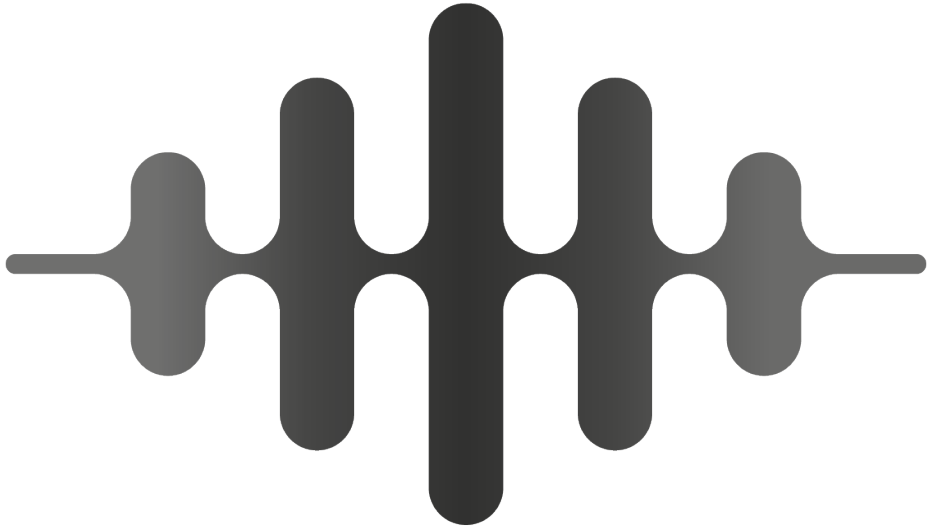


ITU WRS GENEVA2024

2–6 December 2024
Geneva, Switzerland

The ITU Radio Regulations

Mr Joaquin RESTREPO
Capacity Building Coordinator, Radiocommunication Study Groups Department

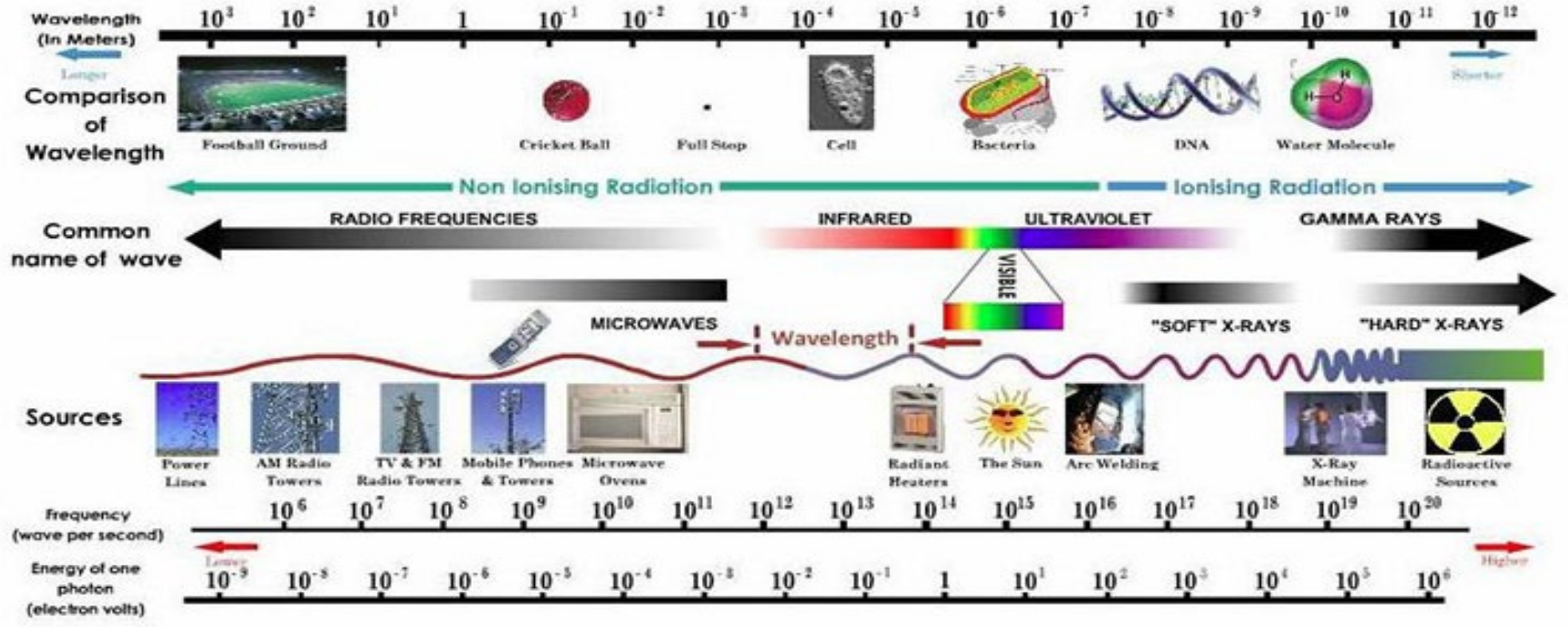
2-6 December 2024, Geneva, Switzerland

RADIOELECTRIC SPECTRUM

- ***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." (usually refers as: "**radio**")*

- ***RR. 1.6 Radiocommunication:*** *Telecommunication by means of radio waves*



RADIOELECTRIC SPECTRUM vs. ELECTROMAGNETIC SPECTRUM

- **Radioelectric Spectrum** is the lower part of Electromagnetic Spectrum, used for Telecommunications
- Expression: "***Spectrum***" refers by default to Radioelectric Spectrum
- Communications systems that DO NOT use Spectrum (in red) may be regulated (National/International); but their regulatory framework is different than *Spectrum R*egulations

	Frequencies < 3.000 GHz?	Free Propagation?	Radioelectric Spectrum?
Infra-red Wireless link	NO	YES	NO
Cable TV (Coaxial)	YES	NO	NO
Optical Fiber	NO	NO	NO
Broadcasting TV	YES	YES	YES

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

ITU RADIO REGULATIONS, RR

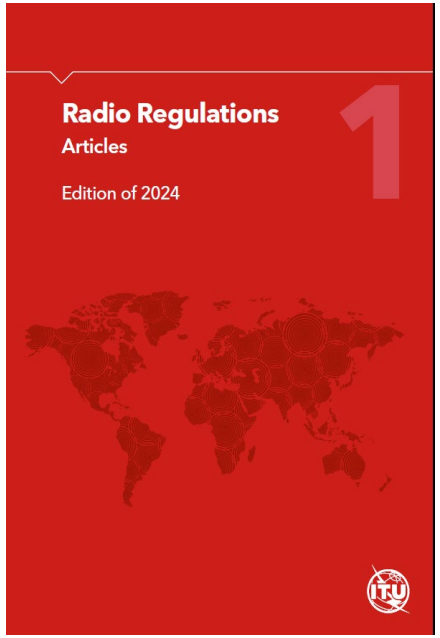
- Spectrum cannot be limited to a given territory; international coordination is necessary

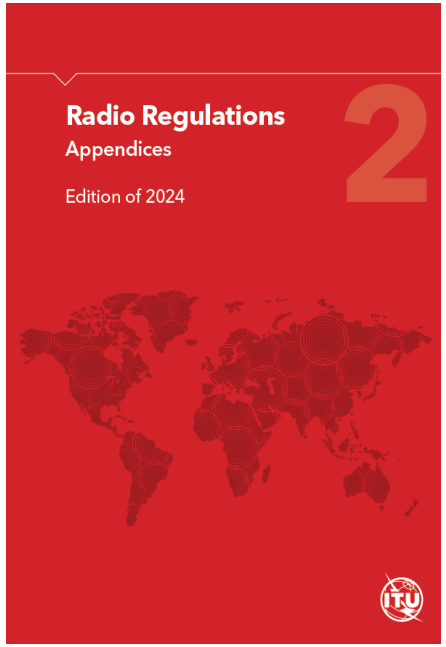
- ITU Radio Regulations (RR) is an International Treaty, elaborated and revised by administrations and membership, during World Radio Conferences (WRC); RR has a binding nature for ITU Member states.

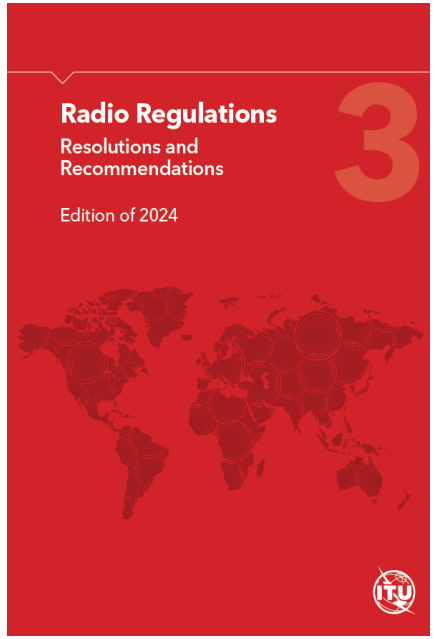
- ITU acts as depositary of RR

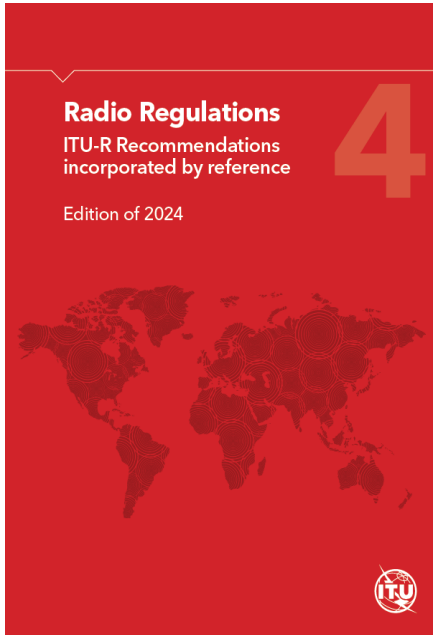
- Last version: RR-24 (as revised during WRC-23)

- RR can be downloaded, free of charge, for the general public, in the 6 UN Languages, at: https://www.itu.int/pub/R-REG-RR-2024









VOLUME 1:
Articles
(62)

VOLUME 2:
Appendices
(23)*

VOLUME 3:
Resolutions (202)*
and
Recommendations (25)*

VOLUME 4:
ITU-R Recommendations
incorporated by reference
(39)*

* Non-consecutive numbering, some with number and letters

RADIO REGULATIONS: VOLUME 3 and 4

RR Resolutions	ITU-R Resolutions
from World Radio Conferences	from Radio Assemblies
Radio Regulations Volume 3 (last version: 2024)	**Book of ITU-R Resolutions (last version: 2023)**
RESOLUTION Number (WRC-year)	RESOLUTION ITU-R Number-Version (year)
RESOLUTION 763 (WRC-15): *Stations on board sub-orbital vehicles* **RESOLUTION 7 (REV. WRC-03):** *Development of national radio-frequency management*	**RESOLUTION ITU-R 69 (2015):** *Development and deployment of international public telecommunications via satellite in developing countries* **RESOLUTION ITU R 11-5 (2015):** *Further development of the Spectrum Management System for Developing Countries*
https://http://www.itu.int/pub/R-REG-RR-2024	https://www.itu.int/pub/R-VADM-RES/en

RR Recommendations	ITU-R Recommendations
from World Radio Conferences	from Study Groups
Radio Regulations Volume 3 (last version: 2024)	**ITU-R Study Groups**
RECOMMENDATION Number (WRC-year)	RECOMENDATION ITU-R Serie Number-Version (month/year)
RECOMMENDATION 724 (WRC-07): *Use by civil aviation of frequency allocations on a primary basis to the fixed-satellite service* **RECOMMENDATION 34 (REV.WRC-12):** *Principles for the allocation of frequency bands*	**RECOMMENDATION ITU-R SM.2103-0 (09/2017):** *Global harmonization of short-range devices categories* **RECOMMENDATION ITU-R SM.1723-2 (09/2011):** *Mobile spectrum monitoring unit*
https://http://www.itu.int/pub/R-REG-RR-2024	https://www.itu.int/pub/R-REC

Examples:

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 →

Cross-reference list of the regulatory provisions, including footnotes and Resolutions, incorporating ITU-R Recommendations by reference

Recommendation ITU-R	Title of the Recommendation	RR provisions and footnotes with ITU-R Recommendations contained in RR Volume 4
TF.460-6	Standard-frequency and time-signal emissions	No. 1.14 (via Resolution 655 (WRC-15))
M.476-5	Direct-printing telegraph equipment in the maritime mobile service	Nos. 19.83, 19.96A, 51.41
M.489-2	Technical characteristics of VHF radiotelephone equipment operating in the maritime mobile service in channels spaced by 25 kHz	Nos. 51.77, 52.231, Appendix 18 (*General notes e)*)
M.492-6	Operational procedures for the use of direct-printing telegraph equipment in the maritime mobile service	No. 56.2
P.525-2	Calculation of free-space attenuation	No. 5.444B (via Resolution 748 (Rev.WRC-15))

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

Voluntary: X
- 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

RR: KEY DEFINITIONS

- ***RR, No. 1.19 Radiocommunication service***: *A service involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes.*

- ***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*

Terrestrial Services (NO satellite links)	
Fixed	
Broadcasting	
Mobile	Land mobile
	Aeronautical mobile
	Maritime mobile
Radiodetermination	Radionavigation
	Radiolocation

but also

Amateur
Standar Frequenct and Time
Meteorogical Aids
.
.

and more

Space Services (satellite links)	
Fixed-satellite	
Broadcasting-satellite	
Mobile-satellite	Land mobile-satellite
	Aeronautical mobile-satellite
	Maritime mobile-satellite
Radiodetermination-satellite	Radionavigation-satellite
	Radiolocation-satellite

but also

Amateur-satellite
Radio Astronomy
Space Research
.
.

and more

41 different types of Services (RR 1.20 to 1.60)

53 different types of Stations (RR 1.65 to 1.115)

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.

RR	English	Français	Español	tip
1.62	Terrestrial Station	Station de Terre	Estación Terrenal	not Space
1.63	Earth Station	Station Terrienne	Estación Terrena	link Earth <--> Space
1.69	Land Station	Station Terrestre	Estación Terrestre	not Maritime nor Aeronautical

RR: ALLOCATIONS vs. ASSIGNMENTS

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.*

RR 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.*

Frequency distribution to	French	English	Spanish	Arabic	Chinese	Russian
Services	Attribution (attribuer)	Allocation (to allocate)	Atribución (atribuir)	توزيع (يوزع)	划分	распределение (распределять)
Areas or countries	Allotissement (allotir)	Allotment (to allot)	Adjudicación (adjudicar)	تعيين (يعين)	分配	выделение (выделять)
Stations	Assignation (assigner)	Assignment (to assign)	Asignación (asignar)	تخصيص (يخصص)	指配	присвоение (присваивать)

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

NOTE: *Most of dictionaries display the expressions "**Allocation**" and "**Assignment**" as being **synonymous**; in the context of Spectrum Management and Regulation **they are different**.*

RR: OTHER CONCEPTS

- ***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,…:*** 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**)*
- ***RR, Nos. 5.286AA, 5.313.A,….***: Bands ***identified**** for International Mobile Telecommunications (**IMT**)

- *: 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*".

RR: ALLOCATION PRINCIPLES

- 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 user profiles (official, commercial, private, etc.)

- 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 (*user profile*)

** Administrations might go further (applications, technologies, profile, etc.) while being consistent with the RR*

RR: Table of Frequency Allocations

5.25 a) services in "**CAPITAL CASE**" (example: FIXED) are **"primary"** category (primary basis)

5.26 b) services in **"**Normal cases**"** (example: Mobile) are "**secondary**" category (secondary basis)

5.48 3) services are listed by **category** then **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.

5.51 6) The footnote references which appear to the **right** of the name of a service are **applicable only to that particular service**.

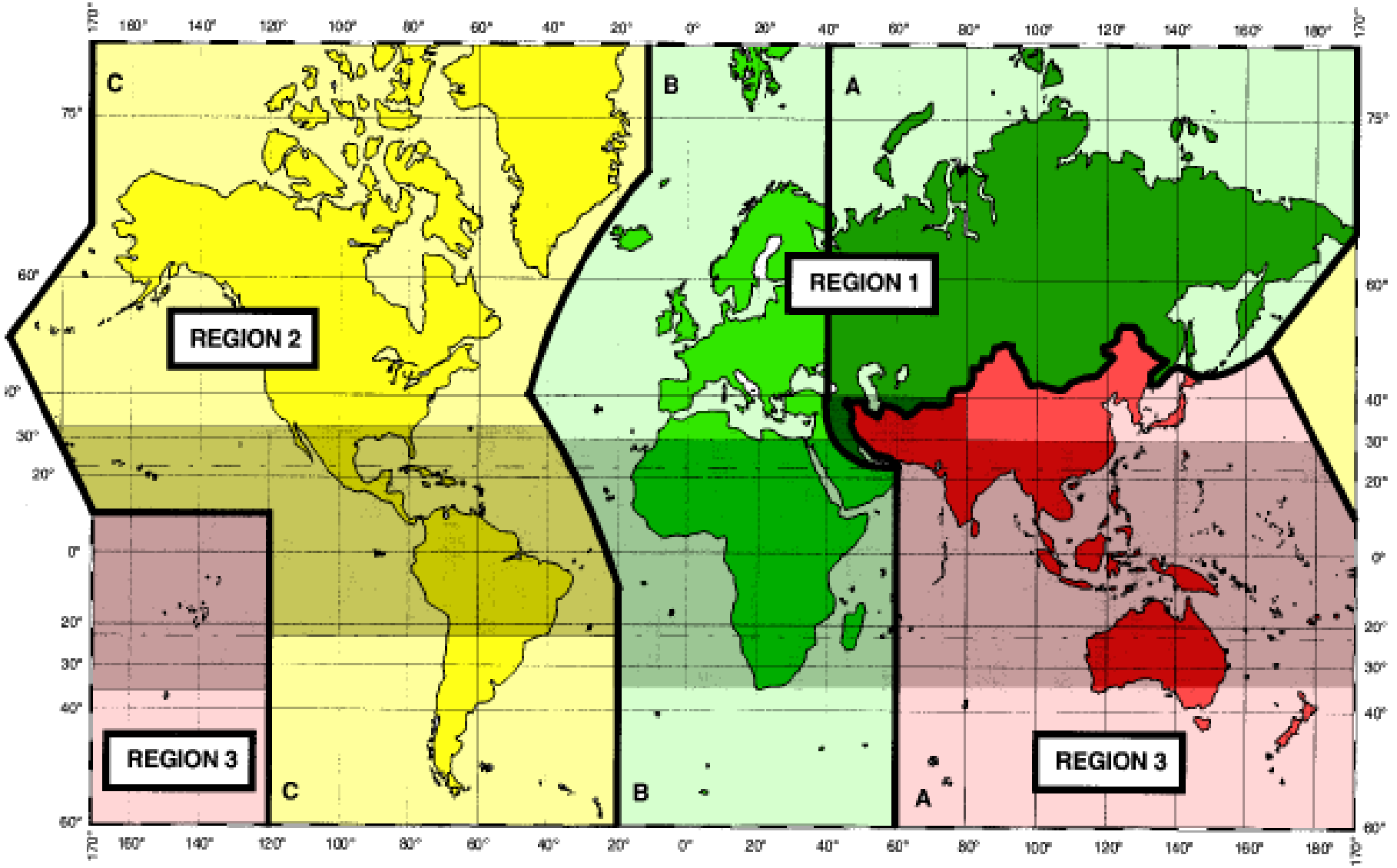
RR: CATEGORIES OF SERVICES

5.25 a) services in "CAPITAL CASE" (example: FIXED) are "PRIMARY" category (primary basis)

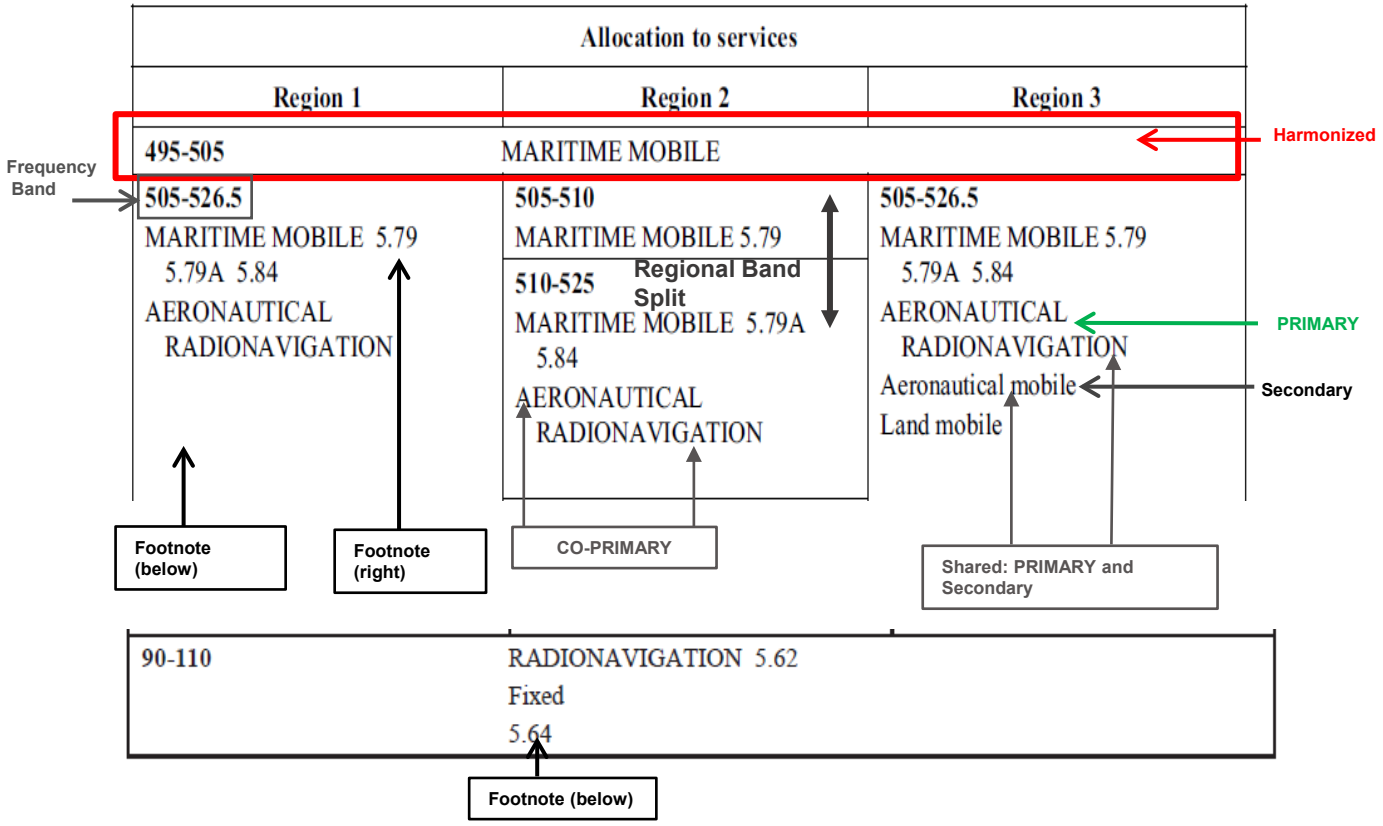
- *5.26 b) services in "Normal cases" (example: Mobile) are "Secondary" category (secondary basis)*
- *5.48 3) services are listed by category then in alphabetical order (French language). The order of listing does not indicate relative priority within each category.*
- *Stations of secondary service: Non-Interference/Non-Protection (NI/NP) vs PRIMARY service*
- *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;*
- *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;*
- *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)
- Arabic & Chinese versions, PRIMARY → bold characters:
- PRIMARY:
- Secondary: **متنقلة بحرية** **无线电定位**

  متنقلة بحرية 无线电定位

RR: WORLD REGIONS



RR: TABLE OF FREQUENCY ALLOCATIONS (Art. 5)



RR: COUNTRY(ies) FOOTNOTES
(Examples*)

137-137.025	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208	FIXED MOBILE
137-137.025	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208	+ BROADCASTING
137-137.025	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208	FIXED MOBILE BROADCASTING

Different Category of Service (5.23):
Same Services
but
Different Categories

Additional Allocation (5.34):
Same Services
+
More Services

ALTERNATIVE Allocation (5.38):
Replaces the allocations indicated on the Table

** No actual footnotes, for illustrative purpose only*

Countries 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**.*

5.23, 5.34, 5.38: rights and restrictions of footnotes

Res. 26: Footnotes on the Art. 5 Table are part of the RR, thus have a binding nature

Rec 34: reduce footnotes to the minimum possible

"*Country(ies)*" versions of Art 5 (see: RR5 Table of Frequency Allocations Software)

RR and Rules of Procedure, RoP

The Rules of Procedure (RoP) 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.

Example:

- ***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.