transmission (CS). [CS 1004]

1.7 terrestrial radiocommunication: Any radiocommunication other than space radiocommunication or radio astronomy.

1.8 space radiocommunication: Any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space.

1.20 fixed service: A radiocommunication service between specified fixed points

1.38 broadcasting service: A radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmission (CS). [CS 1010]
**1.24 mobile service:** A radiocommunication service between mobile and land stations, or between mobile stations (CV).)[CV 103] *

**1.26 land mobile service:** A mobile service between base stations and land mobile stations, or between land mobile stations.

**1.28 maritime mobile service:** A mobile service between coast stations and ship stations, or between ship stations, or between associated on-board communication stations; survival craft stations and emergency position indicating radiobeacon stations may also participate in this service.

**1.32 aeronautical mobile service:** A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies.

- The mobile service covers by default: land, aeronautical, maritime
- In general for maritime services: "Messages which are of a public correspondence nature shall be excluded from this service”
- (and aeronautical?: aeronautical mobile (R)* service: ...reserved for communications relating to safety and regularity of flight, ...
**RR: Radio Stations and Systems**

**1.61 station:** One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radio astronomy service.

**1.64 space station:** A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.

**1.62 terrestrial station:** A station effecting terrestrial radiocommunication. In these Regulations, unless otherwise stated, any station is a terrestrial station.

**1.63 earth station:** A station located either on the Earth's surface or within the major portion of the Earth's atmosphere and intended for communication:
– with one or more space stations; or
– with one or more stations of the same kind by means of one or more reflecting satellites or other objects in space.

**1.69 land station:** A station in the mobile service not intended to be used while in motion.

<table>
<thead>
<tr>
<th>RR</th>
<th>English</th>
<th>Français</th>
<th>Español</th>
<th>tip</th>
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</thead>
<tbody>
<tr>
<td>1.62</td>
<td>Terrestrial Station</td>
<td>Station de Terre</td>
<td>Estación Terrenal</td>
<td>not Space</td>
</tr>
<tr>
<td>1.63</td>
<td>Earth Station</td>
<td>Station Terrienne</td>
<td>Estación Terrena</td>
<td>link Earth --&gt; Space</td>
</tr>
<tr>
<td>1.69</td>
<td>Land Station</td>
<td>Station Terrestre</td>
<td>Estación Terrestre</td>
<td>not Maritime nor Aeronautical</td>
</tr>
</tbody>
</table>
**RR: Radio Stations and Systems**

1.66 **fixed station**: A station in the fixed service

1.85 **broadcasting station**: A station in the broadcasting service.

1.67 **mobile station**: A station in the mobile service intended to be used while in motion or during halts at unspecified points.

1.73 **land mobile station**: A mobile station in the land mobile service capable of surface movement within the geographical limits of a country or continent.

1.77 **ship station**: A mobile station in the maritime mobile service located on board a vessel which is not permanently moored, other than a survival craft station.

1.83 **aircraft station**: A mobile station in the aeronautical mobile service, other than a survival craft station, located on board an aircraft.
RR: Services and Stations

RR defines 41 radio services (Vol. I, Section III: 1.20 to 1.60). They can be grouped according to several parameters, such as:

1. **Link**: Earth (Earth-Earth), Space (Earth --> Space, Space-Space)
2. **Service area**: land (land), sea (maritime), air (aeronautical)
3. **User Profiles**:
   - Public Correspondence: fixed, mobile communications, broadcasting
   - Specialized: aeronautics; maritime, meteorological; observation of the Earth; scientific time standard; astronomy; safety; specials etc

The RR defines 53 radio stations (Vol. I, Section IV: 1.61 to 1.115). They can be grouped according to the same parameters of the radio services.

53 kinds of stations and 41 kinds of services: some stations simultaneously involve more than one service.
Some “by default” implications:

1. **All** radiocommunication services refer to terrestrial radiocommunication unless otherwise stated (RR 1.19) e.g: **Fixed** is terrestrial; **Fixed-Satellite** is **Space link**

2. **Fixed services** are placed on **Land**: links between fixed stations placed on Land (dry masses)

3. **Broadcast services** are placed on **Land**: links between Broadcast stations and Receivers placed on Land (dry masses)

4. **Fixed-Satellite and Broadcast-satellite services** are also mainly intended to **Land Area**; mostly of satellite footprints also cover seas (but are not **maritime services**) and airspaces (but are not **aeronautical services**)

5. **Mobile services** applies for all Areas, unless otherwise stated: a) Land Mobile; b) Maritime Mobile; c) Aeronautical Mobile. E.g.: **Mobile except aeronautical mobile**: it covers both Land Mobile and Maritime Mobile

6. **Maritime** and **Aeronautical** are always **Mobile**

7. **Fixed Stations** might link **Mobile Services**: links between Base Station (Fixed) and **Mobile Station**
Terrestrial services

The following services are not defined by the Radio Regulations (RR) as being part of any grouping of services.

- Broadcasting
- Amateur
- Radio astronomy
- Meteorological aids
- Standard frequency and time signal

Note 1 - The ship movement and port operation services are not subject to any table allocations. They are referred to in RR Appendix 18.
Space services

- Mobile-satellite
  - Land mobile-satellite
  - Maritime mobile-satellite
  - Aeronautical mobile-satellite
    - Aeronautical mobile-satellite (R)
    - Aeronautical mobile-satellite (OR)
  - Radiodetermination-satellite
  - Radiolocation-satellite
  - Earth exploration-satellite
  - Meteorological-satellite

- Radionavigation-satellite
  - Aeronautical radionavigation-satellite
  - Maritime radionavigation-satellite

The following services are not defined by the RR as being part of any grouping of services:

- Fixed-satellite
- Broadcasting-satellite
- Amateur-satellite
- Radio astronomy
- Standard frequency and time signal-satellite
- Space operations
- Space research
- Inter-satellite
RR: Other concepts

1.60 special service: A radiocommunication service, not otherwise defined in this Section, carried on exclusively for specific needs of general utility, and not open to public correspondence.

1.15 industrial, scientific and medical (ISM) applications (of radio frequency energy): Operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications.

ISMs are not strictly a radio service, and because of that they do not have frequency Allocations; they rather have "designations" through footnotes, with their explicit associated restrictions.

15.13 Administrations shall take all practicable and necessary steps to ensure that radiation from equipment used for industrial, scientific and medical applications is minimal and that, outside the bands designated for use by this equipment, radiation from such equipment is at a level that does not cause harmful interference to a radiocommunication service and, in particular, to a radionavigation or any other safety service operating in accordance with the provisions of these Regulations.
**Other concepts:** although not explicitly defined, on the RR when dealing with band allocations (Art. 5), the use into footnotes of expressions: “identified” and “designated” express the interest/intention of some administrations on a future use of that band for a specific application; that in benefit of a mid and long term harmonization of the use of that band. Examples*:

**RR, Nos. 5.138, 5.150, 5.280 (some R1):** Bands *designated* for industrial, scientific and medical (ISM) applications.

**RR, No. 5.552A:** Bands *designated* for use by high Altitude Platform Stations (HAPS)

**RR, No. 5.516B:** bands *identified* for use by High-Density applications in the fixed-satellite service (also named: High Througput Satellites, HTS)


*: Footnotes stated that: “This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations”.
RADIO REGULATIONS: IMT Bands

All footnotes related to IMT indicates that:

the band \( X \) MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations.

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<th>Band (MHz)</th>
<th>Bandwidth (MHz)</th>
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<td>20</td>
<td>5.286AA</td>
</tr>
<tr>
<td>698-960</td>
<td>262</td>
<td>5.313A, 5.317A</td>
</tr>
<tr>
<td>1710-2025</td>
<td>315</td>
<td>5.384A, 5.388</td>
</tr>
<tr>
<td>2110-2200</td>
<td>90</td>
<td>5.388</td>
</tr>
<tr>
<td>2300-2400</td>
<td>100</td>
<td>5.384A</td>
</tr>
<tr>
<td>2500-2690</td>
<td>190</td>
<td>5.384A</td>
</tr>
<tr>
<td>3400-3600</td>
<td>200</td>
<td>5.430A, 5.432A, 5.432B, 5.433A</td>
</tr>
</tbody>
</table>
RR, No. 1.166 interference: The effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunication system, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy.

A Rx may face many interferences sources: intra-band (same or other services); adjacent bands/services; permanent and intermittent; fixed or mobile source; unintentional and intentional; current and futures, etc.
RR, No. 1.167 permissible interference: Observed or predicted interference which complies with quantitative interference and sharing criteria contained in these Regulations or in ITU-R Recommendations or in special agreements as provided for in these Regulations.

RR, No. 1.168 accepted interference: Interference at a higher level than that defined as permissible interference and which has been agreed upon between two or more administrations without prejudice to other administrations.

RR, No. 1.169 harmful interference: 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 (CS).

In Spectrum Management and Regulation, the use of the expression: “Interference” refers by default to “harmful interference”
CS: harmful interference (Art. 45)

197 1 All stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Member States or of recognized operating agencies, or of other duly authorized operating agencies which carry on a radio service, and which operate in accordance with the provisions of the Radio Regulations.

198 2 Each Member State undertakes to require the operating agencies which it recognizes and the other operating agencies duly authorized for this purpose to observe the provisions of No. 197 above.

199 3 Further, the Member States recognize the necessity of taking all practicable steps to prevent the operation of electrical apparatus and installations of all kinds from causing harmful interference to the radio services or communications mentioned in No. 197 above.

RR Art. 15: Interferences
Section I – Interference from Radio Stations
Section II – Interference from electrical apparatus and installations of any kind except equipment used for industrial, scientific and medical applications
Section III – Interference from equipment used for industrial, scientific and medical applications
Section IV – Tests
Section VI – Procedure in a case of harmful interference
Section V – Reports of Infringements
**RR, No. 1.16 allocation (of a frequency band):** Entry in the Table of Frequency Allocations* of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned.

**RR, No. 1.17 allotment (of a radio frequency or radio frequency channel):** Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space radiocommunication service in one or more identified countries or geographical areas and under specified conditions.

* Regulators commonly refers to it as: International Table of Frequency Allocations, IFTA, to easily remind its links to their respective national counterpart: National Table of Frequency Allocations, NFTA
RR, No. 1.18 assignment (of a radio frequency or radio frequency channel): Authorization given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions.

Allocations are granted to Radiocommunications Services
Assignments are granted to Radiocommunications Stations

RR in general does not deal with Assignments*, because it is an sovereign and autonomous right of administrations

However, national Station Assignments shall be consistent with its NTFA and also the RR (No. 4.4) e.g.: assignment of a TV Station, only into a band allocated to Broadcasting Services

* Due to their inherent international coverage nature, some services in some bands need that their allotment be also accompanied by an international assignment of their associated stations (so called: Planned Bands, contained on Vol. 2: Appendices)

NOTE: Most of dictionaries display the expressions “Allocation” and “Assignment” as being synonymous; in the context of Spectrum Management and Regulation they are different.
Allocations: granted to Radiocommunication Services

Assignments: granted to radiocommunication Stations

Generally speaking, the RR does not deal with assignments*: sovereign and autonomous right of administrations. But the national assignments to the respective stations must be in accordance with their CNAF and also with the RR (Article 4.4), e.g.: allocation of a television channel, only in a band allocated to the broadcasting services

* Due to its international nature, some services in some bands require that the award also be accompanied by an international assignment of its associated stations (Planned services, contained in Vol. 2: Appendices)

Art. 4.4: Administrations of the Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations in this Chapter or the other provisions of these Regulations, except on the express condition that such a station, when using such a frequency assignment, shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the Constitution, the Convention and these Regulations..
RR is technically neutral, hence, it

1. Does **allocate** frequency **bands** to radiocommunication services
2. Does **not** allocate to specific **applications**
3. Does **not** allocate to particular **technologies**
4. Does **not** define users **profile**

E.g.: allocation can be made to: “mobile” (service; by default: terrestrial, land)
- not specifically to:
  a) cellular networks (**application**)  
  b) GMS, LTE, Wimax, etc. (**technology**)  
  c) Official/commercial/particular use
Radio Regulations (RR)

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## Frequency Bands

<table>
<thead>
<tr>
<th>Número de la banda</th>
<th>Símbolos (en inglés)</th>
<th>Gama de frecuencias (excluido el límite inferior, pero incluido el superior)</th>
<th>Subdivisión métrica correspondiente</th>
<th>Abreviaturas métricas para las bandas</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>VLF</td>
<td>3 a 30 kHz</td>
<td>Ondas miriamétricas</td>
<td>B.Mam</td>
</tr>
<tr>
<td>5</td>
<td>LF</td>
<td>30 a 300 kHz</td>
<td>Ondas kilométricas</td>
<td>B.km</td>
</tr>
<tr>
<td>6</td>
<td>MF</td>
<td>300 a 3 000 kHz</td>
<td>Ondas hectométricas</td>
<td>B.hm</td>
</tr>
<tr>
<td>7</td>
<td>HF</td>
<td>3 a 30 MHz</td>
<td>Ondas decamétricas</td>
<td>B.dam</td>
</tr>
<tr>
<td>8</td>
<td>VHF</td>
<td>30 a 300 MHz</td>
<td>Ondas métricas</td>
<td>B.m</td>
</tr>
<tr>
<td>9</td>
<td>UHF</td>
<td>300 a 3 000 MHz</td>
<td>Ondas decimétricas</td>
<td>B.dm</td>
</tr>
<tr>
<td>10</td>
<td>SHF</td>
<td>3 a 30 GHz</td>
<td>Ondas centímetricas</td>
<td>B.cm</td>
</tr>
<tr>
<td>11</td>
<td>EHF</td>
<td>30 a 300 GHz</td>
<td>Ondas milimétricas</td>
<td>B.mm</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>300 a 3 000 GHz</td>
<td>Ondas decimilimétricas</td>
<td></td>
</tr>
</tbody>
</table>

**NOTA 1:** La «banda N» (N = número de la banda) se extiende de 0,3 \times 10^N Hz a 3 \times 10^N Hz.

**NOTA 2:** Prefijos: k = kilo (10^3), M = mega (10^6), G = giga (10^9).
5.25 a) services the names of which are printed in “capitals” (example: FIXED); these are called “primary” services;

5.26 b) services the names of which are printed in “normal characters” (example: Mobile); these are called “secondary” services (see Nos. 5.28 to 5.31).

5.48 3) Within each of the categories specified in Nos. 5.25 and 5.26, services are listed in alphabetical order according to the French language. The order of listing does not indicate relative priority within each category.

5.50 5) The footnote references which appear in the Table below the allocated service or services apply to more than one of the allocated services, or to the whole of the allocation concerned. (WRC-2000)

5.51 6) The footnote references which appear to the right of the name of a service are applicable only to that particular service.
Category of Services (basis) might be in a:
- a) PRIMARY basis (indicated by capital letters)*; e.g.: FIXED
- b) Secondary basis (indicated by lower case); e.g.: Fixed

**RR, No. 5.28** Stations of a secondary service:

**RR, No. 5.29** a) shall not cause harmful interference to stations of primary services to which frequencies are already assigned or to which frequencies may be assigned at a later date;

**RR, No. 30** b) cannot claim protection from harmful interference from stations of a primary service to which frequencies are already assigned or may be assigned at a later date;

**RR, No. 5.31** c) can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be assigned at a later date**

(**first in time, first in right**)

* In Arabic and Chinese versions, allocations in a primary basis are indicated by bold characters, it, e.g.:

  - Primary: 
    -  متنقلة بحرية
    - 无线电定位
  - Secondary:
    -  متنقلة بحرية
    - 无线电定位
RADIO REGULATIONS: CATEGORIES OF SERVICES

**ALL PRIMARY:** present and future

**Secondary**
- Prevent
- Accept

**Other Secondary:** ONLY previous

**NI/NP:** No interference / No Protection
<table>
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<tr>
<th>Frequency Band</th>
<th>Region 1</th>
<th>Region 2</th>
<th>Region 3</th>
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<tr>
<td>495-505</td>
<td>MARITIME MOBILE</td>
<td>MARITIME MOBILE</td>
<td>MARITIME MOBILE</td>
</tr>
<tr>
<td>505-526.5</td>
<td>MARITIME MOBILE 5.79 5.79A 5.84</td>
<td>AERONAUTICAL RADIONAVIGATION</td>
<td>MARITIME MOBILE 5.79 5.79A 5.84</td>
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<tr>
<td>510-525</td>
<td>MARITIME MOBILE 5.79A 5.84 AERONAUTICAL RADIONAVIGATION</td>
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<td>AERONAUTICAL RADIONAVIGATION</td>
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<tr>
<td>90-110</td>
<td>RADIONAVIGATION 5.62</td>
<td>Fixed</td>
<td>5.64</td>
</tr>
</tbody>
</table>

**Footnotes:**
- Harmonized
- PRIMARY
- Secondary
- Regional Band Split
- CO-PRIMARY
- Shared: PRIMARY and Secondary
Footnotes format

Footnote shall indicate:

• Area or countries
• Frequency range (could be all or a part of concerned band)
• Type of allocation change (different category; additional; alternative)
• Services to modify
• Restriction?

Case 1: no restriction

5.88 Additional allocation: in **China**, the band **526.5-535 kHz** is *also allocated* to the **aeronautical radionavigation** service on a **secondary basis**.

Case 2: with restriction

5.190 Additional allocation: in **Monaco**, the band **87.5-88 MHz** is *also allocated* to the **land mobile service** on a **primary basis**, subject to agreement obtained under **No. 9.21**.*
Sub-Section IIA – Requirement and request for coordination

9.6 Before an administration notifies to the Bureau or brings into use a frequency assignment in any of the cases listed below, it shall effect coordination, as required, with other administrations identified under No. 9.27:

...............  

9.21 p) for any station of a service for which the requirement to seek the agreement of other administrations is included in a footnote to the Table of Frequency Allocations referring to this provision.
Different Category of Service

5.32 4) Where a band is indicated in a footnote of the Table as allocated to a service “on a secondary basis” in an area smaller than a Region, or in a particular country, this is a secondary service (see Nos. 5.28 to 5.31).

5.33 5) Where a band is indicated in a footnote of the Table as allocated to a service “on a primary basis”, in an area smaller than a Region, or in a particular country, this is a primary service only in that area or country.
### Different Category of Service

<table>
<thead>
<tr>
<th>Frequency Range</th>
<th>Service Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>137-137.025</td>
<td>SPACE OPERATION (space-to-Earth)</td>
</tr>
<tr>
<td></td>
<td>METEOROLOGICAL-SATELLITE (space-to-Earth)</td>
</tr>
<tr>
<td></td>
<td>MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209</td>
</tr>
<tr>
<td></td>
<td>SPACE RESEARCH (space-to-Earth)</td>
</tr>
<tr>
<td></td>
<td>Fixed</td>
</tr>
<tr>
<td></td>
<td>Mobile except aeronautical mobile (R)</td>
</tr>
<tr>
<td></td>
<td>5.204 5.205 5.206 5.207 5.208</td>
</tr>
</tbody>
</table>

5.204 **Different category of service:** in Afghanistan, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Cuba, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Kuwait, Montenegro, Oman, Pakistan, the Philippines, Qatar, Serbia, Singapore, Thailand and Yemen, the band **137-138 MHz** is **allocated to the fixed and mobile**, except aeronautical mobile (R), services **on a primary basis** (see No. 5.33). (WRC-07)
5.34 Additional allocations

5.35 1) Where a band is indicated in a footnote of the Table as “also allocated” to a service in an area smaller than a Region, or in a particular country, this is an “additional” allocation, i.e. an allocation which is added in this area or in this country to the service or services which are indicated in the Table (see No. 5.36).

5.36 2) If the footnote does not include any restriction on the service or services concerned apart from the restriction to operate only in a particular area or country, stations of this service or these services shall have equality of right to operate with stations of the other primary service or services indicated in the Table.

5.37 3) If restrictions are imposed on an additional allocation in addition to the restriction to operate only in a particular area or country, this is indicated in the footnote of the Table.
### 5.176 Additional allocation

In Australia, China, Korea (Rep. of), the Philippines, the Dem. People’s Rep. of Korea and Samoa, the band **68-74 MHz** is also allocated to the **broadcasting service** on a **primary basis**. (WRC-07)
5.38 Alternative allocations

5.39 1) Where a band is indicated in a footnote of the Table as “allocated” to one or more services in an area smaller than a Region, or in a particular country, this is an “alternative” allocation, i.e. an allocation which replaces, in this area or in this country, the allocation indicated in the Table (see No. 5.40).

5.40 2) If the footnote does not include any restriction on stations of the service or services concerned, apart from the restriction to operate only in a particular area or country, these stations of such a service or services shall have an equality of right to operate with stations of the primary service or services, indicated in the Table, to which the band is allocated in other areas or countries.

5.41 3) If restrictions are imposed on stations of a service to which an alternative allocation is made, in addition to restriction to operate only in a particular country or area, this is indicated in the footnote.
5.167 Alternative allocation: in Bangladesh, Brunei Darussalam, India, Iran (Islamic Republic of), Pakistan, Singapore and Thailand, the band 50-54 MHz is allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-07)
Bands Harmonization

NOT HARMONIZED ALLOCATION:

1. **Different Services by Region**: not global scale for terminals; harder border coordination (Regions edges)

2. **Several Primary Services**: countries might adopt different primary services, harder border coordination intra RR Region

3. **Primary and Secondary Services**: countries might allocate services on a different basis onto his territory; international coordination becomes more complex

4. **National Footnotes**: national particular exemptions, with all the above inconvenient
Bands Harmonization

- Harmonized utilization of spectrum by different nations is an essential need to support international roaming, to facilitate interconnection and to provide more economical radiocommunication services,
- Frequency bands can be utilized at same point, in same time, almost once while there could be more than one demand for utilization,
- Uncoordinated electromagnetic radiation of individual and independent spectrum users increase interferences matters

Global Harmonization: Ultimate goal (as possible); **RR Recommendation 34**: recommends that future world radiocommunication conferences:

- **2. Should, wherever possible, allocate frequency bands on a worldwide basis** (aligned services, categories of service and frequency band limits) taking into account safety, technical, operational, economic and other relevant factors;
- **3. Should, wherever possible, keep the number of footnotes in Article 5 to a minimum** when allocating frequency bands through footnotes, in line with the Resolution 26 (Rev.WRC-07);
1. RR: Organization and Main concepts
2. International Table of Frequency Allocations (ITFA)
3. Rules of Procedure
4. Master International Frequency Register, MIFR, and BR IFIC
5. RR and National Spectrum Management
The Rules of Procedure complement the Radio Regulations (RR) by providing clarification of the application of particular Regulations or establishing the necessary practical procedures that may not be provided for in the current Regulatory Provisions.

RoP are revised at RRB meetings
RoP are free of charge and are available at: https://www.itu.int/pub/R-REG-ROP/en
In appliance of provision 4.5 (RR)

4.5 The frequency assigned to a station of a given service shall be separated from the limits of the band allocated to this service in such a way that, taking account of the frequency band assigned to a station, no harmful interference is caused to services to which frequency bands immediately adjoining are allocated.

it shall be followed the associated procedure (RoP)

4.5

1 The application of this provision involves the case of an adjacent band not allocated to the service concerned as well as the case of an adjacent band allocated to the service concerned with a different category of allocation.

1.1 A frequency assignment, of which the assigned frequency band overlaps a band not allocated to the service concerned, shall receive an unfavourable regulatory finding under No. 11.31.

1.2 A frequency assignment, of which the assigned frequency band overlaps a band allocated with a lower category of service will be considered as having the lower category of service and, when recorded, will bear a symbol to this effect. (See Symbols R and S in Table 13B, Column 13B2, of the Preface to the IFL.)

2 To resolve cases of harmful interference between services in adjacent bands it was decided that, irrespective of the phenomena at the origin of the interference (out-of-band emission, intermodulation products, etc.), the administration responsible for the emission overlapping a non-allocated band shall use appropriate means to eliminate the interference.
RoP are to be used by administrations and the BR in applying the Radio Regulations. The RoP have three main parts:

- **Part A:** Rules relating to a provision of the *Radio Regulations*, or a limited number of them
- **Part B:** Rules relating to a process such as the technical examinations
- **Part C:** Rules relating to internal working methods of the Radio Regulations Board (RRB)
The Radio Regulations Navigation Tool is a Java application dedicated to the browsing among the provisions of the following set of documents:

- Volumes I to IV of the Radio Regulations (Edition 2012)
- Rules of Procedures (Edition 2012, rev.8)
- ITU Constitution and Convention (Edition 2011)
- Plenipotentiary Conference 2014 Resolutions,

http://www.itu.int/pub/R-REG-RRX

The updated version of this Tool (RR 2016) will be available in 1Q17
The Frequency Attribution Table Analyzer (RR5FATViewer) is an independent application (off line) that provides a mechanism to use, consult and analyze electronically the Frequency Attribution Table and its associated notes, as they appear in Article 5 of the Radio Regulations. The software is equipped with several tools and utilities that allow, among other things, to track and compare the evolution of the Main Table of Article 5 and its associated footnotes (since the 2001 edition) and for the extraction of the International Plan of Frequency Assignments. "for a specific geographical area (country)."
Radio Regulations (RR)

1. RR: Organization and Main concepts
2. International Table of Frequency Allocations (ITFA)
3. Rules of Procedure
4. Master International Frequency Register, MIFR, and BR IFIC
5. RR and National Spectrum Management
Stations protection cannot be “in abstract”

Stations shall be duly registered, with all their technical parameters, and other issues:

- **Nationally**: National Spectrum Users Database
- **Internationally**: ITU Master Innal. Frequency Register, MIFR

Interference situations need to be objectively analyzed, and measured

- **Nationally**: Application of Spectrum National Rules
- **Internationally**: Application of provisions on RR and RoP
Stations shall be duly registered, with the technical parameters and other relevant data:

- **Nationally**: National Spectrum Users Database
- **Internationally**: ITU Master International Frequency Register, MIFR

Interference situations need to be objectively analyzed, and measured:

- **Nationally**: Application of Spectrum National Rules
- **Internationally**: Application of provisions on RR and RoP

Such analysis can only be made if affected stations are duly registered (Stations protection cannot be “in abstract”)
RR, No. 8.1. **International rights and obligations** of administrations in respect to frequency assignments shall be derived from the recording of those in the **Master International Frequency Register (Master Register)** or from their conformity, where appropriate, with a plan.

RR, No. 8.3. Frequency assignments **recorded** in the Master Register with a favourable finding have the **right to international recognition**.

RR, No. 8.4 A frequency assignment shall be known as a **non-conforming assignment** when it is **not in accordance** with the **Table of Frequency Allocations** or the other provisions of these Regulations.

RR, No. 8.5 If **harmful interference** to the reception of any station whose assignment is **in accordance** with No. 11.31 is actually **caused by** the use of a frequency assignment which is **not in conformity** with No. 11.31, the **station** using the latter frequency assignment must, upon receipt of advice thereof, immediately **eliminate this harmful interference**.
MIFR: what to notify?

1. Any frequency assignment (new entry or change of one recorded on the MIFR; RR, No. 11.1) relating to a transmitting station and to its associated receiving stations:
   a) Capable of causing harmful interference to any service of another administration (RR, No. 11.3)
   b) Used for International radiocommunication (RR, No. 11.4)
   c) Subject to world or regional frequency allotment or assignment plan which does not have its own notification procedure (RR, No. 11.5)
   d) Subject to the Art. 9 coordination procedure (RR, No. 11.6)
   e) Requesting international recognition (RR, No. 11.7)
   f) Non-conforming assignments*: for information only (RR, No. 11.8):

2. Receiving earth station or space station

3. Receiving HAPS stations in Fixed service in some Bands (RR, Nos. 5.543A & 5.52A)

4. Land station for reception from mobile stations
   • Involved Transmitting Stations: if apply any case from a) to f)
   • Involved Receiving Stations: if apply b) c) and e)

5. Used for reception of a radio astronomy station (if desired; RR, No. 11.12)

* Its operation shall not cause harmful interference to, and not claim protection from (RR, No. 8.4)
MIFR: what NOT to notify?

1. Assignments involving specific frequencies which are prescribed by RR for common use by terrestrial stations of a given service (RR, No. 11.13)*

2. Assignments to (RR, No. 11.14):
   a) Ship stations
   b) Mobile stations of other services
   c) Stations in amateur service
   d) Earth stations in amateur-satellite service
   e) Broadcasting Stations subject to a seasonal planning (Frequency range: 5900 to 26100 KHz; RR, Art. 12)

* Entered in MIFR directly by BR; consolidated table published in the Preface to the BR IFIC (RR, Chapter VI)
The **BR International Frequency information Circular (BR IFIC)** is intended to provide information on the frequency assignments/allotments submitted by administrations to the BR for recording in the Master International Frequency Register (MIFR) and Plans.

The BR IFIC is published once every two weeks by the BR (RR, Nos. 20.1 to 20.6 and 20.15). The BR IFIC is issued in the 6 UN languages: Arabic, Chinese, English, French, Russian and Spanish.

Due to the large volume of data, the BR IFIC is published in two parts: Terrestrial Services and Space Services. BR IFIC web sites:

Preface: It contains basic guidelines for its use.

The BR IFIC is a reference publication for Frequency Managers.

List of Assignments recorded in the MIFR with a favourable finding have the right to international recognition (RR, No. 8.3).

Acknowledgement of receipt for the notifying administration.

Coordination with administrations of neighbouring countries.

One copy of the BR IFIC is distributed free of charge to every administration.

It is essential to consult the BR IFIC regularly.
**RR, Art 18: Licenses**

**RR, No. 18.1:** No transmitting station may be established or operated by a private person or by any enterprise without a licence issued in an appropriate form and in conformity with the provisions of these Regulations by or on behalf of the government of the country to which the station in question is subject (however, see Nos. 18.2, 18.8 and 18.11).

Central provision of the RR: enables recognition of spectrum uses and their protection against harmful interference, at national and international level.

The international recognition requires the entry into the MIFR.
“Unlicensed Devices”

Expressions: “unlicensed”, “license exempt”, “blanket licenses” etc., refer to radio devices with transmitting capabilities (emitting radio waves) that can be operated by any person, without obtaining previously a particular authorization for it (particular assignment, license).

They always operate in a regime of “non-interference/non-protection basis” to allocated services. (NI/NP)

They shall share frequencies with other similar devices, all of them with equally rights, i.e., none of them having any priority (operation is likely lower than secondary). Without a limit to the amount of devices operating simultaneously in a same area, average used bandwidth cannot be guaranteed (QoS levels cannot be guaranteed).

Particular licensing waiving is only possible because of operation of “unlicensed devices” has been previously authorized to all public through a Generic Use Authorization, (also named General License, or equivalent names). Generic Use Authorization always includes a set of detailed technical and operational specifications that must be strictly obeyed when operating such devices, in order to guarantee their use without interfering to other similar devices or other services.

The expression “unlicensed” shall not be misinterpreted as permission to operating these devices in a free will fashion; its operation must strictly observe its GUA. Any alteration to exceed authorized pre setup parameters is an infringement of that GUA.
“Unlicensed Devices”

Every “unlicensed device” shall be pre set-up to obey its ruling specifications, enabling to operate without adjustments performed by its final user before or during operation. They are commonly labeled as “X compliant” to indicate to buyers its alignment with concerned ruling.

The expression “unlicensed” shall not be misinterpreted as permission to operating these devices in a free will fashion; its operation must strictly observe its ruling. Any alteration to exceed authorized pre setup parameters is an infringement of that ruling.

They always operate in a regime of “non-interference/non-protection basis” to allocated services

They shall share frequencies with other similar devices, all of them with equally rights, i.e., none of them having any priority (operation is likely lower than secondary). Without a limit to the amount of devices operating simultaneously in a same area, average used bandwidth cannot be guaranteed (QoS levels cannot be guaranteed).

As they are not protected and shall not interfere, they are not registered on Spectrum Users Databases: National, or International (MIFR)
Microsatellites

They are space stations, and subject to international regulations

**Radiocommunication space station:**
Subject to the provisions of the ITU Radio Regulations

**Object thrown into space:**
Subject to the provisions of the Space Law Treaties of the Commission for the Peaceful Uses of Outer Space (COPUOS)

The monitoring of these standards allows these projects, and the states involved, their harmonious operation without causing, or being affected by, risks to other existing systems.
Radio Regulations (RR)

1. RR: Organization and Main concepts
2. International Table of Frequency Allocations (ITFA)
3. Rules of Procedure
4. Master International Frequency Register, MIFR, and BR IFIC
5. RR and National Spectrum Management
Spectrum management is a combination of administrative and technical activities for efficient utilization of spectrum by users without causing harmful interference in their service area.

Main 3 layers:
1. **Planning**: Defining the use of different bands: Allocations to services
2. **Licensing**: Authorizing of emissions, and technical conditions: Assignments to Stations (Licenses)
3. **Monitoring & Enforcement**: Verifying the use of spectrum in conformity with licenses conditions; preventive and corrective measures

Spectrum cannot be confined to a given territory, then international matter shall be considered; furthermore, international harmonization entails many advantages for national management and spectrum users ecosystem.
Spectrum management goals include:

- making the radio spectrum available for government and non-government uses to stimulate social and economic progress
- making efficient and effective use of the spectrum

3 main layers:

1. **Planning**: Defining the use of different bands: Allocations to services: National Table of Frequency Allocations should be coherent with ITFA (Art. 5 of RR)

2. **Licensing**: Authorizing of emissions, and technical conditions: Assignments to Stations (Licenses). Licenses are registered in a National Spectrum Assignments Database those requiring international recognition should be registered in ITU MIFR

3. **Monitoring & Enforcement**: Verifying the use of spectrum in conformity with licenses conditions; preventive and corrective measures

RR AND NATIONAL SPECTRUM MANAGEMENT

RR is applied on the international context; for national issues, each country should apply its national framework.

National spectrum regulations use to “replicate” RR concepts provisions, adopting them into their legal framework, including:

- **Allocations:**
  IFTA is based on “technologic neutrality basis”.
  NTFA, shall be consistent with ITFA in particular his Region, and footnotes including that country.
  NFTA may include channeling Plans. They are free to associate allocations to applications and/or technologies.

- **Licenses(assignments):**
  Authorizations to stations, fixing specific conditions, as; RF Power, coverage. Also regulatory and financial conditions, as: timeline terms, spectrum fees, etc.
  A Spectrum Users Database shall storage and process Licensing information (duly tuned with NTFA); this Database shall be consistent with MIFR, in special with stations potentially interfering/being interfered to/from stations under jurisdiction of other countries.
  All stations shall be licensed prior to operate (RR, Art. 18)
### RR and Spectrum Management Layers

<table>
<thead>
<tr>
<th>Legal Framework</th>
<th>National</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Planing</td>
<td>National table of Frequency Allocations, NFAT</td>
<td>International Table of Frequency Allocations, ITFA (RR, Art. 5)</td>
</tr>
<tr>
<td>2. Licensing</td>
<td>National Spectrum Users Database</td>
<td>Master International Frequency Register, MIFR (RR, Art. 8)</td>
</tr>
<tr>
<td>3.b. Enforcement</td>
<td>National Regulators</td>
<td>ITU Radiocommunications Bureaux, BR</td>
</tr>
<tr>
<td></td>
<td>National Courts</td>
<td>ITU Radio Regulations Board, RRB</td>
</tr>
</tbody>
</table>

Every SM Layer has both a National and International facet
Every national Layer shall be consistent with its International pair
ITU has not legal tools to force compliance of RRB decisions...
Radio Regulations (RR)

Spectrum cannot be confined to a given territory

RR is an international treaty and should be considered by national administrations

Stations should be duly registered to be protected

International harmonization brings many advantages for Administrations

(facilitates coordination, roaming, allows for economies of scale)
Thank you!

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