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Frequency plans and coordination procedures for non-broadcasting services

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Scope and outline of presentation

- **Scope of terrestrial services other than broadcasting**

FXM

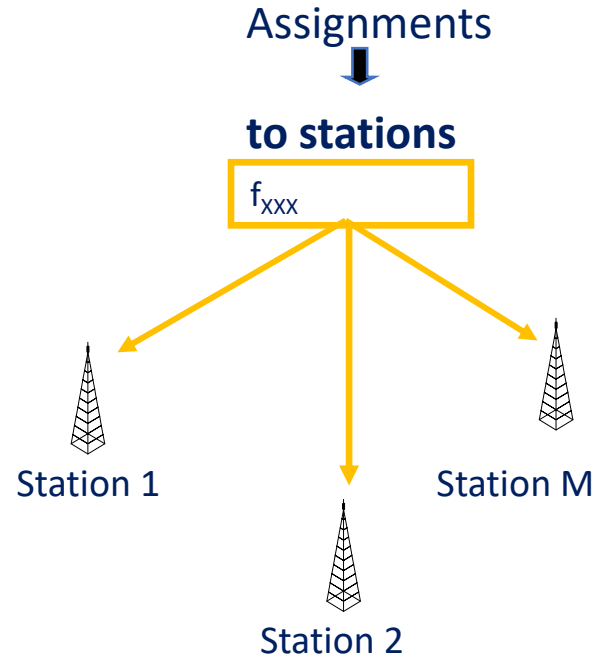
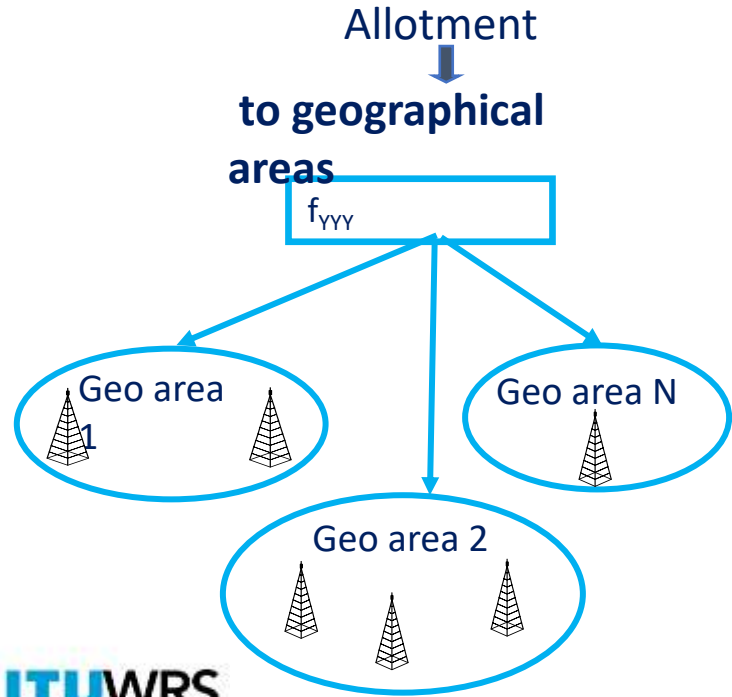
- Fixed service
- Mobile services (land, aeronautical and maritime mobile)
- Radionavigation services (aeronautical and maritime radionavigation services)
- Radiolocation, meteorological aids, standard frequency and time signal

- **Outline of presentation:**

- Frequency allotment and assignment plans for FXM
- Coordination of FXM assignments
- Examination of FXM assignments under RR Article 11

Frequency plans for FXM services

Allotment Plans $\leftarrow \rightarrow$ Assignment Plans





Frequency allotment plans for FXM services

Worldwide frequency allotment plans



AP25 - Plan for maritime mobile service, HF (4000 – 27 500 kHz)



AP26 - Plan for aeronautical mobile (off-route) service, HF (3025 – 18030 kHz)



AP27 - Plan for aeronautical mobile (route) service, HF (2850 – 22000 kHz)



Regional frequency allotment plan



GE85-MM-R1: Frequency allotment plan for national channels in Digital Selective Calling (DSC) system in bands 435-526.5 kHz and 1 606.5 - 2 160 kHz

Region 1





Allotment plan for the maritime mobile service (AP25 to RR)

- Worldwide allotment plan, maritime mobile service, 4000-27500 kHz
 - 240 channels; allotment areas, channel bandwidth – 2,8 kHz, class of emission - J3E or J2D, maximum peak envelope power - 10 kW



19 792.4	ALS	
(19 791)	CHN	
	E	
(1813)	F	
	HWA	
	IND E	
	IND W	
	J	
	PTR	
	S	ADD
	TUR	
	USAE	
	USA SO	
	USA W	



Channel 1813 is allotted to allotment areas IND E and IND W . Administration of India can assign this channel to any coast station located in allotment areas IND E and IND W.





Allotment plans for the aeronautical mobile services (AP26/AP27 to RR)



- Worldwide plan for aeronautical mobile off-route service
3 025 - 18 030 kHz / 10 sub-bands/ Carrier frequencies /allotment areas
 - Maximum bandwidth - 2.8 kHz, Classes of emission - J3E; A1A; A1B; F1B(A,H)2(A,B); (R,J)2(A,B,D); J(7,9)(B,D,X)
 - Mean effective radiated power: 1 kW (aeronautical stations)
50 W (aircraft stations)



- Worldwide plan for aeronautical mobile route service
2 850 - 22 000 kHz / Carrier frequencies / geographical areas (MWARA, RDARA, VOLMET areas)
 - Classes of emission: J3E, H2B, J7B, J2D, J9X (A1A/A1B) and F1A/F1B, Frequency separation - 3 kHz, multiple to 1 kHz
 - Maximum peak envelope power in AP27/60, e.g. (J3E, H2B, J7B, JXX):
6 kW (aeronautical stations)
400 W (aircraft stations)





Review of RR AP27 (WRC-23 agenda item 1.9)

Accommodate **digital technologies for commercial aviation safety-of-life applications** in existing HF bands allocated to the aeronautical mobile (route) service ► **Res. 429 (WRC-19)**

- Replanning of RR AP27 frequency Plan to accommodate digital technologies for commercial aviation safety-of-life applications in existing HF bands allocated to the aeronautical mobile (R) service.
- The purpose of the replanning is to take advantage of the various benefits that a modern wideband HF communication system could offer (e.g. contiguous or non-contiguous channel aggregation, faster data rates, better voice communications etc.).
- To ensure compatibility with existing systems operating within or adjacent to those frequency bands affected needs to be ensured.



Frequency assignment plans for FXM services

Regional frequency assignment plans



GE85-R1-MAR: Plan for maritime mobile service, MF bands



GE85-R1-AER: plan for aeronautical radionavigation service, MF bands



GE85-EMA: plan for maritime radiobeacons, European maritime area 283.5 - 315 kHz



The List of frequency assignments for primary terrestrial services other than broadcasting in the planning area and bands (174-230 MHz/ 470-862 MHz) governed by the **Regional Agreement GE06**

Region 1



GE06 Planning Area





Frequency assignment plan GE85-R1-AER

▪ Scope

- Plan for aeronautical radionavigation service in Region 1
- Frequency bands: 415 – 435 kHz, 510 – 526.5 kHz
- Takes into account also maritime mobile service stations

▪ Characteristics

- 34 channels, spacing - 1 kHz (0.5 kHz exceptionally)
- Classes of emission – A1A, A2A

▪ Coordination procedure

- Submission of AP4 information to the BR, publication of the complete information in BR IFIC
- Coordination with affected administrations having assignments in conformity with the Plan
- Informing the BR about the results (90+15 days)
- Successful coordination - recording in the Plan





FXM frequency plans (summary)



Plan Name/Type	Radiocommunication service	Planned bands	Planning area
AP 25 (Allotment)	Maritime mobile (Coast radiotelephone stations)	4000 - 27500 kHz	Worldwide
AP26 (Allotment)	Aeronautical Mobile (OR)	3025 - 18030 kHz	Worldwide
AP27 (Allotment)	Aeronautical Mobile (R)	2850 - 22000 kHz	Worldwide
GE85-MM-R1 (Allotment)	Maritime Mobile (DSC)	435 - 526.5 kHz 1 606.5 - 2 160 kHz	Region 1
GE85-R1-MAR (Assignment)	Maritime Mobile	415 - 495 kHz 505 - 526.5 kHz 1 606.5 - 1 625 kHz 1 635 - 1 800 kHz 2 045 - 2 160 kHz	Region 1
GE85-R1-AER (Assignment)	Aeronautical Radionavigation	415 - 435 kHz 505 - 526.5 kHz	Region 1
GE85-EMA (Assignment)	Maritime Radionavigation	283.5 - 315 KHz	European Maritime Area
GE06 List (Assignment)	e.g. Fixed / Mobile / Radionavigation etc.	174-230 MHz 470-862 MHz	In parts of Regions 1 and 3

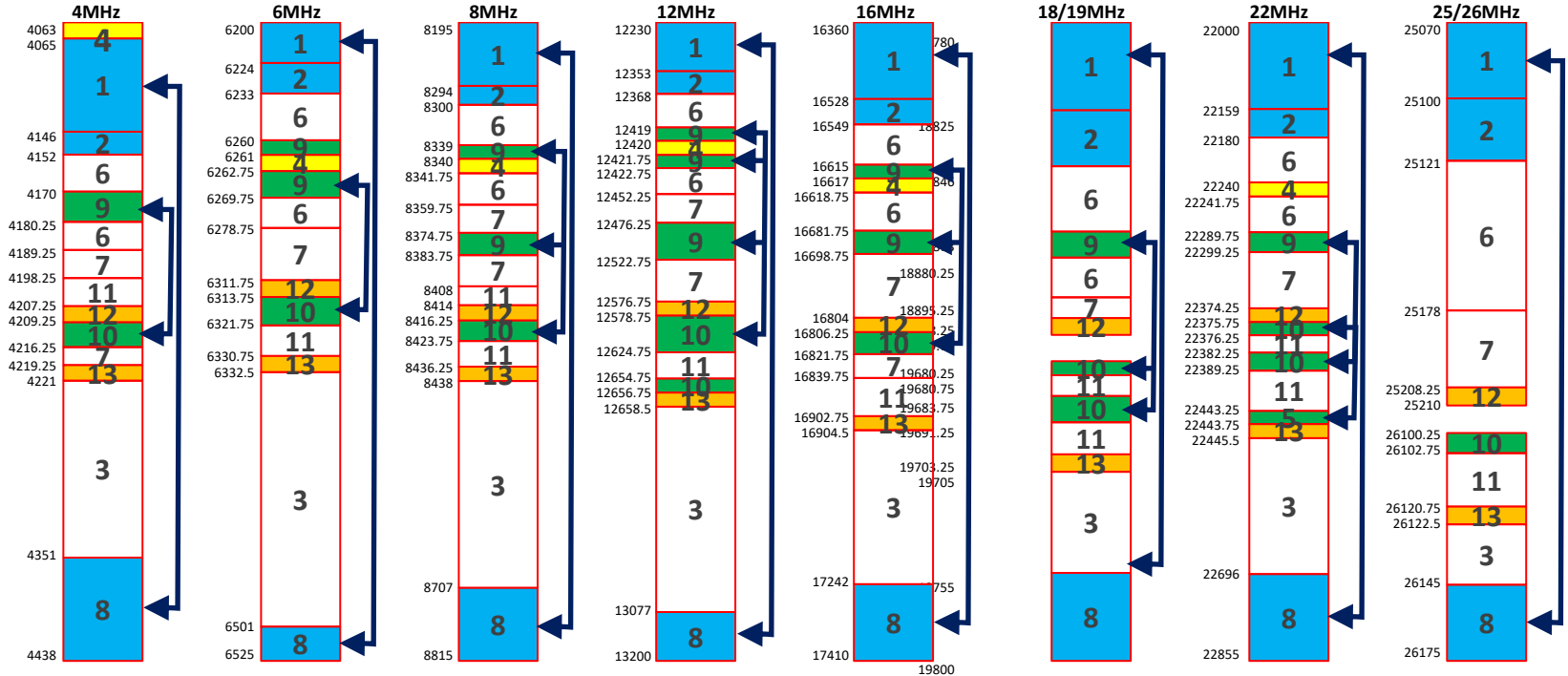


Maritime mobile service frequencies and channelling arrangements in HF RR AP 17

- MMS in the bands between 4000 and 27500 kHz.
- Sub-divisions of the exclusive frequency bands at 4, 6, 8, 12, 16, 18/19, 22 and 25/26 MHz.
- Channels to be used by ship stations (MS) and coast stations (FC).
- Facilitate the working of duplex radiotelephone equipment on board ship.
- Frequencies (paired and non-paired) for NBDP (narrow-band direct printing) telegraphy systems.
- MOD by WRC-12 - designating bands for data transmissions in digital format
- MOD by WRC-19 - 6 channels between 4 221 kHz and 22 455.5 kHz for use by Navigational Data for broadcasting maritime safety and security related information (NAVDAT)
- Each sub-band elaborately planned in order to make maximum use of the available spectrum.

Maritime mobile service frequencies and channelling arrangements in HF RR AP 17

Sub-division of the exclusive maritime mobile bands between 4 000 kHz and 27 500 kHz



- 1 Radiotelephony (MS, duplex)
- 2 Radiotelephony (MS, FC, simplex)

- 3 wide-band data transmission
- 4 oceanographic data transmission (OGD)
- 5 narrowband direct-printing (NBDP) (FC, non-paired)

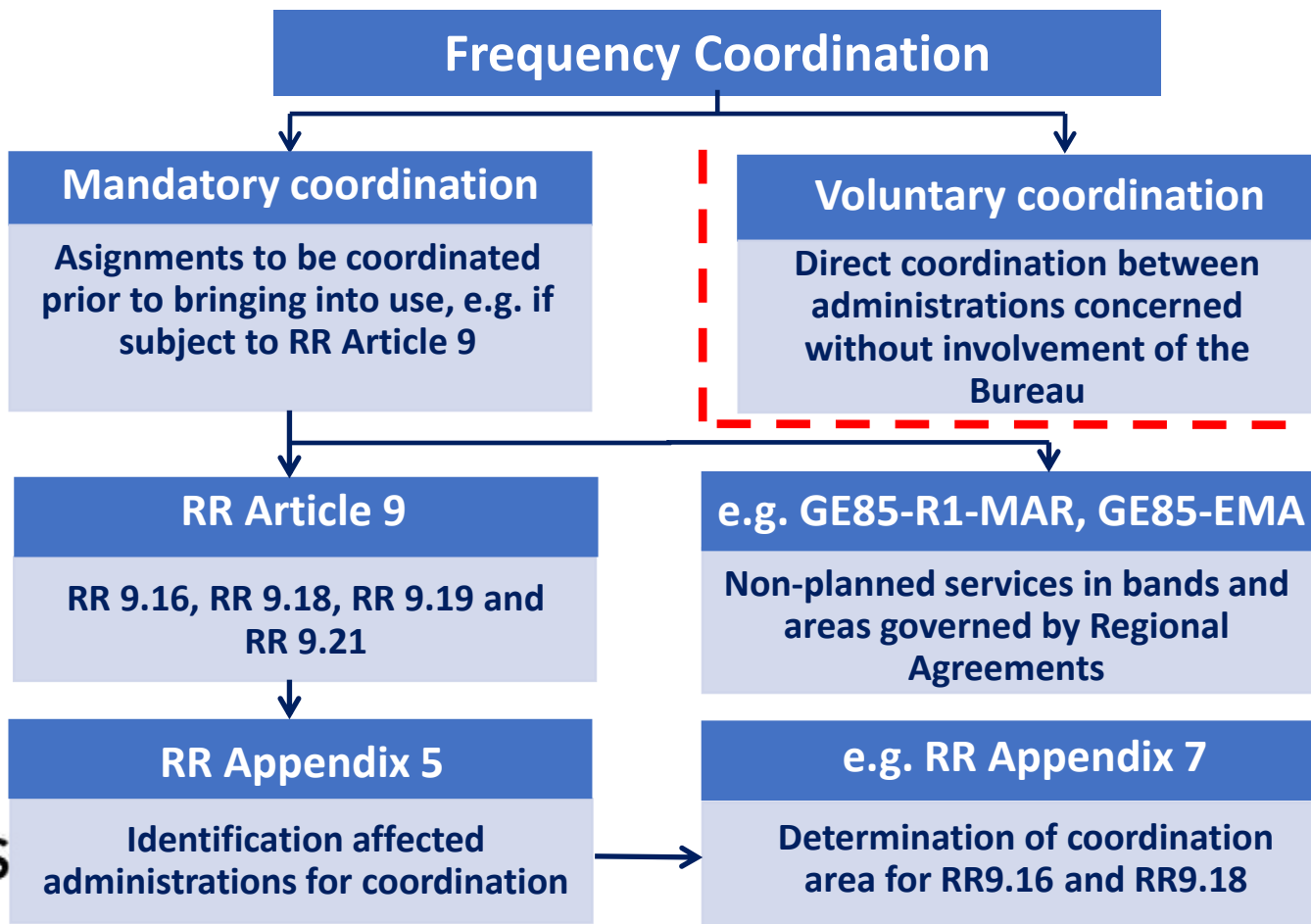
- 6 data transmission (MS)
- 7 data transmission (MS, FC)
- 8 Radiotelephony (FC, duplex)

- 9 narrowband direct-printing (NBDP) (MS, paired and non-paired)
- 10 narrowband direct-printing (NBDP) (FC, paired and non-paired)

- 11 data transmission (FC)
- 12 digital selective calling (DSC) (MS)
- 13 digital selective calling (DSC) (FC)



Coordination of FXM assignments (1)

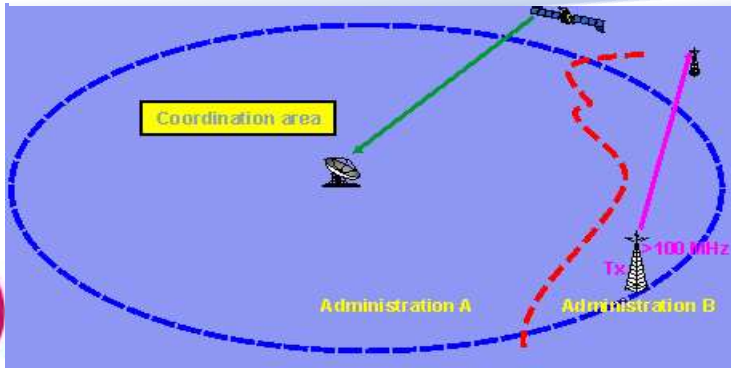




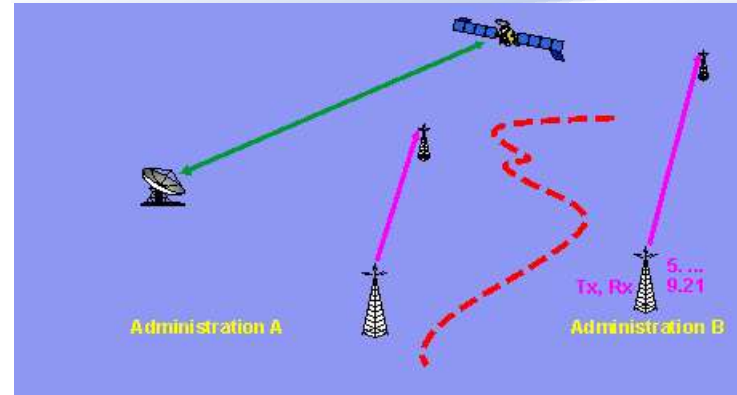
Coordination of FXM assignments (2)

Mandatory coordination cases under RR Article 9
RR 9.16, RR 9.18,
RR 9.19 and RR 9.21

RR 9.16/RR 9.18



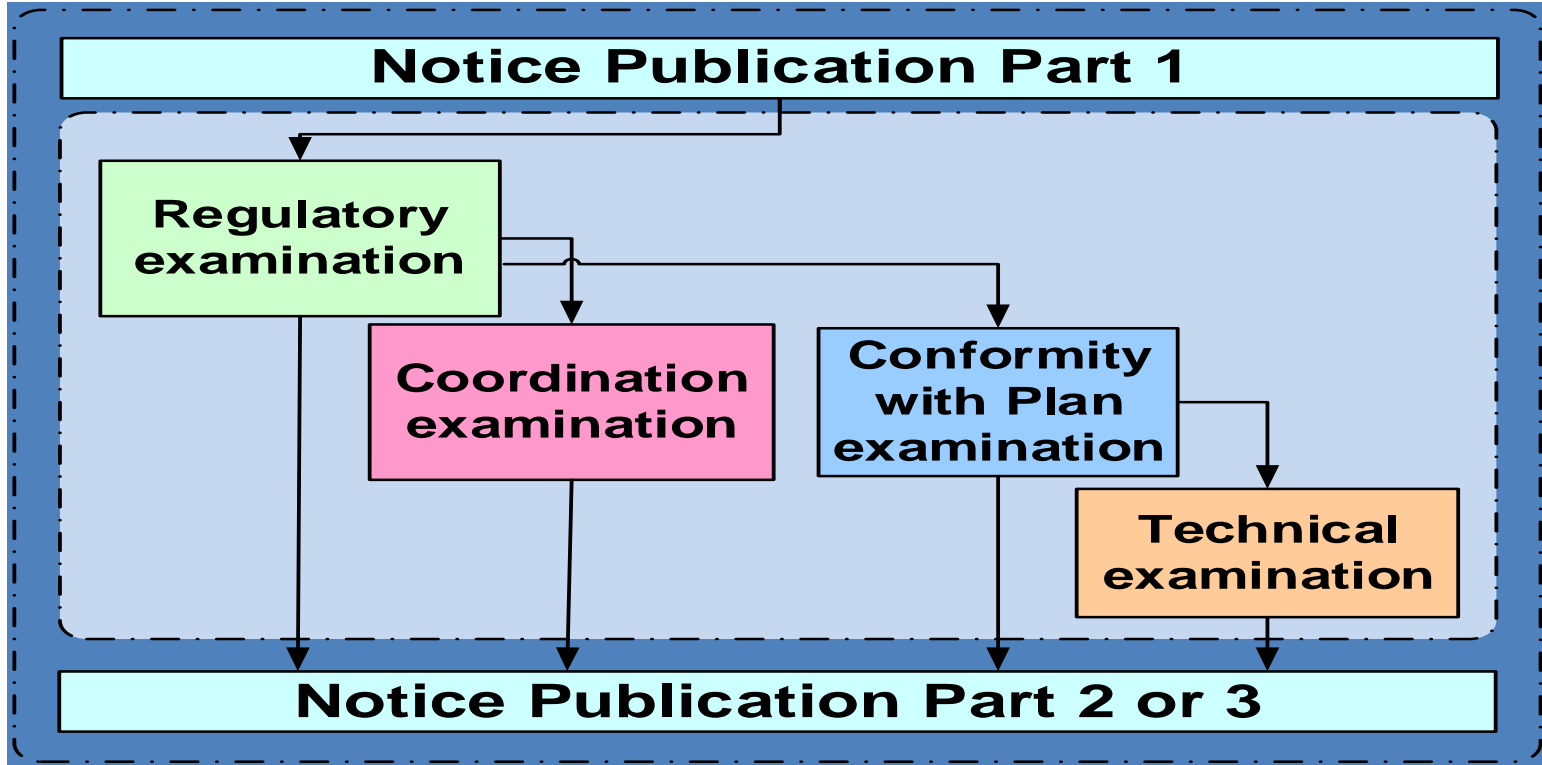
RR 9.21



RR 9.19



Examination of FXM assignments under RR Article 11





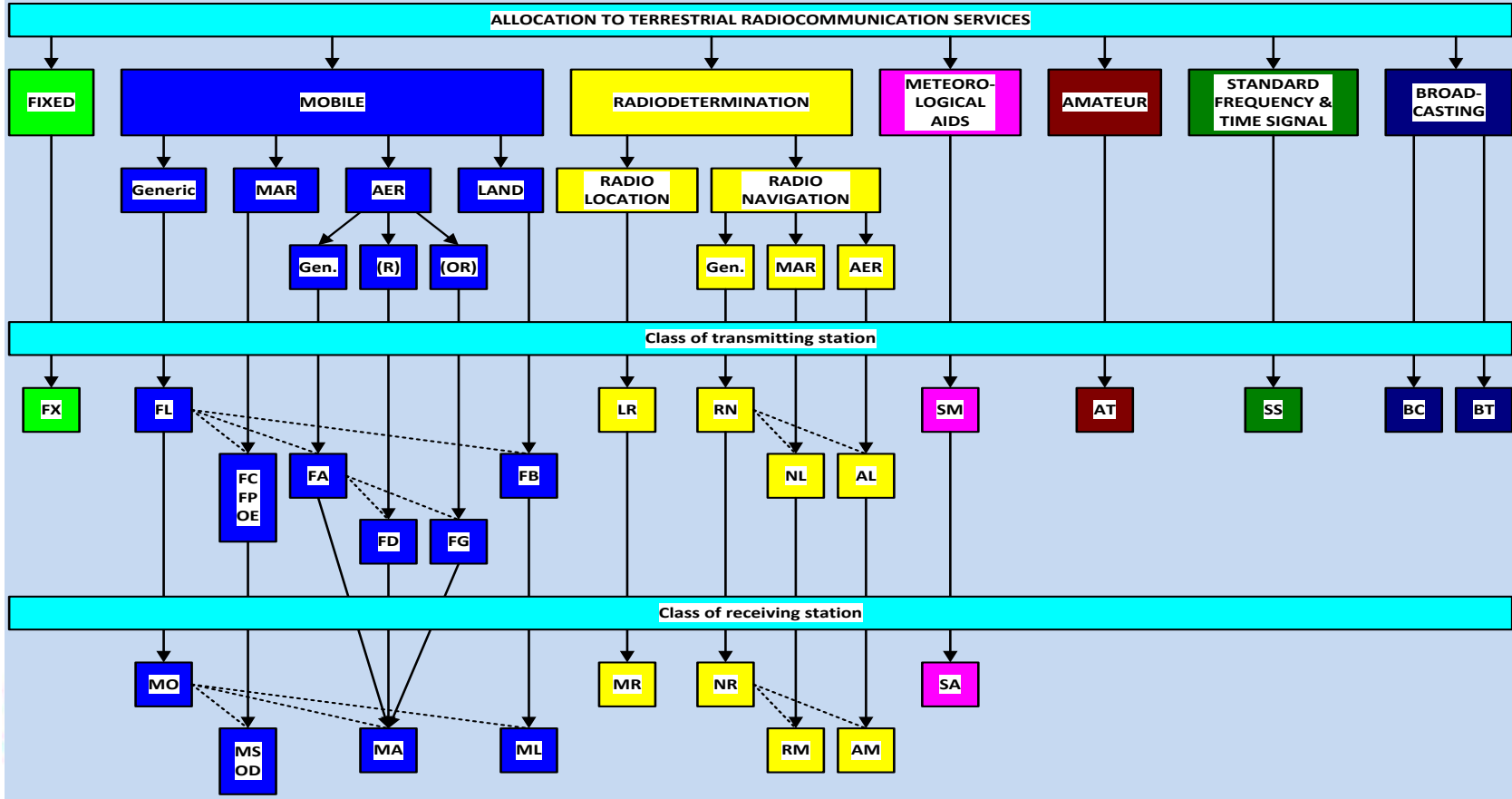
Regulatory examination RR 11.31 (1)

- **Table of frequency allocations, including footnotes:**
 - Notified band within the band allocated to the service
 - Receiving point is in country where allocation exists
 - Category of allocation: primary or secondary
 - Successful application of RR **9.21** (RR **11.31.1**)
 - ✓ for allocations to mobile service and/or identifications for IMT subject to RR **9.21** (470-694/698 MHz, 694 – 790 MHz (Region 1), 1427-1518 MHz, 3300-3400 MHz, 3400-3700 MHz and 4800 – 4990 MHz)
 - ✓ RoP (e.g. RR **5.316B**, RR **5.341A**, Section **B6** etc.)
 - ✓ **CR/391, CR/467** Nature of Service **IM** – IMT station in the mobile service (to enable the examination of the conditions associated with IMT)
- **Other RR provisions:**
 - Power limits RR **21.3** – RR **21.5A**
 - Specific requirements for services (e.g. classes of emission, channeling arrangements, power limits for MMS in HF bands)



Regulatory examination (2)

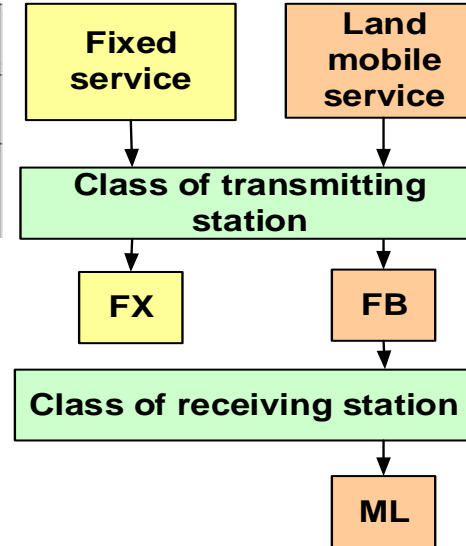
Relation between radio services and classes of stations



Regulatory examination (3)

Permitted classes of station

Allocation to services		
Region 1	Region 1	Region 1
24 000-24 450	FIXED LAND MOBILE	





Regulatory examination (4)

Allocation to services		
Region 1	Region 2	Region 3
322-328.6 MH z	FIXED MOBILE RADIO ASTRONOMY 5.149	
<p>Example for FIXED service with <u>Favourable</u> finding</p> <p>Class of station FX</p> <p>Assigned frequency: 327.0 MHz / fmin: 325.5 MHz/ fmax: 328.5 MHz</p> <p>Bandwidth 3 MHz</p>		
328.6-335.4 MHz	AERONAUTICAL RADIONAVIGATION 5.259	
<p>Example for FIXED service with <u>Unfavourable</u> finding</p> <p>Class of station FX</p> <p>Assigned frequency 328.0 MHz / fmin: 326.5 MHz/ fmax: 329.5 MHz</p> <p>Bandwidth 3 MHz</p> <p>Reason for unfavorable finding: <u>bandwidth overlaps with non-allocated band</u></p>		



Regulatory examination (5)

Protection of space services in uplink (RR Article 21 power limits on transmitters in fixed and mobile services):

RR21.3: e.i.r.p. ≤ 55 dBW

RR21.4 (protection of GSO): e.i.r.p.:

≤ 47 dBW within 0.5° of GSO

$\leq 47 - 55$ dBW

between 0.5° and 1.50° of GSO

RR21.5: Power to antenna:

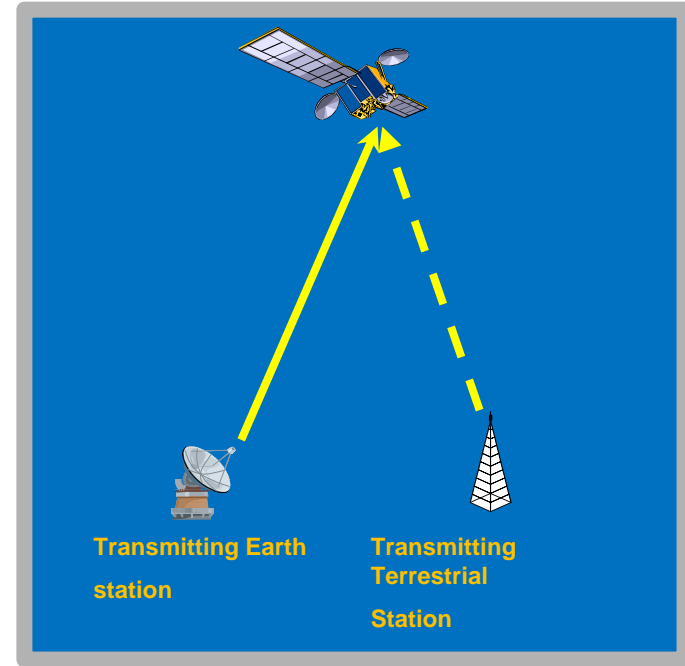
≤ 13 dBW in bands 1- 10 GHz

≤ 10 dBW above 10 GHz

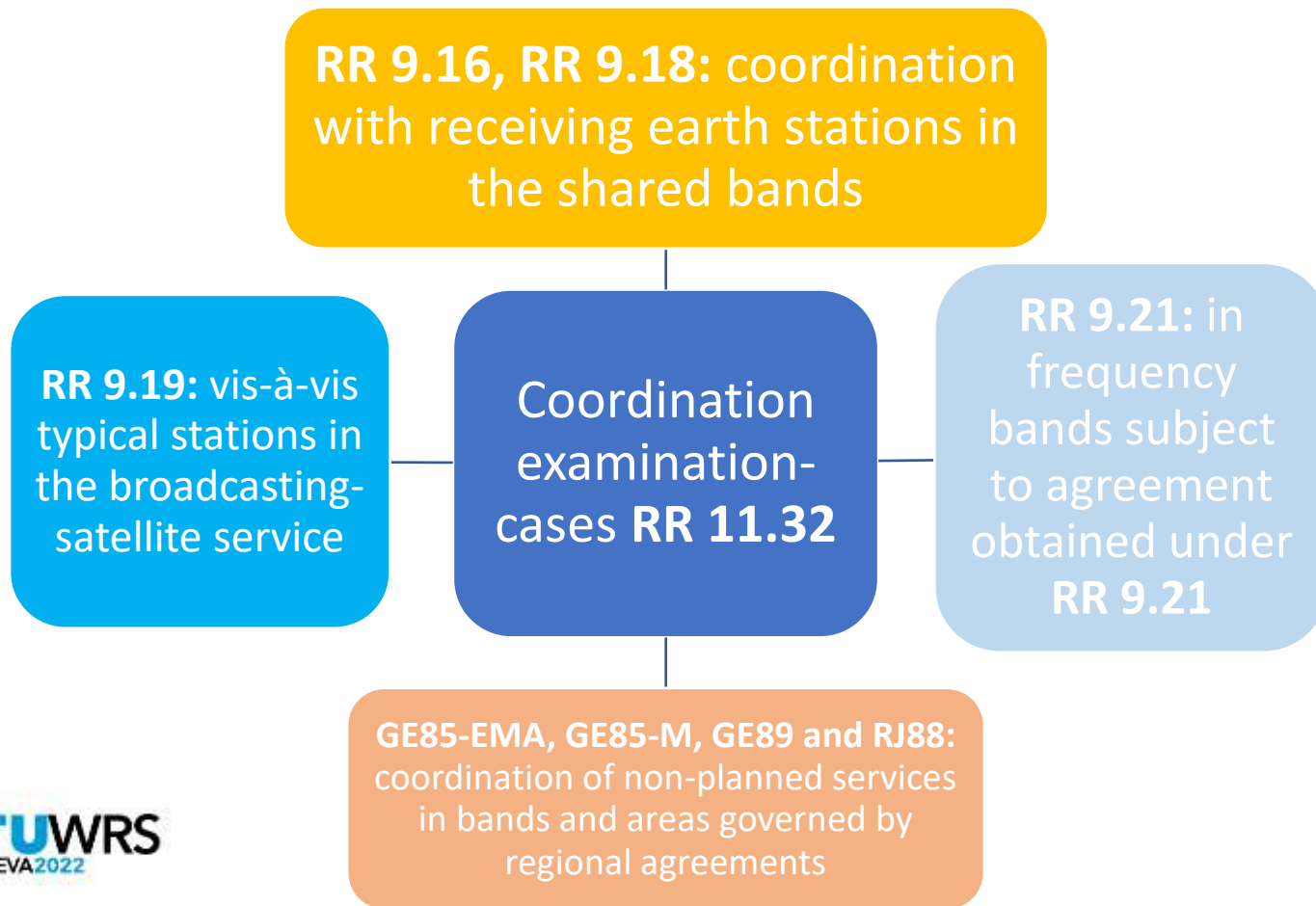
RR21.5A: Power to antenna

≤ -3 dBW for FS in 18.6- 18.8 GHz

RR21.3 – RR21.5A: in bands of Table 21-2



Coordination examination-cases RR 11.32 (1)



Coordination examination (2)

- Sharing between terrestrial and space services
 - More than 60 frequency bands above 100 MHz allocated with equal rights to terrestrial and space services
- Protection of space services from terrestrial services:
 - Protection of receiving earth stations and BSS typical receiving earth stations from terrestrial transmitters (downlink) -> coordination

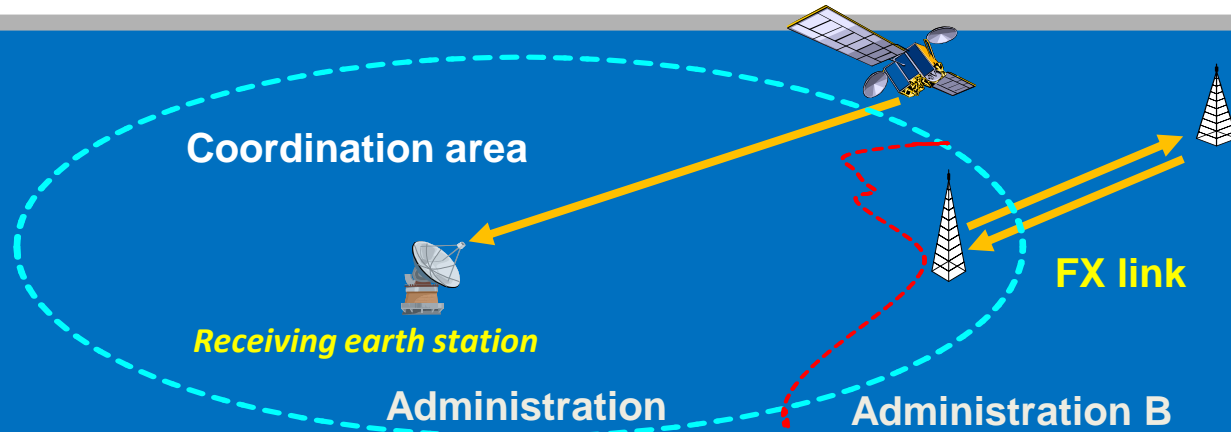
7 250-8 500 MHz

Allocation to services		
Region 1	Region 2	Region 3
8 025-8 175	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	



Coordination examination (3)

- **Protection of space services in downlink**
 - Protection of specific receiving earth station:
coordination of terrestrial transmitters located within coordination area of an earth station (RR9.16, RR9.18)
 - Protection of BSS typical receiving earth stations: coordination of terrestrial transmitters vs. BSS service area (RR9.19)



Coordination of terrestrial transmitter with receiving earth station is necessary if there is frequency overlap and terrestrial station is located within coordination area



Conformity with Plan examination (1)

Worldwide allotment plans for maritime mobile and aeronautical mobile services (AP25, AP26 and AP27)

Notified frequency is in allotted channel listed in the Plan

Notified geographical area corresponds to a Plan allotment

Receiving area is within the allotment area

AP25

19 792.4	ALS	
(19 791)	CHN	
	E	
(1813)	F	
	HWA	
	IND E	
	IND W	
	J	
	PTR	
	S	ADD
	TUR	
	USA E	
	USA SO	
	USA W	





Technical examination (1)

Applies to AP26 and AP27 - if a notice is in conformity with the technical principles of allotment plan, but not in conformity with the allotment plan

AP26 - notice is examined with respect to the allotments in Part III of **AP26** (RR 11.39C)

AP27 - notice is examined whether the protection specified in **AP27** is afforded to the allotments in the Plan and to assignments already recorded in the Master Register with a favourable finding (RR 11.39A)



RR provisions for use of assignments to terrestrial service stations

Article 4: general rules for assignment and use of frequencies

Article 5: frequency allocations - assignments should be in conformity with Table of Frequency Allocations and footnotes

Article 9: coordination procedures - assignments should be coordinated prior to bringing into use, if subject to Article 9

Appendix 5: identification affected administrations for coordination

Appendix 7: determination of coordination area (for RR9.16, RR9.18)

Article 11: notification and recording of assignments

Appendix 4: characteristics of assignments to be notified for recording in the Master Register or used in coordination

Article 8: status of assignments recorded in the Master Register

Article 21: sharing between terrestrial and space services – power limits on transmitters in fixed and mobile services

Other provisions: Art. 24 (FS), Art. 43 (AMS), Art. 51, 52 (MMS), AP25 (MMS), AP26 (AM(OR)S), AP27 (AM(R)S), etc.



Thank you!

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Questions to:

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