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29TH WORLD RADIOCOMMUNICATION SEMINAR

30 November – 11 December 2020

ITUWRS ONLINE2020

Coordination under No. 9.21 of the RR for Terrestrial services (FXM)

BR / TSD

www.itu.int/go/wrs-20

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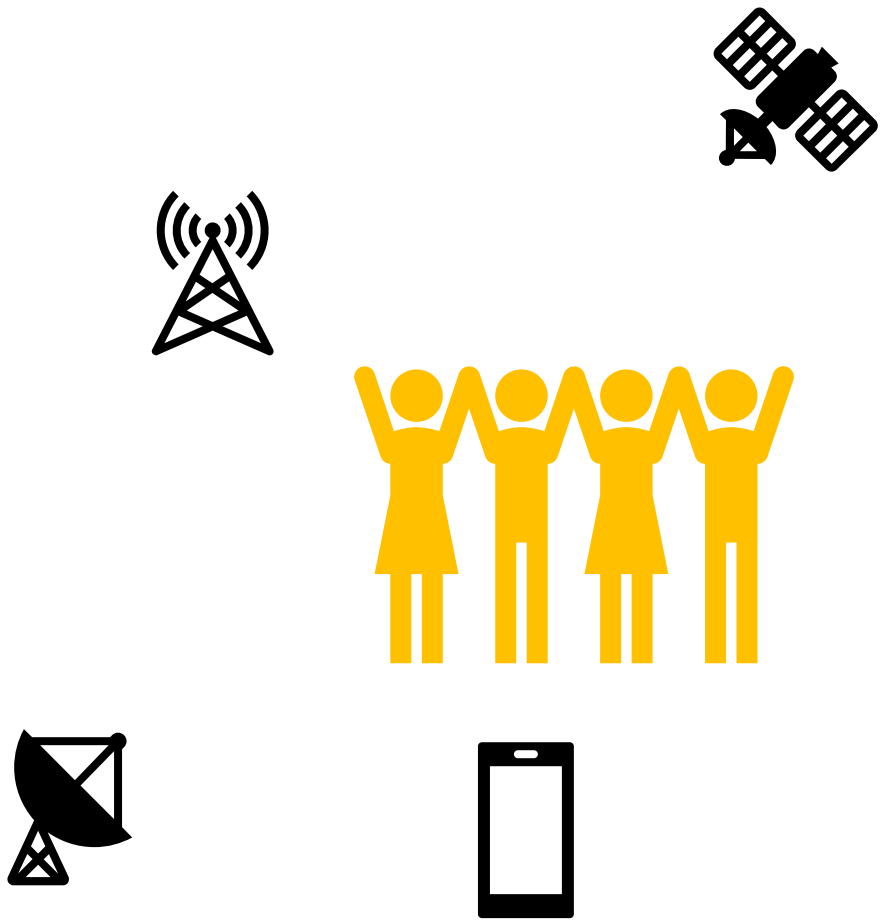


Radio Regulations

Articles

1

CHAPTER III – Coordination, notification and recording of frequency assignments and Plan modifications **RR9-1**

ARTICLE 9

Procedure for effecting coordination with or obtaining agreement of other administrations[1, 2, 3, 4, 5, 6, 7, 8] (WRC-19)

Exercise 1

When does the coordination under provision 9.21 is required?

Solution 1

- 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: (WRC-03)
- 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. (WRC-2000)

Exercise 2

Please identify the different points between coordination under No. 9.21 and Nos. 9.18 and 9.19 in general.

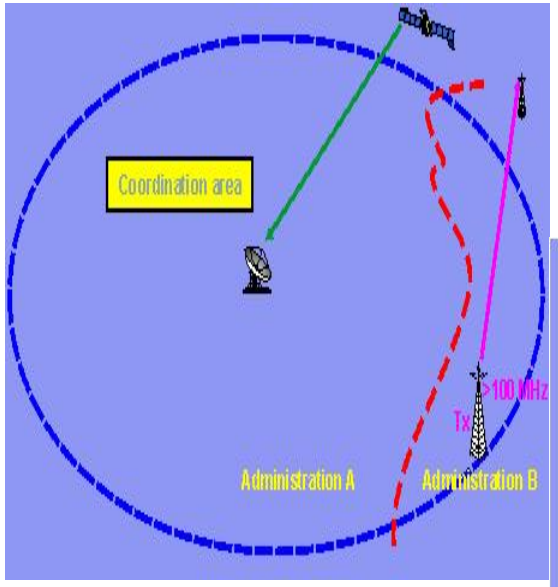
Solution 2

➢The service to be protected

- ✓ For No. 9.18 coordination, it is a satellite service(receiving earth station)
- ✓ For No. 9.19 coordination, it is BSS (service area)
- ✓ For No. 9.21 coordination, it is any service to which the frequency band is allocated on an equal or higher status with the notified frequency assignment.

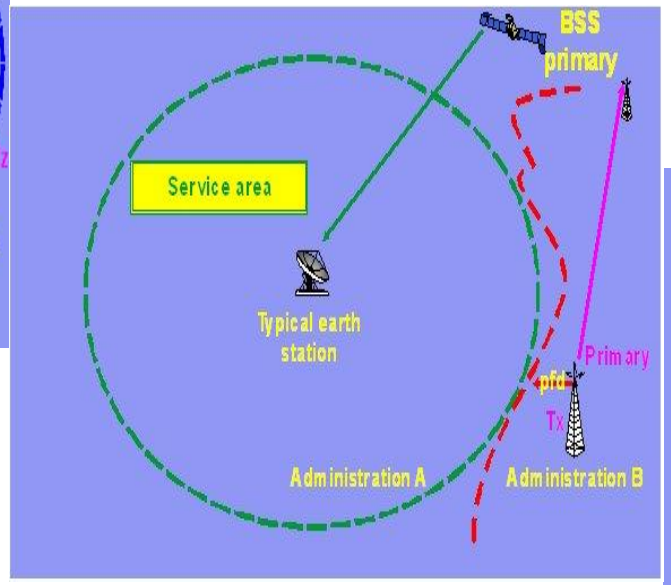
See also ITU Web-page on coordination

Solution 2 (2)



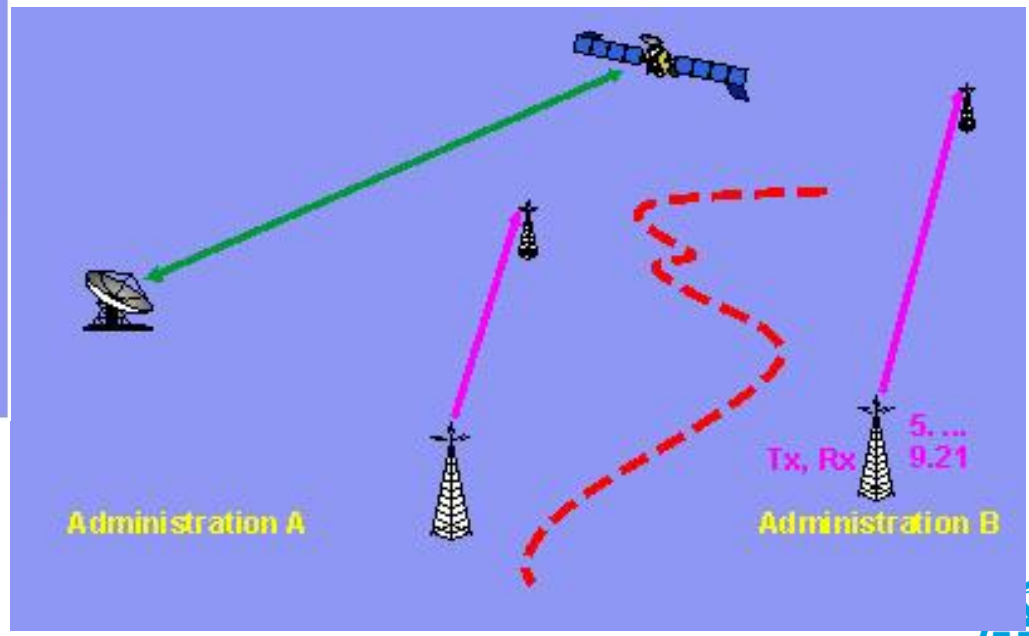
RR 9.18 coordination

RR 9.19 coordination



See also ITU Web-page on coordination

RR 9.21 coordination



Solution 2 (3)

➢For No. 9.18 coordination and No. 9.19 coordination,

- ✓ the notifying administration should **identify** potentially affected administrations and **send** the request for coordination **directly** to the identified administrations to effect the coordination **without BR's involvement**

➢For No. 9.21 coordination,

- ✓ the notifying Administration should **send** its request for coordination to **the BR** to effect the coordination. The **BR identifies** the potentially affected administrations and inform them of the request.

Exercise 3

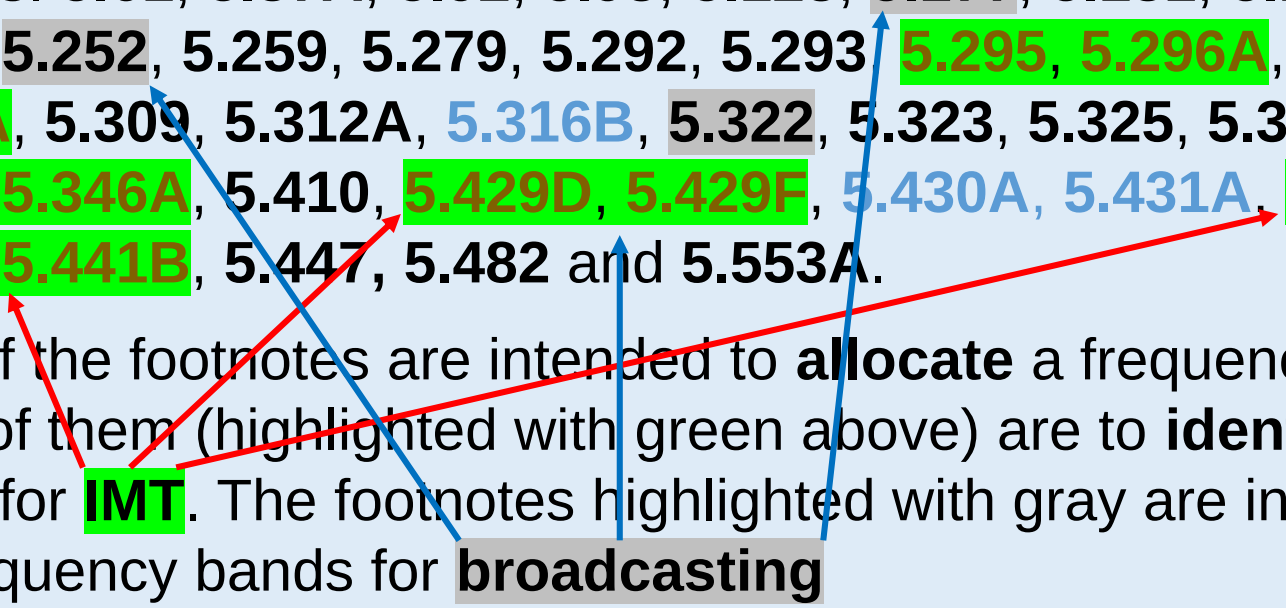
Please identify which footnotes are referring to No. 9.21.

Which ones are for allocation to the services and which ones are for identification for IMT?

Solution 3

➢ RR contains 44 footnotes for TS referring to No. 9.21

- ✓ RR Nos. **5.61**, **5.87A**, **5.92**, **5.93**, **5.123**, **5.177**, **5.181**, **5.190**, **5.197**, **5.225A**, **5.251**, **5.252**, **5.259**, **5.279**, **5.292**, **5.293** **5.295**, **5.296A**, **5.297**, **5.308**, **5.308A**, **5.309**, **5.312A**, **5.316B**, **5.322**, **5.323**, **5.325**, **5.326**, **5.341A**, **5.341C**, **5.346**, **5.346A**, **5.410**, **5.429D**, **5.429F**, **5.430A**, **5.431A**, **5.431B**, **5.432B**, **5.434**, **5.441B**, **5.447**, **5.482** and **5.553A**.
- ✓ Most of the footnotes are intended to **allocate** a frequency bands, however some of them (highlighted with green above) are to **identify** the frequency bands for **IMT**. The footnotes highlighted with gray are intended to allocate the frequency bands for **broadcasting**



Exercise 4

Please explain what the disadvantages would be, if an ADM does not effect coordination for the services mentioned in the footnotes listed in Solution 3.

Solution 4

- **If an ADM does not effect coordination in the frequency bands allocated subject to coordination under No. 9.21,**
  - ✓ It is considered as there is **no allocation** at all in its country;
  - ✓ Any assignments for the service subject to coordination under No. **9.21** could **not** get a **favorable** findings in the examination with respect to No. **11.31**; and
  - ✓ They have **no right to international recognition** stipulated by No. **8.3**.

8.3 Any frequency assignment recorded in the Master Register with a favourable finding under No. **11.31** shall have the right to international recognition. For such an assignment, this right means that other administrations shall take it into account when making their own assignments, in order to avoid harmful interference. In addition, frequency assignments in frequency bands subject to coordination or to a plan shall have a status derived from the application of the procedures relating to the coordination or associated with the plan.

Exercise 5

From the frequency table in the following slides,

1. **Please find the frequency bands allocated to the TS in your country.**
2. **Please find the frequency bands identified for IMT in your country.**

Solution 5

➢ Frequency, service, area and coord. criteria

RR No.	Freq. band	Service	Coordination criteria	Area *
5.61	70-90 kHz 110-130 kHz	RADIOLOCATION	RoP B4	XR2
5.87A	526.5-1606.5 kHz	RADIONAVIGATION	RoP B4	UZB
5.92	1606.5-1625 kHz 1635-1800 kHz 1850-2160 kHz 2194-2300 kHz 2502-2850 kHz 3500-3800 kHz	RADIODETERMINATION	RoP B5	XR1
5.93	1 625-1 635 kHz 1 800-1 810 kHz 2 160-2 170 kHz	FIXED MOBILE	RoP B4	ARM, AZE, BLR, GEO, HNG, KAZ, LVA, LTU, MNG, NIG, POL, KGZ, UZB, SVK, RUS, TJK, TCD, TKM, UKR
5.123	3 900-3 950 kHz	BROADCASTING	RoP B4	ARM, AZE, BLR, RUS, GEO, KAZ, UZB, KGZ, TJK, TKM, UKR
5.177	73-74 MHz	BROADCASTING	Recs. ITU-R SM.851 and ITU-R BS.412	AFS, BOT, LSO, MWI, MOZ, NMB, SWZ, ZMB, ZWE

Region 2

** The areas in Region 2 are highlighted with light green, in Region 3 with sky blue and in Region 1 without highlight.*

Solution 5 (2)

Return to the first band.

➢ Frequency, service, area and coord. criteria

RR No.	Freq. band	Service	Coordination criteria	Area *
5.181	74.8-75.2 MHz	Mobile	Not available yet	EGY, ISR, SYR
5.190	87.5-88 MHz	LAND MOBILE	Not available yet	MCO
5.197	108-111.975 MHz	Mobile	Not available yet	SYR
5.225A	154-156 MHz	RADIOLOCATION	No. 5.225A	ALG, ARM, AZE, BLR, CHN, F, IRN, KAZ, KGZ, RUS, TJK, TKM, UKR, UZB, VTN, AMS, CRO, HKG, KER, MAC, MYT, NCL, OCE, REU, WAL
5.251	230-235 MHz	AERONAUTICAL RADIONAVIGATION	Not available yet	NIG
5.252	230-246 MHz 238-254 MHz	BROADCASTING	Rec. ITU-R SM.851	AFS, BOT, LSO, MWI, MOZ, NMB, SWZ, ZMB, ZWE
5.259	328.6-335.4 MHz	Mobile	Not available yet	EGY, SYR
5.279	430-435 MHz 438-440 MHz	Fixed MOBILE except aero.	Not available yet	MEX
5.292	470-512 MHz	MOBILE	RoP B6	ARG, URG, VEN

** The areas in Region 2 are highlighted with light green, in Region 3 with sky blue and in Region 1 without highlight.*

Solution 5 (3)

Return to the first band.

➢ Frequency, service, area and coord. criteria

RR No.	Freq. band	Service	Coordination criteria	Area *, **
5.293	470-512 MHz	FIXED MOBILE	RoP B6	ARG, BAH, BRB, CAN, CHL, CUB, EQA, GUY, JMC, MEX, PNR, USA, ALS, HWA, JON, MDW, PAQ, PTR, VIR
	614-698 MHz	MOBILE		CAN, BAH, BRB, CHL, CUB, GUY, JMC, MEX, PNR, USA, ALS, HWA, JON, MDW, PAQ, PTR, VIR
	614-806 MHz	FIXED		CAN, CHL, CUB, GUY, JMC, PNR, USA, ALS, HWA, JON, MDW, PAQ, PTR, VIR
5.295	470-608 MHz	MOBILE (IMT) (Covered by 5.293 & 5.297)	RoP B6	BAH, BRB, CAN, MEX, USA, ALS, HWA, JON, MDW, PTR, VIR
5.296A	470-698 MHz 610-698 MHz	MOBILE (IMT)	RoP B6	FSM, SLM, TUV, VUT BGD, MLD, NZL, CKH, NIU, TKL
5.297	512-608 MHz	FIXED MOBILE	RoP B6	BAH, BRB, CAN, CTR, CUB, SLV, GTM, GUY, JMC, MEX, USA, ALS, HWA, JON, MDW, PTR, VIR
5.308	614-698 MHz	MOBILE	RoP B6	BLZ, CLM, GTM
5.308A	614-698 MHz	MOBILE (IMT) (Covered by 5.293 and 5.308)	RoP B6	BAH, BLZ, BRB, CAN, CLM, GTM, MEX, USA, ALS, HWA, JON, MDW, PTR, VIR
5.309	614-806 MHz	FIXED	RoP B6	SLV

** The areas in Region 2 are highlighted with light green, in Region 3 with sky blue and in Region 1 without highlight.*
*** The areas highlighted with yellow are in added by WRC-19.*

Solution 5 (4)

Return to the first band.

➢ Frequency, service, area and coord. criteria

RR No.	Freq. Band **	Service	Coordination criteria	Area
5.312A	694-790 MHz. 726-753MHz 753-758 MHz, 766-778 MHz 778-790 MHz	MOBILE except aero.	RoP 5.312A Res. 760 (Rev.WRC-19)	XR1 countries within 450 km from countries listed in No. **5.312** (ARM, AZE, BLR, BUL, GEO, KAZ, KGZ, RUS, TJK, TKM, UKR, UZB): ALB, ARM, AUT, AZE, BIH, BLR, BUL, CZE, D, DNK, EST, FIN, GEO, GRC, HNG, HRV, I, IRQ, KAZ, KGZ, LTU, LVA, MKD, MDA, MNE, MNG, NOR, POL, ROU, RUS, S, SRB, SVK, SYR, TJK, TKM, TUR, UKR, UZB
5.316B	790-862 MHz, 790-811 MHz 811-814 MHz 822-852 MHz 852-862 MHz	MOBILE except aero.	RoP 5.316B Res. 749 (Rev.WRC-19)	
5.322	862-960 MHz	BROADCASTING	Rec. ITU-R SM.851	ABA (African broadcasting area) except AFS, ALG, BDI, E, EGY, LSO, LBY, MRC, MWI, NIG, NMB, TZA, ZMB, ZWE
5.323	862-880 MHz 880-890.2 MHz 862-960 MHz 900-915 MHz 915-925 MHz 925-935.2 MHz	AERONAUTICAL RADIONAVIGATION	RoP B6	ARM, AZE, BLR, BUL, KAZ, UZB, KGZ, ROU, RUS, TJK, TKM, UKR

*** The frequency bands highlighted with grey are effective until 31 December 2020.*

Solution 5 (5)

Return to the first band.

➢ Frequency, service, area and coord. criteria

RR No.	Freq. band	Service	Coordination criteria	Area *
5.325	890-942 MHz	RADIOLOCATION	RoP B6	USA, ALS, HWA, JON, MDW, PTR, VIR
5.326	903-905 MHz	MOBILE except aero.	RoP B6	CHL, PAQ
5.341A	1429-1452 MHz 1492-1518 MHz	MOBILE except aero. (IMT)	RoP 5.341A, RoP B6	XR1 countries within 670 km from countries listed in No. **5.342** (ALB, ARM, AUT, AZE, BLR, BUL, KGZ, RUS, UKR, UZB): ALB, ARM, AUT, AZE, BIH, BLR, BUL, CZE, D, DNK, EST, FIN, GEO, GRC, HNG, HRV, I, IRQ, KAZ, KGZ, LTU, LVA, MDA, MKD, MNE, MNG, NOR, POL, ROU, RUS, S, SRB, SVK, SVN, SYR, TJK, TKM, TUR, UKR, UZB
5.341C	1429-1452 MHz 1492-1518 MHz	MOBILE (IMT)	RoP B6	XR3
5.346	1452-1492 MHz	MOBILE except aero. (IMT)	RoP 5.346 RoP B6	Countries mentioned in No. **5.346** and located within 670 km from countries listed in No. **5.342** (ARM, AZE, BLR, KGZ, RUS, UZB, UKR): IRQ
5.346A	1452-1492 MHz	MOBILE (IMT)	RoP B6	XR3
5.410	2500-2690 MHz	FIXED (ST)	Not available	XR1

** The areas in Region 2 are highlighted with light green, in Region 3 with sky blue and in Region 1 without highlight.*

Solution 5 (6)

Return to the first band.

➢ Frequency, service, area and coord. criteria

RR No.	Freq. band	Service	Coordination criteria	Area *. **
5.429D	3300-3400 MHz	MOBILE except aero. (IMT)	RoP B6	ARG, URG, PRG
5.429F	3300-3400 MHz	MOBILE (IMT)	RoP B6	CBG, IND, INS, LAO*, PAK, PHL*, VTN* (* no allocation to the LMS)
5.430A	3400-3600 MHz	MOBILE except aero.	RoP B6	XR1
5.431A	3400-3500 MHz	MOBILE except aero.	RoP B6	XR2
5.431B	3400-3600 MHz	MOBILE except aero. (IMT)	RoP B6	XR2
5.432B	3400-3500 MHz	MOBILE except aero.	RoP B6	AUS, BGD, BRU, CHN, IND, INS, IRN, MLA, NZL, PHL, SNG, AMS, KER, NCL, OCE, WAL, CKH, HKG, MAC, NIU, THA, TKL
5.434	3600-3700 MHz	MOBILE except aero. mobile (IMT)	RoP B6	CAN, CLM, CTR, USA, ALS, HWA, JON, MDW, PTR, VIR
5.441B	4800-4825 MHz 4825-4835 MHz 4835-4950 MHz 4950-4990 MHz	MOBILE (IMT) MOBILE except aero. (IMT) MOBILE (IMT) MOBILE except aero. (IMT)	Res. 223 (Rev. WRC-19)	AFS, AGL, ARM, AZE, B, BDI, BEN, BFA, BOT, CBG, CHN, CME, COD, CTI, DJI, GMB, GUI, IRN, KAZ, KEN, KGZ, KRE, LAO, LBR, LSO, MAU, MNG, MOZ, MWI, NIG, RUS, SDN, SWZ, TGO, TZA, UGA, UZB, VTN, ZMB, ZWE

** The areas in Region 2 are highlighted with light green, in Region 3 with sky blue and in Region 1 without highlight.*

*** The areas highlighted with yellow are in added by WRC-19.*

Solution 5 (7)

Return to the first band.

➢ Frequency, service, area and coord. criteria

RR No.	Freq. band	Service	Coordination criteria	Area *, **
5.447	5150-5250 MHz	MOBILE	Not available yet	CTI, EGY, ISR, LBN, SYR, TUN
5.482	10.6-10.68 GHz	FIXED MOBILE except aero.	Not available	XAA except ALG, ARM, ARS, AZE, BGD, BHR, BLR, EGY, GEO, IND, INS, IRN, IRQ, JOR, KAZ, KGZ, KWT, LBN, LBY, MDA, MRC, AOE, MTN, NIG, OMA, PAK, PHL, QAT, SNG, SYR, TJK, TKM, TUN, UAE, UZB, VTN
5.553A	45.5-47 GHz	MOBILE (IMT)	Not available	AFS, AGL, ALG, B, BEN, BFA, BHR, BLR, BOT, CPV, CTI, EST, HRV, GAB, GHA, GMB, GNB, GRC, GUI, HNG, IRN, IRQ, JOR, KOR, KWT, LBR, LSO, LTU, LVA, MAU, MDG, MLI, MOZ, MRC, MTN, MWI, NGR, NIG, NMB, OMA, QAT, S, SDN, SEN, SEY, SLV, SRL, SWZ, TGO, TUN, TZA, UAE, ZMB, ZWE

*** In the country highlighted with grey, the allocation is effective until 31 December 2020.*

Solution 5 (8)

- For example, Switzerland is involved in only two footnotes.
- The following 7 frequency bands are allocated subject to No. 9.21 coordination.
  - ✓ **5.92**: 1606.5-1625 kHz, 1635-1800 kHz, 1850-2160 kHz, 2194-2300 kHz, 2502-2850 kHz, 3500-3800 kHz for radiodetermination service
  - ✓ **5.430A**: 3400-3600 MHz, Mobile, except aeronautical service
- There is no identification of a frequency band for IMT subject to No. 9.21 coordination in Switzerland.

Exercise 6

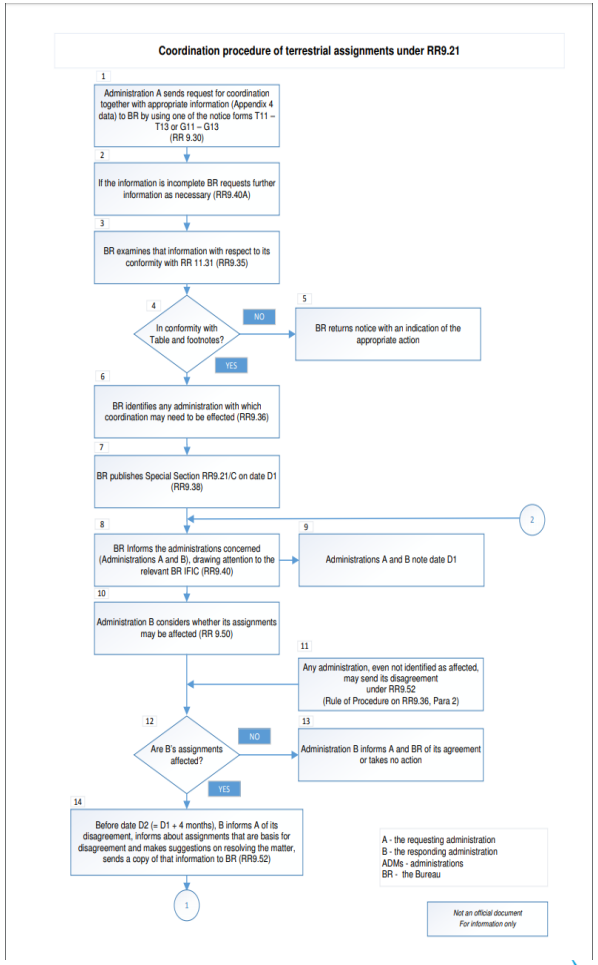
From the coordination procedure in the following slides,

1. **Please find the statutory period of the coordination under No. 9.21.**
2. **What will happen if an affected ADM does not reply to the request.**

Solution 6

- **Coordination Procedure is described in Article 9 (Nos. 9.23-9.65)**
- **It shows the procedure in the aspects of**
  - ✓ the notifying administration;
  - ✓ the potentially affected administrations; and
  - ✓ the BR

The flow chart is available at ITU web page.



Solution 6 (2)

Notifying ADM	Step	BR	Step	Affected ADM
Requests for coordination (RR **9.30**)	1	Acknowledges the receipt of the request		
	1-1	Requests further information as necessary (RR **9.40A**)		
	2	Examines with respect to conformity with RR **11.31**		
	2-1	If not conform, returns notice with an indication of the appropriate action		
	3	Identifies any administration with which coordination may need to be effected (RR **9.36**)		
	4	Publishes Special Section *RR9.21/C* on date *D1* (RR **9.38**)		
	4-1	Informs the concerned administrations (notifying and affected), drawing their attention to the relevant BR IFIC (RR **9.40**)	4-1	Note date D1

Solution 6 (3)

Notifying ADM		BR		Affected ADM
			5	Examines whether its assignments may be affected (RR **9.50**)
			6	Before date *D2* (= *D1* + ***4 months***), informs notifying ADM of its disagreement, informs about assignments that are basis for disagreement and makes suggestions on resolving the matter, sends a copy of that information to BR (RR **9.52**)
			6-1	Any administration, even not identified as affected, may send its disagreement under RR **9.52** (Rule of Procedure on RR 9.36, Para 2)
Consultations with affected ADMs (RR **9.53**, RR **9.54** and RR **9.55**)	7	Assists administrations if requested (RR **9.59** or RR **9.63**)	7	Consultations with notifying ADM (RR **9.53**, RR **9.54** and RR **9.55**)

Solution 6 (4)

Notifying ADM		BR		Affected ADM
Before or on date *D2*, informs BR about coordination results including ADMs agreed, disagreed and not replied if any, also about modifications of characteristics (RR **9.55** and RR **9.58**)	8	If characteristics were changed, publishes a new Special Section *RR9.21/C* with modified characteristics (RR **9.58**) based on principles of RoP on RR **9.27**		
	8-1	If not, publishes Special Section *RR9.21/D* after *D2* (RR **9.53A**) with list of ADMs: 1) submitted their agreement; 2) submitted their disagreement; **3) not responded and regarded as unaffected** (RR **9.52C**).		

Solution 6 (5)

Notifying ADM		BR		Affected ADM
Consultations with affected ADMs (RR **9.53**, RR **9.54** and RR **9.55**)	12	Assists administrations if requested (RR **9.59** or RR **9.63**)	12	Consultations with notifying ADM (RR **9.53**, RR **9.54** and RR **9.55**)
	13	Proposes solution	13	
Proceed for Article **11** notification	15		14	Agreement
Disagreement remains unresolved and defers Article **11** notification for 6 months (RR **9.64**)	15		14	Disagreement

Exercise 7

Where are the coordination criteria used for the identification of the affected administrations?

Solution 7

- **The criteria for identification of affected administrations required for the application of the No. 9.21 procedure are fully or partially available**
  - ✓ in the footnotes, e.g. Nos. **5.225A, 5.430A, 5.431B** and **5.432B**;
  - ✓ in the WRC Resolutions, e.g. Resolutions **223 (Rev.WRC-19)**, **749 (Rev.WRC-19)** and **760 (Rev.WRC-19)**; or
  - ✓ in the associated Rules of Procedure (e.g. RoP B4, B5 and B6)
- **Coordination criteria is normally given in the form of**
  - ✓ electric field strength level (dBuV/m);
  - ✓ power flux density (dBW/m^2); or
  - ✓ coordination distance (km).

Exercise 8

Footnote No. 5.225A provides two types of criteria.

Please identify the more stringent one.

Solution 8

➢ Coordination criteria in the footnotes

- ✓ No. **5.225A** in the frequency band 154-156 MHz for the RLS operating from terrestrial locations, the following criteria shall be used:
  - in Region 1, the field-strength value of **12 dB(μV/m)** for **10%** of the time produced at **10 m** above ground level in the **25 kHz** reference frequency band at the **border** of the territory of any other administration
  - in Region 3, the interference-to-noise ratio (I/N) value of **−6 dB** (N = −161 dBW/4 kHz), or **−10 dB** for applications with greater protection requirements, such as PPDR, for **1%** of the time produced at **60 m** above ground level at the border
- ✓ Nos. **5.430A, 5.431B, 5.432B, 5.434** in the frequency band 3 400-3 600 MHz, the MS except AMS shall ensure that
  - pfd produced at **3 m** above ground does not exceed **−154.5 dB(W/(m².4 kHz))** for more than **20%** of time at the border of the territory of any other administration

Solution 8 (2)

➢ Comparison of the criteria in No. 5.225A.

- ✓ E = N + I/N + 20 log(4 πf/c) + 10 log(30) + 10 log(25kHz/4kHz) + 120
- ✓ For given values N = -161 dBW/4kHz and N = -10 dB in Region 3,
- ✓ E = -12 dB(μV/m·25kHz).
- ✓ Therefore the criteria for Region 3 is 24 dB stringent than the criteria for Region 1.
- ✓ Furthermore the antenna height 60 m and the time percentage 1% in Region 3 are also much more stringent than those (10 m and 10%) in Region 1.

Exercise 9

From the coordination criteria given in Resolutions 749 and 760, please explain the benefit of the harmonized frequency arrangement.

Solution 9

➢Coordination criteria in WRC Resolutions

- ✓ Resolution **749 (Rev. WRC-19)**
  - Base station in 791-821 MHz: 70/125/175 km*

    (* land path ≥ 90% / 50% ≤ land path < 90% / land path < 50%)
  - Mobile station in 832-862 MHz: 150/175 km (** land path ≥ 50% / land path < 50%)
  - Other cases - base station: 432/450 km** , mobile station: 410 km
- ✓ Resolution **760 (Rev. WRC-19)**
  - Base station in 758-788 MHz: 70/125/175 km*
  - Mobile station in 703-733 MHz: 0 km
  - Other cases - base station: 432/450 km** , mobile station: 410 km

❖ The benefit of frequency arrangement: Shorter coordination distance.

Exercise 10

From the RoP on 5.312A, 5.316B, 5.341A and 5.346, please check if your administration needs to request No. 9.21 coordination in the band 694-862 MHz and 1429-1518 MHz.

(Only for Region 1 countries)

Solution 10

➢ Coordination criteria given in RoP

- ✓ RoP Section B4
  - Rules in the context of the frequency allocations in Nos. **5.61**, **5.87A**, **5.92**, **5.93** and **5.123** in the frequency range between 9 kHz and 28 MHz
- ✓ RoP Section B5
  - Rules in the context of the frequency allocation to the RDS in No. **5.92** in the frequency bands 1 606.5-1 625 kHz, 1 635-1 800 kHz, 1 850-2 160 kHz, 2 194-2 300 kHz, 2 502-2 850 kHz and 3 500-3 800 kHz
- ✓ RoP Section B6
  - Rules in the context of frequency allocations or identifications governed by Nos. **5.292, 5.293, 5.295, 5.296A, 5.297, 5.308, 5.308A, 5.309, 5.323, 5.325, 5.326, 5.341A, 5.341C, 5.346, 5.346A, 5.429D, 5.429F, 5.430A, 5.431A, 5.431B, 5.432B** and **5.4341** and **5.553A** in the frequency ranges 470 MHz-47 GHz

Solution 10 (2)

➢Coordination criteria given in RoP

- ✓ RoP 5.312A and RoP 5.316B
  - Those Region 1 administrations whose territories are located beyond the distance of 450 km from the countries mentioned in No. **5.312** are exempted from application of No. **9.21** procedure to their MS except AMS assignments in the frequency band 694-790 MHz and 790-862 MHz.

~~SUI~~

- ✓ RoP 5.341A and RoP 5.346
  - Those Region 1 administrations whose territories are located beyond the distance of 670 km from the countries mentioned in No. **5.342** are exempted from application of No. **9.21** procedure to their IMT stations operating in the frequency band 1 429 -1 518 MHz.

Exercise 11

Please explain the coordination criteria for No. 9.21 coordination and No. 9.18 coordination in the frequency band 1429-1518 MHz.

Solution 11

- **Summary of requirements in the frequency band 1 429-1 518 MHz**

Process	Freq. band	Service (Application)	Criteria	Area
RR9.21 Coord.	1429-1518 MHz	MOBILE except Aero. (IMT)	-181 dBW/m^2·4kHz and 450 km	Regions 1 and 3
RR9.18 Coord.	**1452-1492** MHz	MOBILE except Aero. (IMT) Other cases of Terrestrial service	−154 dB(W/(m^2 · 4 kHz)) 1200 km	Regions 1 and 3

- **The coordination requirement under No. 9.21 is effected by making coordination request to the BR**
- **The coordination requirement under No. 9.18 should be effected bilaterally with affected ADMs without involvement of the BR**

Exercise 12

Please describe the difference between the coordination criteria given in Resolution 223 and pfd limit given in No. 5.441B for the frequency band 4800-4990 MHz.

Solution 12

- **Summary of requirements in the frequency band 4 800-4 990 MHz**

Process	Freq. band	Service (Application)	Criteria	Area
RR9.21 Coord.	4800-4825 MHz	MOBILE (IMT)	300/450 km	AFS, AGL, ARM, AZE, B, BDI, BEN, BFA, BOT,
	4825-4835 MHz	MOBILE except aero. (IMT)	70 km	CBG, CHN, CME, COD, CTI, DJI, GMB, GUI,
	4835-4950 MHz	MOBILE (IMT)	300/450 km	IRN, KAZ, KEN, KGZ, KRE, LAO, LBR, LSO,
	4950-4990 MHz	MOBILE except aero. (IMT)	70 km	MAU, MNG, MOZ, MWI, NIG, RUS, SDN, SWZ,
			to the border	TGO, TZA, UGA, UZB, VTN, ZMB, ZWE
5.441B PFD limit			-155* dBW/m^2·MHz at the height of 19000 m and 20 km from the coast	~~AFS,~~ AGL, ~~ARM,~~ AZE, ~~B,~~ BDI, BEN, BFA, BOT, ~~CBG, CHN,~~ CME, COD, CTI, DJI, GMB, GUI, IRN, ~~KAZ,~~ KEN, KGZ, KRE, ~~LAO,~~ LBR, LSO, MAU, MNG, MOZ, MWI, NIG, ~~RUS,~~ SDN, SWZ, TGO, TZA, UGA, ~~UZB, VTN,~~ ZMB~~, ZWE~~

- **The coordination requirement is effected by making coordination request to the BR, under No. 9.21**
- **The PFD limit would be checked when the assignment is notified under Article 11 to the BR**

Exercise 13

Please investigate which propagation models are used in application of No. 9.21 in the range 694 MHz-47 GHz.

Solution 13

➢Propagation Models

- ✓ The calculation results of power flux density or electric field strength may vary according to the path loss prediction methods (e.g. Recommendations ITU-R P.368, P.452, P.525, P.528, P.1546, P.2041 and etc.)
- ✓ Therefore it is important to have an agreement among concerned parties on a propagation model for a coordination procedure.
- ✓ If no propagation model is specified with a given criteria in the Radio Regulations, the BR would request the RRB to decided it based on the available ITU-R Recommendations and Reports.

Solution 13 (2)

➢ Propagation Models mentioned in RoP B6

- ✓ Recommendation ITU-R P.452
  - Valid for propagation predictions between stations on the surface of the Earth in frequency range from about 0.1 GHz to 50 GHz (See example.)
- ✓ Recommendation ITU-R P.1546
  - Valid for point-to-area radio propagation predictions for terrestrial services in the frequency range 30 MHz to 3 000 MHz, up to 1 000 km distance and effective transmitting antenna heights less than 3 000 m.
- ✓ Recommendation ITU-R P.528
  - valid for propagation prediction of aeronautical and satellite services ground-air, ground-satellite, air-air, air-satellite, and satellite-satellite links in the frequency range of 125-15 500 MHz

➢ More information related to propagation models and software

- ✓ P-series ITU-R Recommendations download
- ✓ ITU-R Study Group 3 Software and data download
- ✓ GNU Octave download

Exercise 14

As a notifier, please think about what do you need to do for effecting the coordination under No. 9.21.

Solution 14

➢ Before notifying frequency assignments for recording in the MIFR in accordance with Article 11

- ✓ Check if the corresponding frequency allocation is subject to coordination under No. **9.21**
  - Using the footnotes of Article **5** of the RR (See also file attached in the link 'Frequency bands')
- ✓ Submit a request for coordination to the BR through WISFAT
  - Using the notice type G11, G12 or G13 (for GE06 Agreement bands), and T11, T12 or T13 (for all other bands)
  - WISFAT process for the request for coordination is the same as that of a notification under Article 11

➢ After submitting a request for coordination

- ✓ Check if the request is published in a Special Section RR9.21 (in Part C) correctly
- ✓ Implement necessary steps for coordination with the administrations identified as affected.

Solution 14 (2)

➢ At the end of the statutory coordination period of 4 months

- ✓ Inform the BR of the coordination results, including the names of administrations giving their agreement, disagreement and those that did not reply, together with any modification, if necessary.
- ✓ Check if the assignment is published in a Special Section RR9.21 (Part D)

➢ After the publication of SS RR9.21 (Part D)

- ✓ Notify the frequency assignment to the BR through WISFAT in accordance with RR Article **11**
  - Including the name(s) of administration(s) which gave an agreement to the assignment in the coordination information of the notice
- ✓ Check if the assignment is published in a BR IFIC (Part 1)
- ✓ Check if the assignment is published in a BR IFIC (Part 2)

Exercise 15

As an affected administration, please think about what do you need to do for effecting the coordination under No. 9.21.

Solution 15

➢ Upon receiving a coordination request or publication of the coordination request in a special section RR9.21 (Part C)

- ✓ Check if the special section includes your country name in the list of administrations, identified as potentially affected
- ✓ Identify stations of your country, located within the coordination distance
- ✓ Respond to the coordination request
  - Agreement; or
  - Disagreement with information of assignments upon which that disagreement is based
- ✓ Send a copy of that information to the BR

Solution 15 (2)

➢ After the publication of SS RR9.21 (Part D)

- ✓ Check if the decision of your Administration is correctly reflected in relation to the corresponding assignment.

➢ A point that should be kept in mind

- ✓ For coordination requests under No. **9.21** an administration, not responding within the statutory **4 months** period, shall be regarded as unaffected. (No. **9.52C**)

Exercise 16

Have you found any specific points to be considered in the application of No. 9.21?

Solution 16

- **During the period of 2012-2020, there have been 3 491 requests for coordination under No. 9.21 for TS except BS**
  - ✓ All of them are in accordance with Nos. **5.316B**, **5.430A** and **5.441B**
- **For some bands, no clear guidance is available yet, for the criteria applicable for identification of affected administrations under No. 9.21:**
  - ✓ for the frequency bands 74.8-75.2 MHz, 87.5-88 MHz, 108-111.975 MHz, 230-235 MHz, 328.6-335.4 MHz, 430-440 MHz, 2 500-2 690 MHz, 5 150-5 250 MHz and 10.6-10.68 GHz mentioned in Nos. **5.181**, **5.190**, **5.197**, **5.251**, **5.259**, **5.279**, **5.410**, **5.447** and **5.482** respectively.

Exercise 17

From an example notice with a frequency of 3550 MHz in a Region 1 country, please check why one neighboring country is identified as affected while others are not.

Solution 17

➢Example 1 for RR9.21

BR ID: 120184205
Administration: LVA
Adm's unique ID: T13_Test
Fragment: Req_agrt
Provision: RR9.21
Notice type: T13 / ADD
Date Rcv: 02 Jul 2020
Date In Use: 20 Feb 2019

Assigned frequency: 3550 MHz
Bandwidth: 100M
Examination category: C9_21
Class of station: ML
Geographic area: LVA
Site name: Test
Coordinates: 23°40'25"E - 56°32'7"N
Coordinates: 23.6736° ; 56.5353°

Administration	Provision	Coord Status	Source	Date effective	Declared by
BLR	COORD	COORD COMPLETED	NOTIFIER	02-Jul-2020	NOTIFIER
EST	COORD	COORD COMPLETED	NOTIFIER	02-Jul-2020	NOTIFIER
LTU	COORD	COORD COMPLETED	NOTIFIER	02-Jul-2020	NOTIFIER
LTU	RR9.36	COORD REQUIRED	ITU	19-Oct-2020	ITU
S	COORD	COORD COMPLETED	NOTIFIER	02-Jul-2020	NOTIFIER

Solution 17 (2)

- 6 test cases were checked (BLR, EST, LTU, POL, RUS, S)
  - ✓ Case 2.1: Considered Administration: **LTU** - Status: **COORD REQUIRED**
  - ✓ Case 2.1: Tx antenna parameters: Location 23°41'46"E - 56°34'54"N - Gain: 0.0 dB - Height: 2 m - Polarization: Unknown - Radiated power: 47.5 dBW - Protection Criteria: ROP B6 (3.8)
  - ✓ Case 2.1: Test point antenna parameters: Location 23°40'51"E - 56°21'47"N - Country LTU - Gain 0.0 dB - Height 3.0 m
  - ✓ Case 2.1: Calculation results: Distance 24.3 km - Path Loss 172.8 dB – Maximum Calculated pfd **-136.9 dB(W/m²·4kHz)** - Trigger pfd **-154.5 dB(W/m²·4kHz)**
  - ✓ Case 2.1: Observation: LTU in coord list (shortest path case heuristic)
  - ✓ Case 2.2: Considered Administration: **BLR** - Status: **COORD NOT REQUIRED**
  - ✓ Case 2.2: Tx antenna parameters: Location 23°36'27"E - 56°39'12"N - Gain: 0.0 dB - Height: 2 m - Polarization: Unknown - Radiated power: 47.5 dBW - Protection Criteria: ROP B6 (3.8)
  - ✓ Case 2.2: Test point antenna parameters: Location 26°34'11"E - 55°39'41"N - Country BLR - Gain 0.0 dB - Height 3.0 m
  - ✓ Case 2.2: Calculation results: Distance 214.1 km - Path Loss 211.3 dB - Maximum Calculated pfd **-175.3 dB(W/m²·4kHz)** - Trigger pfd -154.5 dB(W/m²·4kHz)
  - ✓ Case 2.2: Observation: BLR not in coord list (brute force case)

Exercise 18

From an example notice with frequency 600 MHz in a Region 2 country, please check what coordination criteria are used.

Solution 18

Example 2 for RR9.21

BR ID: 120184194
Administration: CUB
Administration's unique ID: CUB-T11-2
Fragment: Req_agrt
Provision: RR9.21
Notice type: T11 / ADD
Date Rcv: 02 Jul 2020

Assigned frequency: 600 MHz
Bandwidth: 6M00
Examination category: C9_21
Class of station: FX
Geographic area: CUB
Site name: LOS PALACIOS
Coordinates: 83°13'37"W - 22°39'12"N

- No country was identified as affected.
- 14 test cases were considered (BAH, BLZ, CLM, G/CYM, GTM, HND, HTI, JMC, MEX, NCG, SLV, HND/SWN, G/TCA, USA)
  - ✓ Case 14: Tx antenna parameters: Location 83°13'37"W - 22°39'12"N - Gain: 22.8 dBd - Height: 15 m - Polarization: Vertical - Radiated power: 22.8 dBW - Protection Criteria: ROP B6
  - ✓ Case 14: Test point antenna parameters: Location 82°07'26"W - 24°32'48"N - Country USA - Gain 0.0 dB - Height 10 m
  - ✓ Case 14: Calculation results: Distance 238.7 km - Path Loss 105.0 dB - Maximum Calculated Field Strength 4.8 dB(uV/m) - **Trigger Field Strength 20.0 dB(uV/m)**

Exercise 19

From an example notice with frequency 1462 MHz in a Region 3 country, please follow the process for identification of affected administrations.

Solution 19

➢Example 3 for RR9.21 with nature of service = ‘IM’

BR ID: 119107006
Administration: KOR
Adm’s unique ID: 32201211008376702013
Fragment: NTFD_RR
Provision: RR11.2
Notice type: T12
Date Rcv: 08 Nov 2019

Assigned frequency: 1462 MHz
Bandwidth: 20M0
Examination category: C9_21
Class of station: FB
Geographic area: KOR
Site name: SKT Backryung
Coordinates: 124°38’04“E - 37°57’08"N

Administration	Provision	Coord Status	Source	Date effective	Declared by
CHN	RR9.36	COORD REQUIRED	ITU	19-Oct-2020	ITU
KRE	RR9.36	COORD REQUIRED	ITU	19-Oct-2020	ITU
CHN	RR9.36	COORD COMPLETED	NOTIFIER	02-Jul-2020	NOTIFIER
KRE	RR9.36	COORD COMPLETED	NOTIFIER	02-Jul-2020	NOTIFIER

Solution 19 (2)

- **5.346A** The frequency band 1 452-1 492 MHz is identified for use by administrations in Region 3 wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution **223 (Rev.WRC-19)** and Resolution **761 (Rev.WRC-19)**. The use of this frequency band by the above administrations for the implementation of IMT is subject to agreement obtained under No. **9.21** from countries using stations of the aeronautical mobile service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-19)

- RoP B6

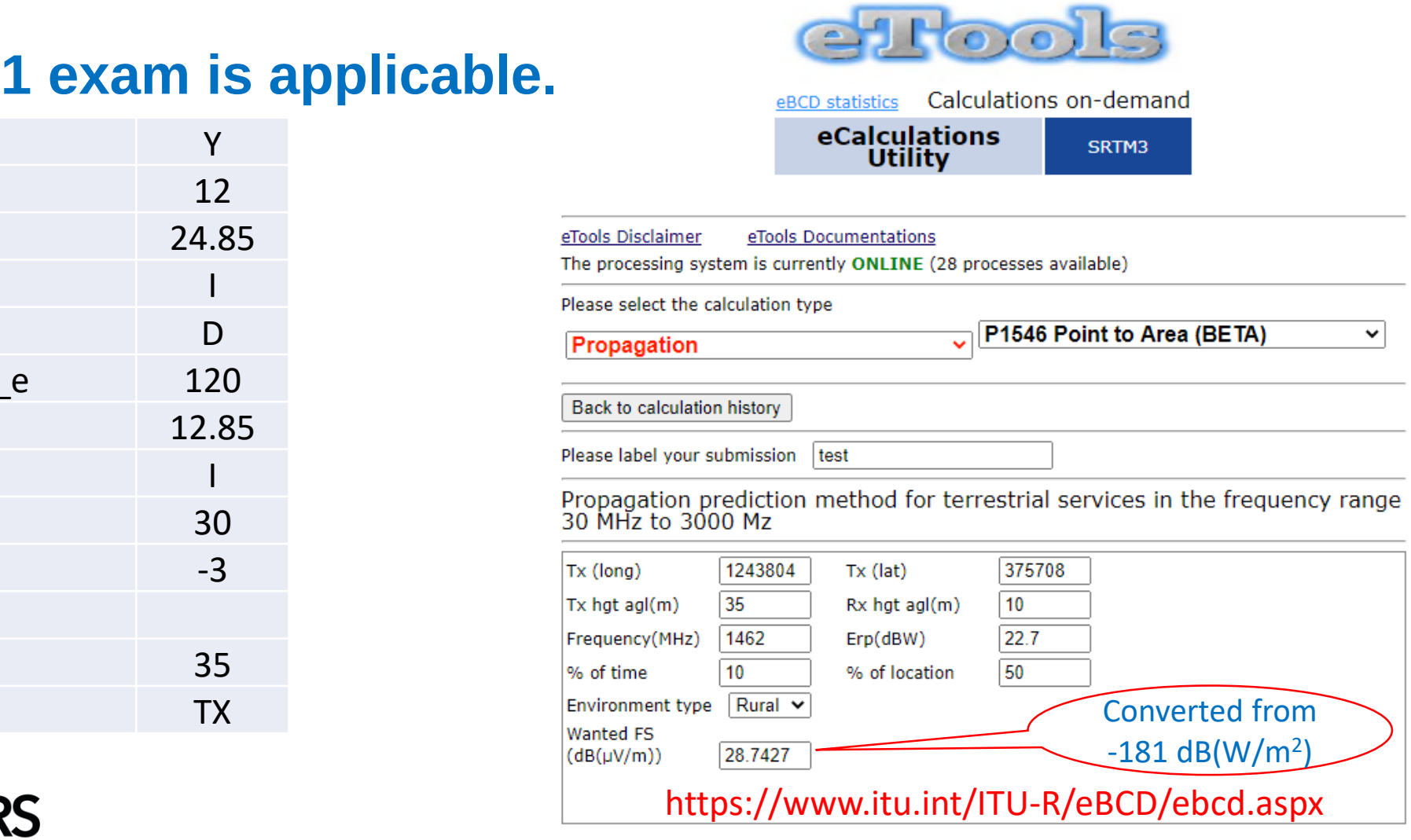
3.6 For protection of ground-based stations in the aeronautical mobile service in the frequency band 1 429-1 518 MHz from IMT, in the context of the provisions of Nos. **5.341A**, **5.341C**, **5.346** and **5.346A**, the coordination distances are calculated using the propagation curves given in Recommendation ITU-R P.1546-5 for 10% of time and 50% of locations with the coordination trigger power flux density of -181 dB(W/m^2) within 4 kHz of reference bandwidth produced at the height of 10 m above ground level as given in Recommendation ITU-R M.1459-0.

For protection of stations on-board aircraft in the aeronautical mobile service, the coordination distance of 450 km is used.

Solution 19 (3)

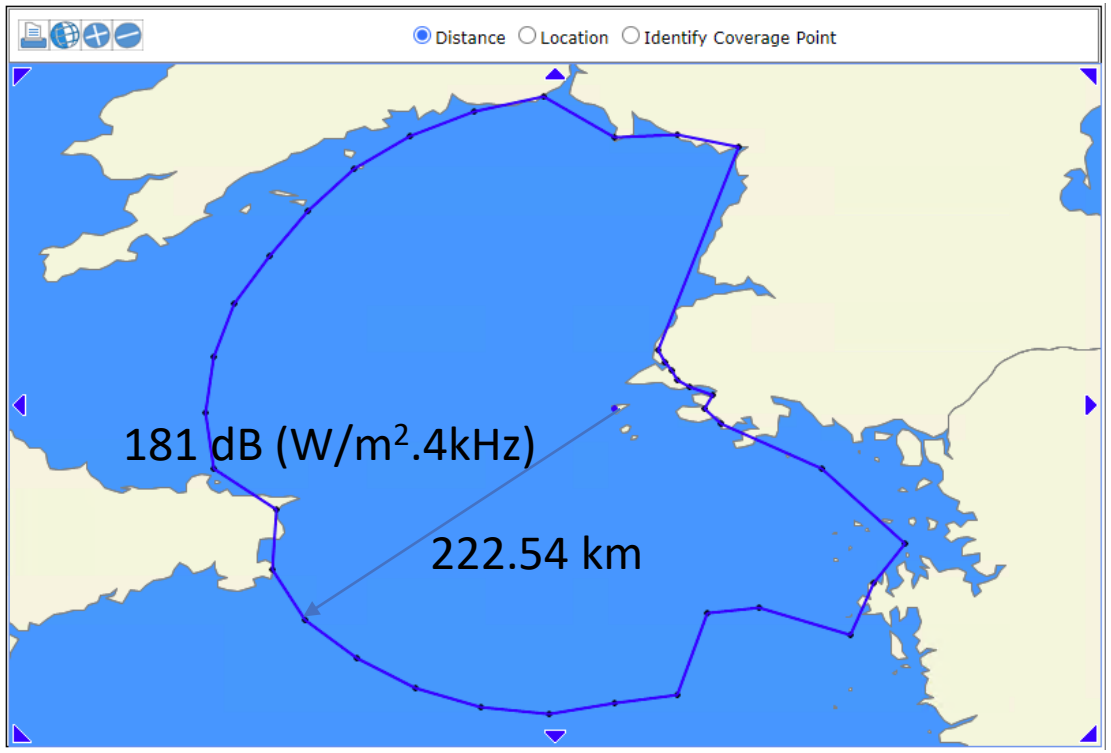
- **RR9.21 exam is applicable.**

pwr_xyz	Y
pwr_ant	12
pwr_dbw	24.85
pwr_eiv	I
ant_dir	D
azm_max_e	120
gain_max	12.85
gain_type	I
bmwdth	30
elev	-3
polar	
hgt_agl	35
tx_rx	TX



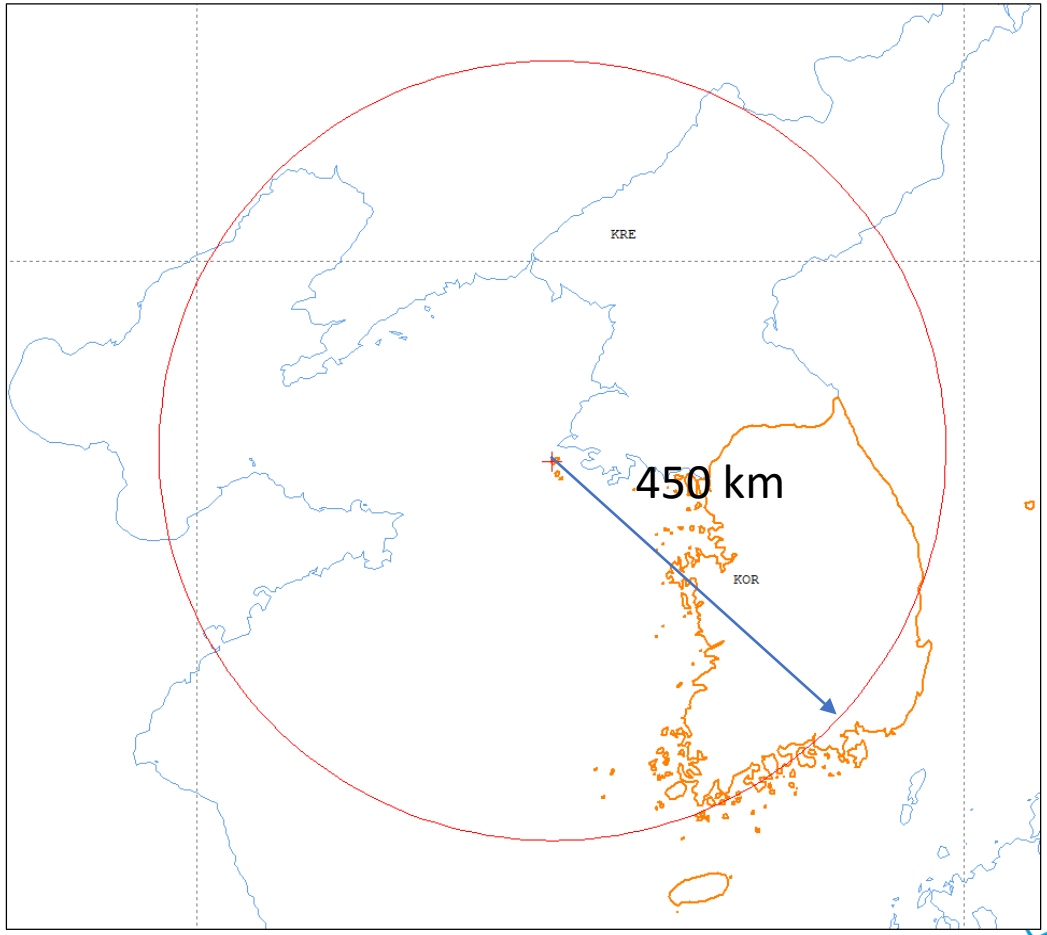
Solution 19 (4)

- **RR9.21 exam is applicable.**
  - ✓ Criteria for protection of AMS aeronautical station: 181 dB (W/m^2.4kHz) for 10% time and 50% location using Rec. ITU-R P.1546
  - ✓ Countries within this criteria: 2 country (CHN, KRE)



Solution 19 (5)

- **RR9.21 exam is applicable.**
  - ✓ Criteria for protection of AMS aircraft station: 450 km.
  - ✓ Countries within 450 km: 2 country (CHN, KRE)



Exercise 20

As a potentially affected administration, please find the minimum field strength to be protected in your country from a J3E SSB public telephony stations of neighboring countries using 2165 kHz and 1 kW under the allocation of No. 5.93.

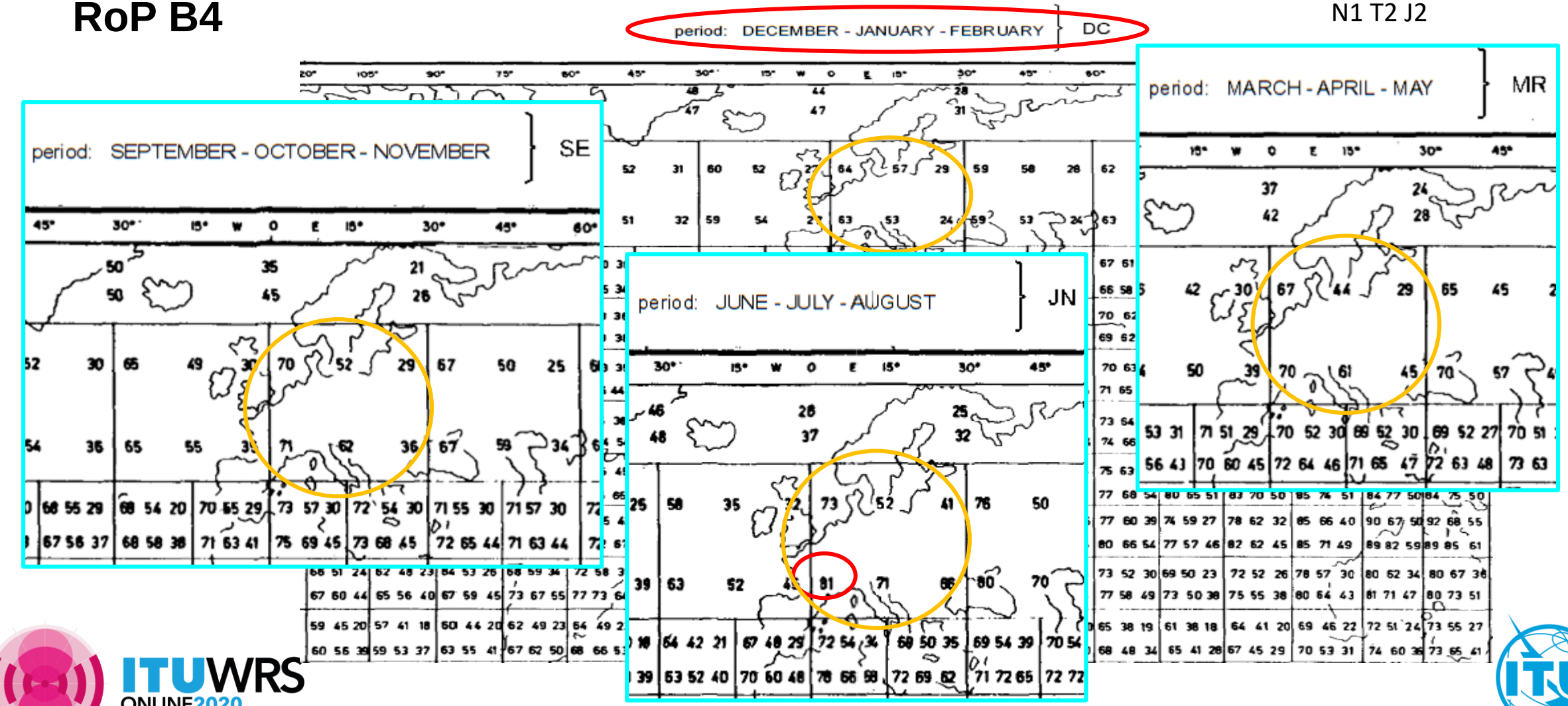
Solution 20

- **The answer varies country by country.**
- **The following answer is for the case of Switzerland.**
  - ✓ From the Table 1 to 4 of the RoP B4, the noise grade figures are found as 63 for DC, 70 for MR, 81 for JN and 71 for SE. Because no information was given on the operating season, the worst case of 81 would be selected.
  - ✓ Because the time block is not given in the question, from the Table 5A, the worst-case criteria would be selected.
    In Switzerland, it is 20 dB (uV/m).
  - ✓ For the J3E public telephony, from the same Table, it should be compensated by 25 dB and results in **45 dB** (uV/m).

Solution 20 (2)

RoP B4

N2 T1 J1
N1 T2 J2



Solution 20 (3)

Minimum field strength to be protected (dB relative to 1 μV/m) Type of transmission: Telegraphy, aural reception (B > 0.5 kHz)

5A

NOISE GRADE	(kHz)																	
	10			20			50			100			200			500		
	N2 N1	T1 T2	J1 J2	N2 N1	T1 T2	J1 J2	N2 N1	T1 T2	J1 J2	N2 N1	T1 T2	J1 J2	N2 N1	T1 T2	J1 J2	N2 N1	T1 T2	J1 J2
100	72	72	74	70	72	81	72	72	74	70	72	81	72	72	74	70	72	81
	72	74	77	71	75	81	72	74	77	71	75	81	72	74	77	71	75	81
90	69	69	72	67	69	77	69	69	72	67	69	77	69	69	72	67	69	77
	70	71	74	67	71	77	70	71	74	67	71	77	70	71	74	67	71	77
80	66	66	69	63	65	73	66	66	69	63	65	73	66	66	69	63	65	73
	67	68	71	63	66	72	67	68	71	63	66	72	67	68	71	63	66	72
70	64	63	66	60	61	68	64	63	66	60	61	68	64	63	66	60	61	68
	64	65	68	59	61	68	64	65	68	59	61	68	64	65	68	59	61	68
60	61	60	64	57	57	64	61	60	64	57	57	64	61	60	64	57	57	64
	61	61	66	56	56	63	61	61	66	56	56	63	61	61	66	56	56	63
50	58	57	61	53	53	60	58	57	61	53	53	60	58	57	61	53	53	60
	58	58	63	52	52	59	58	58	63	52	52	59	58	58	63	52	52	59
40	55	55	58	49	50	56	38	39	46	26	28	35	14	16	22	7		
	55	55	60	49	47	55	38	35	43	26	24	32	14	14	20			
30	52	52	56	46	47	52	33	34	40	19	22	27	11	11	13	7		
	52	51	58	45	42	50	32	28	36	20	16	24	11	11	11			
20	50	49	54	43	42	48	28	28	33	15	15	20	11	11	11	7		
	49	48	55	40	37	46	27	20	30	15	15	15	11	11	11			

(MHz)																		
1			1.5			2			3			4						
N2 N1	T1 T2	J1 J2	N2 N1	T1 T2	J1 J2	N2 N1	T1 T2	J1 J2	N2 N1	T1 T2	J1 J2	N2 N1	T1 T2	J1 J2				
52	54	52	47	50	41	44	47	34	38	42	23	34	38	16				
51	55	54	47	49	43	42	45	36	36	39	27	32	35	22				
42	44	42	38	40	32	35	38	26	31	34	17	28	31	11				
41	45	44	37	40	33	34	36	28	30	31	20	27	28	15				
32	34	32	28	31	23	27	29	18	24	27	10	22	25	5				
31	35	34	28	30	25	26	28	20	23	24	13	21	22	9				
22	24	22	19	22	14	18	20	10	17	19	3	16	18	1				
21	25	24	19	22	16	18	20	12	16	18	6	15	16	4				
12	14	12	10	12	6	10	12	2	10	12	–1	10	12	–1				
11	15	14	9	12	7	9	11	4	9	11	0	9	10	–1				
4	4	4	3	3	3	2	3	2	3	4	–1	4	5	–1				
4	5	4	3	3	3	2	3	2	2	3	–1	4	4	–1				
4			3			2			–1			–1						
4			3			2			–1			–1						
4			3			2			–1			–1						

Constants to be added to obtain other types of emissions			
Digital transmissions, J2D			–8
Narrow-band TG (B < 0.5 kHz)			–5
Telegraphy aut. (B > 0.5 kHz)			4
Phototelegraphy			16
Telephony	CO	J3E R3E B8E	14
		H3E	20
		A3E	23
	CP	J3E R3E B8E	25
		H3E	31
		A3E	34

Exercise 21

Please find the coordination distance to assure a protection ratio of 17 dB in your country from the frequency assignments to a radiodetermination station using 30 W in a neighboring country under the allocation of No. 5.92.

Solution 21

- **The answer can vary country by country.**
- **The following answer is for the case of Switzerland.**
  - ✓ From the Table 1 to 4 of the RoP B4, the noise grade figures are found as 63 for DC, 70 for MR, 81 for JN and 71 for SE. Because no information was given on the operating season, the worst case of **81** would be selected.
  - ✓ Having the protection criteria 17 dB and power 30 W, the coordination distance can be directly read as **3100 km** from the Table 1 of RoP B5.

Solution 21 (2)

ROP B5

TABLE 1

Coordination distance for assuring protection ratio of 17 dB
(protected transmission: telegraphy, automatic reception)

Noise degree	50	60	70	80
Minimum field strength (dB relative to 1 µV/m)	4	13	22	30

Power (of the interfering transmission)		**Coordination distance (km)**			
1 W	0 dBW	4 400	3 400	1 800	800
3 W	5 dBW	4 900	3 900	2 800	1 400
10 W	10 dBW	5 000	4 500	3 500	2 200
30 W	15 dBW	5 000	5 000	4 000	3 100
50 W	17 dBW	5 000	5 000	4 200	3 400

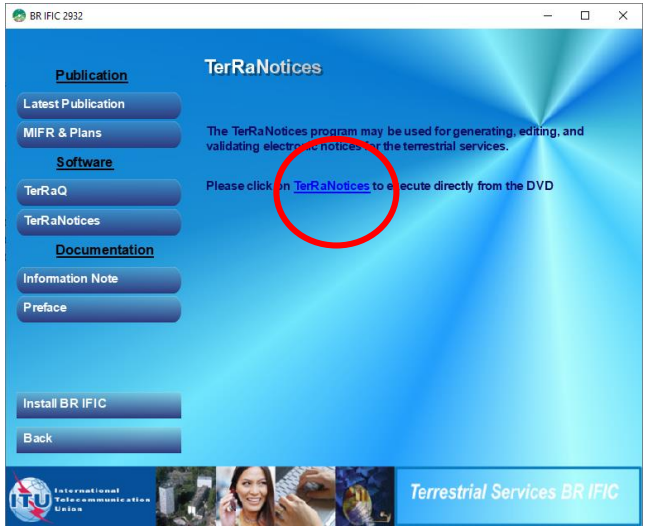
Exercise 22

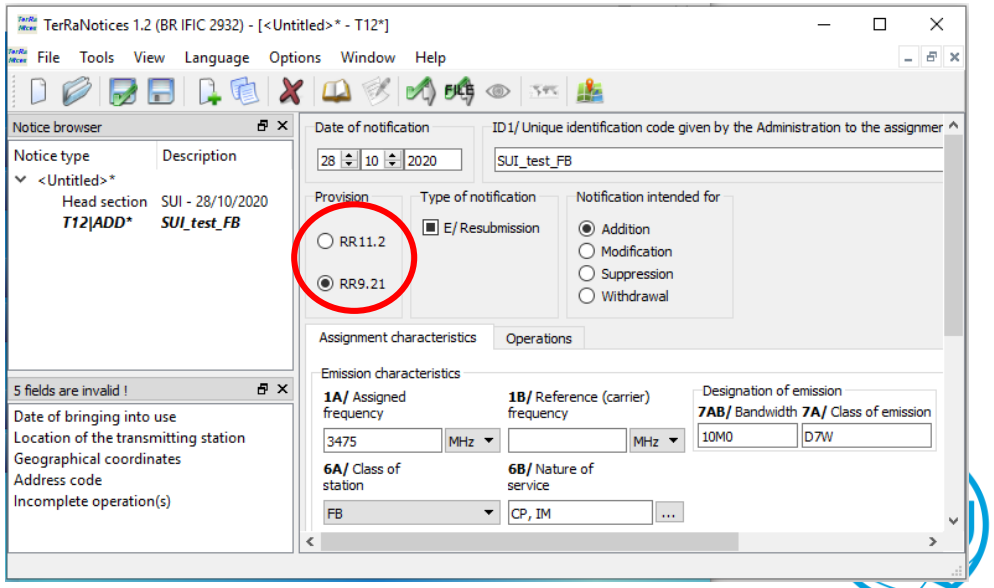
Please create a notice file for a request for coordination using TerRaNotice.

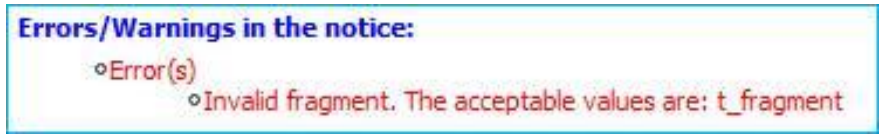
Solution 22

Hint

- ✓ Example test notice is in the following slide.
- ✓ Open TerRaNotice.
- ✓ Select "**RR9.21**"
- ✓ Fill in all the required fields from the information of the station that you have chosen in your country.
- ✓ Save the file after validation.







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Solution 22 (2)

Example notices

<HEAD>
t_email_addr=chungsang.ryu
@itu.int
t_adm=SUI
t_d_sent=2018-11-01
</HEAD>
<NOTICE>
t_notice_type=T12
t_fragment=NTFD_RR
t_prov=RR11.2
t_action=ADD
t_adm_ref_id=SUI_test_FB
t_freq_assgn=3475.00
t_long=+0085307
t_lat=+460636
t_site_name=SUI_test
t_addr_code=A
t_op_hh_fr=00:00
t_op_hh_to=24:00
t_emi_cls=D7W
t_d_inuse=2010-04-22
t_site_alt=80
t_station_id=3L KNS312 1
t_d_adm_ntc=2010-05-21
t_bdwdth_cde=10M0
t_is_resub=FALSE
t_stn_cls=FB
t_ctry=SUI
t_nat_srv=CP
<COORD>
t_adm=F
t_adm=I
</COORD>
<ANTENNA>
t_pwr_xyz=Y
t_ant_dir=D
t_elev=-8
t_pwr_dbw=48
t_azm_max_e=90
t_pwr_eiv=I
t_hgt_agl=30
t_gain_max=23
t_pwr_ant=25
t_bmwdth=65
t_gain_type=I
<RX_STATION>
t_long=+0085307
t_lat=+460636
t_geo_type=CIRCLE
t_radius=5
</RX_STATION>
</ANTENNA>
</NOTICE>

<NOTICE>
t_notice_type=T13
t_fragment=NTFD_RR
t_prov=RR11.9
t_action=ADD
t_adm_ref_id=SUI_test_ML
t_freq_assgn=3475.000000
t_long=+0085307
t_lat=+460636
t_site_name=SUI_test
t_addr_code=A
t_op_hh_fr=00:00
t_op_hh_to=24:00
t_emi_cls=D7W
t_d_inuse=2010-04-22
t_d_adm_ntc=2010-05-21
t_bdwdth_cde=10M0
t_is_resub=FALSE
t_stn_cls=ML
t_ctry=SUI
t_nat_srv=CP
<COORD>
t_adm=RUS
</COORD>
<ANTENNA>
t_pwr_xyz=Y
t_pwr_dbw=-5
t_pwr_eiv=I
t_pwr_ant=-7
<TX_STATION>
t_long=+0085307
t_lat=+460636
t_geo_type=CIRCLE
t_radius=5
</TX_STATION>
</ANTENNA>
</NOTICE>
<TAIL>
t_num_notices=2
</TAIL>

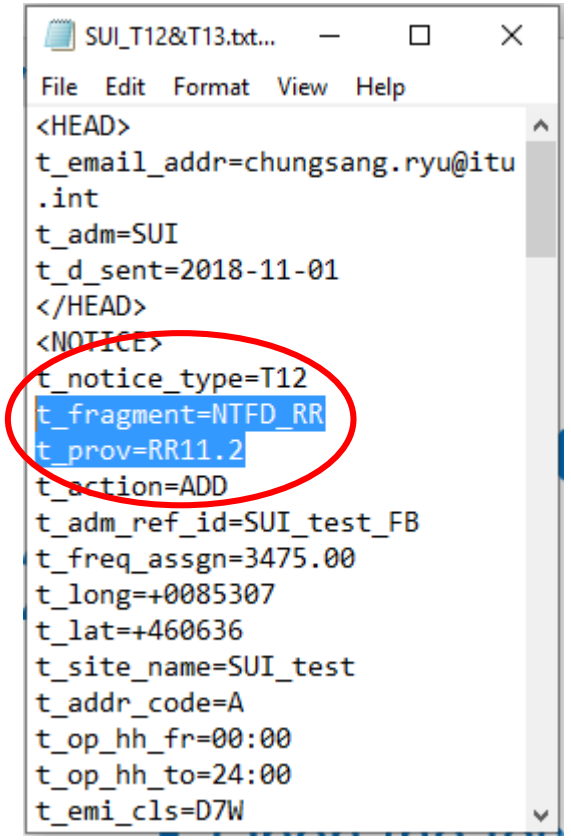
Exercise 23

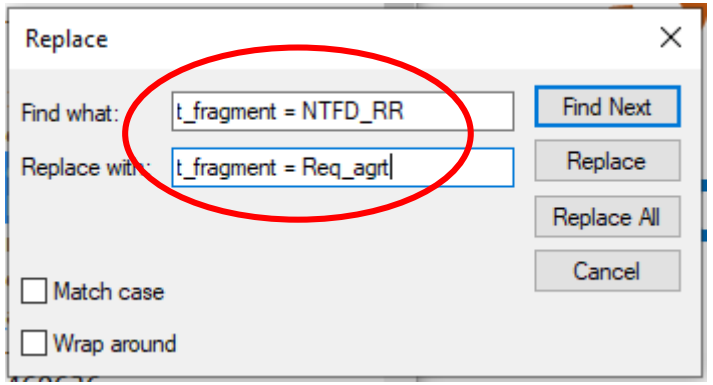
Please create a notice file for a request for coordination by converting an existing notice file.

Solution 23

Hint

- ✓ Example notice is in Solution 22.
- ✓ Open the test notice with Notepad, Notepad++ or MS Word.
- ✓ Replace “t_fragment=NTFD_RR” with “t_fragment=Req_agrt”
- ✓ Replace “t_prov=RR11.2” with “t_prov=RR9.21”
- ✓ Replace “t_prov=RR11.9” with “t_prov=RR9.21”
- ✓ Save the file.





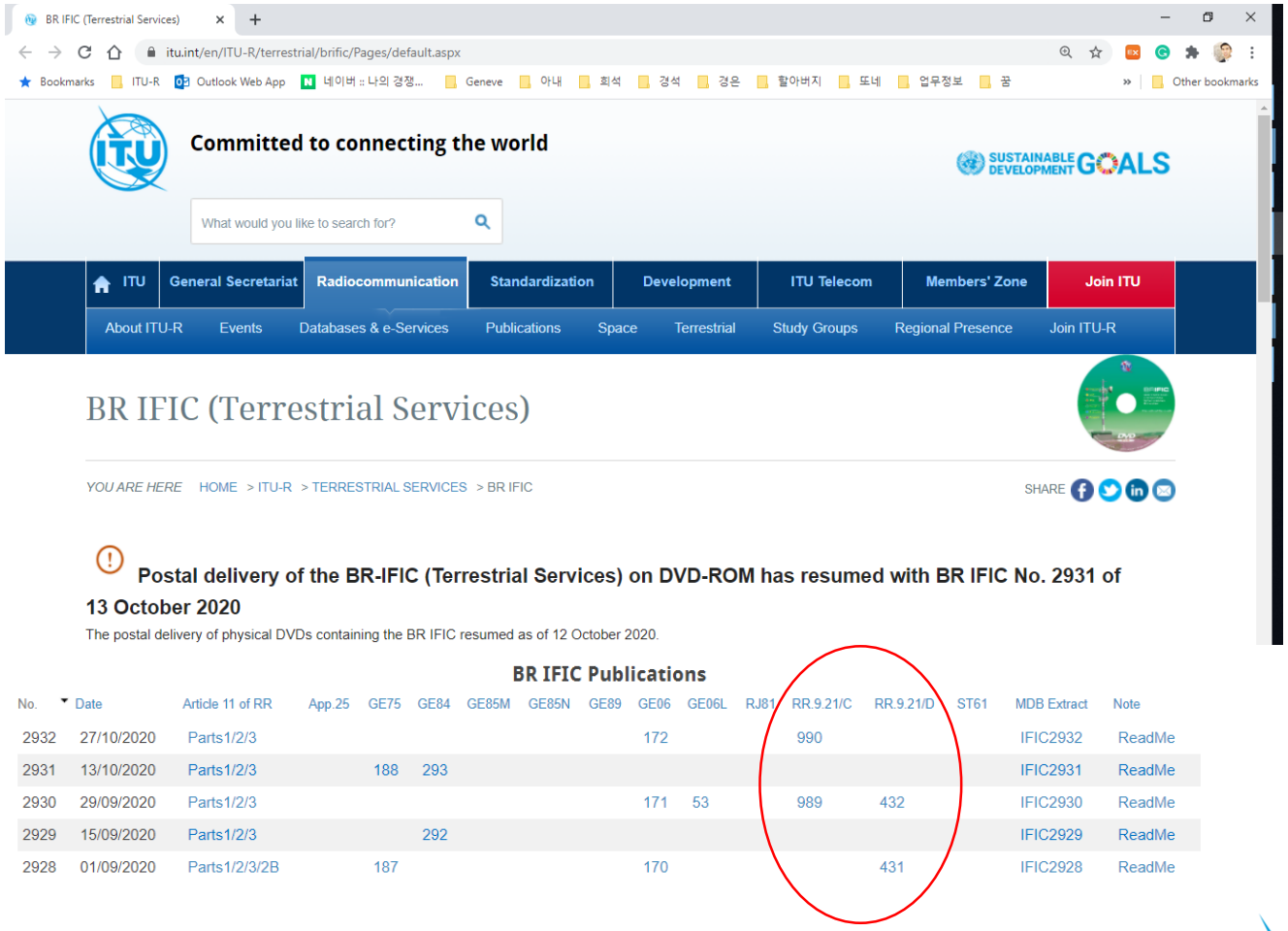
Exercise 24

1. From SS RR9.21/C/987 and RR9.21/C/988 on the BR IFIC webpage, please check whether your administration is involved.
2. From SS RR9.21/D/431 and RR9.21/D/432 please check the format of Part D of the Special Section RR9.21.

Solution 24

- https://www.itu.int/en/ITU-R/terrestrial/brific/Pages/default.aspx

- SS RR9.21/C/987 or RR9.21/C/988
- SS RR9.21/D/431 or RR9.21/D/432



ITUWRS ONLINE2020

Thank you!

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