29TH WORLD RADIOCOMMUNICATION SEMINAR
30 November – 11 December 2020

ITUWRS ONLINE2020

Cross-border coordination issues for fixed and mobile services

ITU BR/TSD

www.itu.int/go/wrs-20
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Contents

1. General aspects of coordination (1)

➢Goals of frequency coordination

- ✓To ensure interference-free operation in border areas
- ✓To assist in long-term planning of frequencies
- ✓To promote efficient spectrum utilization
- ✓To help to resolve interference between neighboring countries

➢Parameters for coordination are defined in Nos. 1.166 - 1.176 of the Radio Regulations (RR), e.g.

- ✓Interference
  - Permissible interference, Accepted interference, Harmful interference
- ✓Coordination
  - distance, Coordination contour, Coordination area

1. General aspects of coordination (2)

- ✓ **Permissible interference**
- ✓ **Accepted interference**
- ✓ **Coordination contour**

1.172 *coordination contour*: The line enclosing the coordination area.

~~1.169~~ *~~harmful~~ interference*: ~~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).

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.

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.

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.

1. General aspects of coordination (3)

➢Methods to facilitate frequency sharing

Freq. separation	Spatial separation	Time separation	Signal separation*
Channelling plans Band segmentation Frequency division multiple access (FDMA) Control of emission characteristics	Geographical site separation Space diversity Antenna characteristics: - polarization/ pattern - discrimination Physical barriers and site shielding	Time division multiple access (TDMA) Duty cycle control Dynamic real-time frequency assignment Etc.	Coded modulation: e.g. CDMA system Interference power/bandwidth adjustments - Power control - Low power, SRD Adaptive signal processing: e.g. SDR

*These techniques may also be applied together with the technologies of former separations. See Rec. ITU-R SM.1132

1. General aspects of coordination (4)

- Initiation
  - ✓ On planning stage
    - based on calculated values
  - ✓ On operating stage
    - based on measured values
- Steps of coordination
  - ✓ Identification of potentially affected countries
    - using agreed characteristics and the worst-case assumption
  - ✓ Coordination
    - using real parameters, environmental data including terrain elevation data and agreed methods

2. Coordination of FXM assignments (1)

Mandatory coordination	Voluntary coordination
Coordination **shall** be effected before notification among administrations identified with **defined** criteria	Coordination **can/may** be effected among concerned administrations with **agreed** criteria
Coordination is mandated by: - Article **9** (Nos. **9.16**, **9.18, 9.19** and **9.21**), - No. **5.457** - Res. **122 (Rev.WRC-19), 221 (Rev.WRC-07), 165 (WRC-19), 167 (WRC-19), 168 (WRC-19), 612 (WRC-12)** - Worldwide Plan (e.g. Appendix **25**) - Regional Plans (e.g. GE85-EMA, GE06)	Coordination is established among concerned administrations in accordance with Article **6** (Special Agreements)
BR examines with respect to: - No. **11.31** (for assignments under No. **9.21,** WRC **Res**) - No. **11.32** (for assignments under Nos. **9.16, 9.18**) - No. **11.34** (for assignments in the plans e.g. in Appendix **25**, and Regional Plans)	BR does not take the voluntary coordination information into account in its examination process

See also: https://www.itu.int/en/ITU-R/terrestrial/fmd/Pages/coordination.aspx

2. Coordination of FXM assignments (2)

➢Coordination criteria (Appendix 5)

Reference of Article 9	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Remarks
No. **9.16** Terrestrial	Frequency bands for which a footnote refers to No. **9.11A**	Transmitting terrestrial station is situated within the coordination area of a receiving earth station	The coordination area of the affected earth station has already been determined using the calculation method of Appendix **7**
No. **9.18** Terrestrial	Any frequency band allocated to a space service	Transmitting terrestrial station is situated within the coordination area of a receiving earth station	The coordination area of the affected earth station has already been determined using the calculation method of No. **9.17** **(**Appendix **7)**

2. Coordination of FXM assignments (3)

➢Coordination criteria (Appendix 5)

Reference of Article 9	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Remarks**
No. **9.19** Terrestrial	11.7-12.7 GHz (see Article **6** of Appendix **30**) 12.5-12.75 GHz (terrestrial services in Nos. **5.494** and **5.496** as well as in Regions 2 and 3 in respect of BSS allocation in Region 3) 17.7-17.8 GHz (terrestrial services in all three Regions in respect of BSS allocation in Region 2)	i) Necessary bandwidths overlap; and ii) the power flux-density (pfd) of the interfering station at the edge of the BSS service area exceeds the permissible level	Check by using the assigned frequencies and bandwidths (See also Article 6 of Appendix **30**)

2. Coordination of FXM assignments (4)

➢Coordination criteria (Appendix 5)

Reference of Article 9	**Frequency bands (and Region) of the service for which coordination is sought**	**Threshold/condition**	**Remarks**
No. **9.19** Terrestrial	1 452-1 492 MHz 2 310-2 360 MHz (terrestrial services in all three Regions in respect of BSS allocation in No. **5.393**) 2 520-2 670 MHz (see No. **5.416**) 40.5-42.5 GHz 74-76 GHz	i) Necessary bandwidths **overlap**; and ii) the power flux-density (pfd) of the interfering station at the edge of the BSS service area exceeds the permissible level	Check by using the assigned frequencies and bandwidths (See also RoP on No. **9.19**)

2. Coordination of FXM assignments (5)

➢Coordination criteria (Appendix 5)

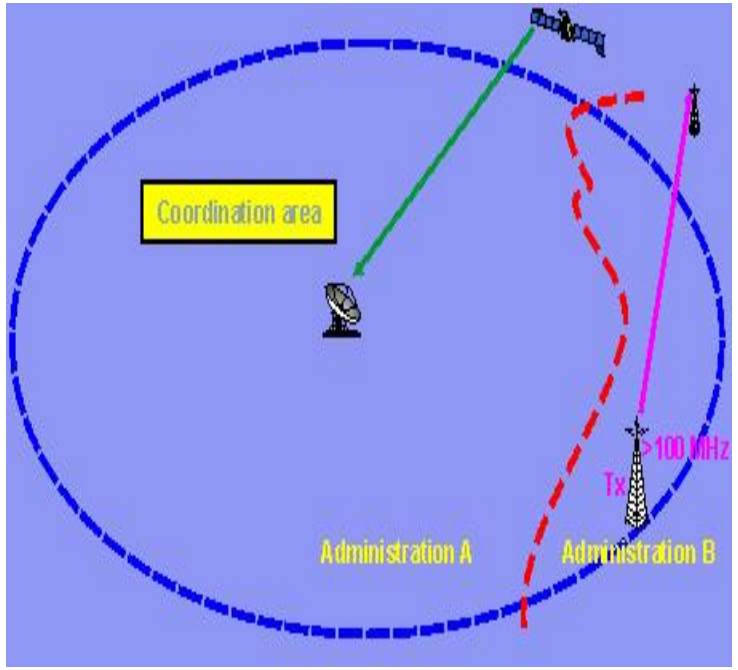
Reference of Article 9	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Remarks
No. **9.21** Terrestrial	Band(s) indicated in the relevant footnote	Incompatibility established by the use of Appendices 7, 8, technical Annexes of Appendices **30** or **30A**, pfd values specified in some of the footnotes, other technical provisions of the Radio Regulations or ITU-R Recommendations, as appropriate	Methods specified in, or adapted from, Appendices **7, 8, 30, 30A**, other technical provisions of the Radio Regulations or ITU-R Recommendations

2. Coordination of FXM assignments (6)

- Coordination criteria (coordination trigger) is given in a form of
  - ✓ Interference to noise ratio (I/N) (e.g. I/N = - 6 dB for mobile service, e.g. No.**5.225A**)
  - ✓ Permissible field strength (E) (e.g. E = 25 dBuV/m in GE06)
  - ✓ Permissible power-flux density (pfd) (e.g. pfd = -154.5 dBuV/m/4 kHz in No. **5.431B**)
  - ✓ Distance separation (e.g. d=175 km in Res. **749 (Rev.WRC-19)** and **760 (Rev.WRC-19);** 1200 km in RoP on No. **9.19**)
  - ✓ Coordination contour/area (e.g. earth station coordination contour, Non-planned BSS service area)
- Coordination point
  - ✓ At the border (e.g. with respect Non-planned BSS area)
  - ✓ At a station (e.g. FSS earth station in Appendix **7**)
- The conversion among the form of the criteria (E, I and pfd) is possible referring to Recommendation ITU-R P.525

3. Coordination under Nos. 9.16 & 9.18 (1)

- Procedures of coordination under Nos. **9.16** and **9.18**
  - ✓ **9.16** k) for a transmitting station of a terrestrial service for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to No. **9.11A** and which is located within the coordination area of an earth station in a non-geostationary-satellite network;
  - ✓ **9.18** n) in the bands referred to in No. for any transmitting station of a terrestrial service **9.17** (above 100MHz allocated with equal rights to space and terrestrial services) within the coordination area of an earth station, in respect of this earth station, with the exception of the coordination under Nos. **9.16** and **9.19**;



3. Coordination under No. 9.18 (2)

- Example 1 for No. 9.18

BR ID: 092016563
Administration: CAN
Administration's unique ID: C20044139
Fragment: NTFD_RR
Provision: RR11.2
Notice type: T11
Date Rcv: 07 Dec 2004

Assigned frequency: 2293 MHz
Bandwidth: 6M00
Examination category: SBD
Class of station: FX
Geographic area: CAN
Site name: JOLIETTE QU
Coordinates: 73°24'18"W - 46°0'58"N

- No earth station was identified as affected.

3. Coordination under No. 9.18 (3)

- Example 2 for No. 9.18

BR ID: 120107812
Administration: E
Administration's unique ID: VIZZ-0100009 fr 2020
Fragment: NTFD_RR
Provision: RR11.2
Notice type: T11 / ADD
Date Rcv: 07 Apr 2020
Date In Use: 17 Dec 2019
Stage: RETURNED
Publication history: NTFD_RR/1/2919, NTFD_RR/3/2932
Last processed by: [PUB]\landeryo **on** 21 Oct 2020 - 15:47:09

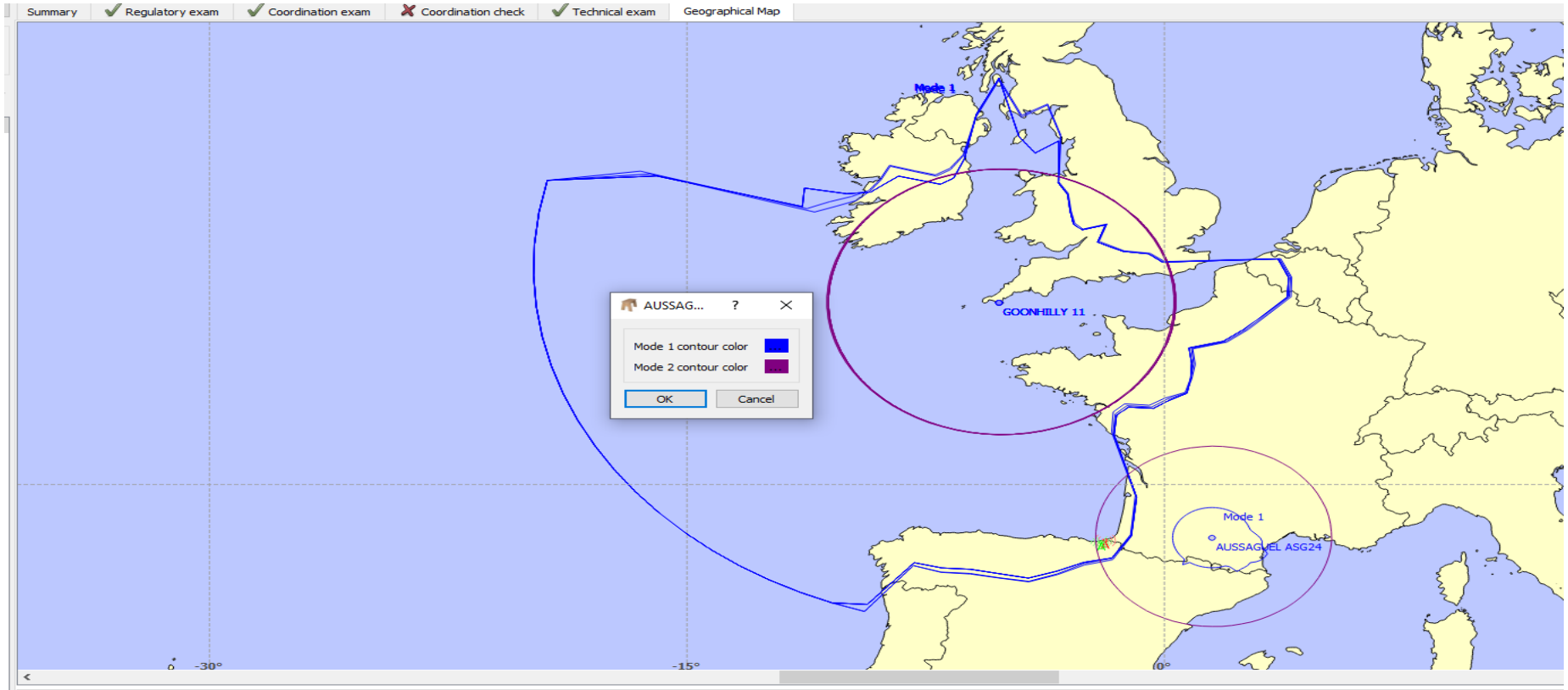
Assigned frequency: 11.605 GHz
Bandwidth: 40M0
Examination category: SBB
Class of station: FX
Geographic area: E
Site name: JAIZKIBEL
Coordinates: 1°51'27"W - 43°20'38"N
Coordinates: -1.8575° ; 43.3439°

- Administrations of UK and F were identified as affected.

6 earth stations of UK and 1 earth station of F were identified as affected:

3. Coordination under No. 9.18 (4)

➢Example 3 for No. 9.18

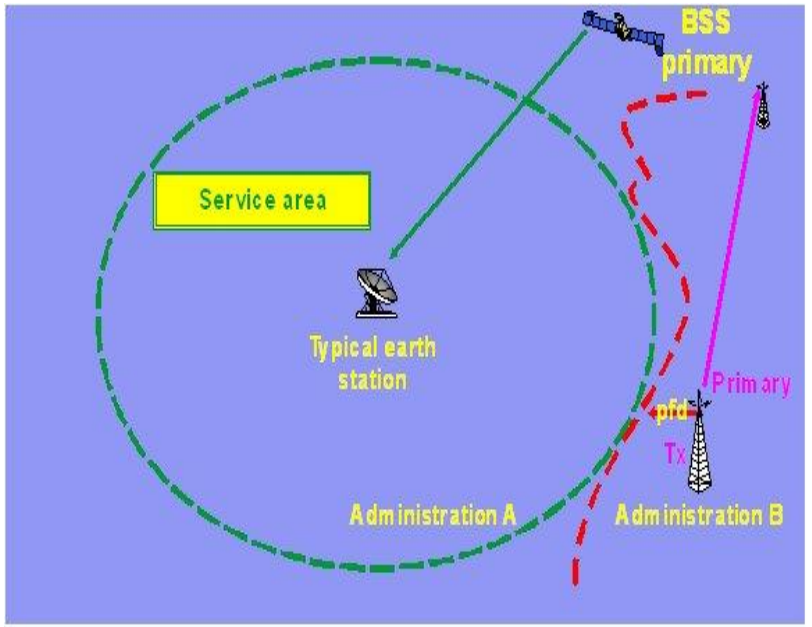


Coordination exam

	ES name	Adm. (Country)	Satellite name	ES frequency (MHz)	GroupID	NoticeID	Calculated azimuth	Calculated distance (km)	Mod 1 (km)	Mod 2 (km)	Coordinates	Class of station	Bandwidth (MHz)	Is favorable
☑	GOONHILLY 11	G (G)	GDL-6	11582.250	93600103	93500006	159.909°	787.436	847.022	403.000	5°11'41"W - 50°02'42"N	TC	26.000	FALSE
☑	GOONHILLY 11	G (G)	GDL-6	11597.000	93600103	93500006	159.909°	787.436	847.022	403.000	5°11'41"W - 50°02'42"N	TC	26.000	FALSE
☑	GOONHILLY 11	G (G)	GDL-6	11611.750	93600103	93500006	159.909°	787.436	847.022	403.000	5°11'41"W - 50°02'42"N	TC	26.000	FALSE
☑	GOONHILLY 11	G (G)	GDL-6	11626.500	93600103	93500006	159.909°	787.436	847.022	403.000	5°11'41"W - 50°02'42"N	TC	26.000	FALSE
☑	GOONHILLY 11	G (G)	EUTELSAT-1	11658.330	93600127	93500007	159.909°	787.436	852.949	402.000	5°11'41"W - 50°02'42"N	TC	80.000	FALSE
☑	GOONHILLY 11	G (G)	EUTELSAT 1-3	11658.330	93600176	93500009	159.909°	787.436	846.949	402.000	5°11'41"W - 50°02'42"N	TC	80.000	FALSE
☑	AUSSAGUEL ASG24	F (F)	NSS-36	11623.440	118746786	118505290	269.175°	271.301	100.000	295.165	1°29'49"E - 43°25'41"N	TC	4.194	FALSE

4. Coordination under No. 9.19 (1)

- Procedures of coordination under No. **9.19**
  - ✓ **9.19** o) for any transmitting station of a terrestrial service or any transmitting earth station in the fixed-satellite service (Earth-to-space) in a frequency band shared on an equal primary basis with the broadcasting-satellite service, with respect to typical earth stations included in the service area of a space station in the broadcasting-satellite service.
  - ✓ RoP on No 9.19 : Frequency overlap and distance from the station to the national border of any country included in a non-planned BSS service area less than 1200km
  - ✓ Non-planned BSS Frequency bands: 1452-1492 MHz, 2310-2360 MHz, 12.7-12.75 GHz,17.7-17.8 GHz, 40.5-42.5 GHz and 74-76 GHz



4. Coordination under No. 9.19 (2)

➢Rules of Procedure 9.19 (New)

- ✓For transmitting **IMT stations** notified with nature of service “IM” in the frequency band 1 452-1 492 MHz, in Regions 1 and 3: frequency overlap and the **power flux-density** of −154 dB(W/(m^2 · 4 kHz)) at the edge of the service area of non-planned BSS, is calculated using Recommendation ITU-R P.452-16 for 20 % of time;

- ✓For **all non-IMT stations** in the frequency band 1 452-1 492 MHz, as well as for transmitting terrestrial stations in other non-planned BSS frequency bands: frequency overlap and the distance from the location of the terrestrial station to the national border of any country included in the service area of the BSS assignment is less than 1 200 km;

4. Coordination under No. 9.19 (3)

➢Example 1 for RR9.19

BR ID: 118010749
Administration: F
Administration's unique ID: 1085719
Fragment: NTFD_RR
Provision: RR11.2
Notice type: T11 / ADD
Date Rcv: 28 Feb 2018

Assigned frequency: 1485 MHz
Bandwidth: 1M00
Examination category: NBSS
Class of station: FX
Geographic area: GUF
Site name: REGINA5
Coordinates: 52°7'42"W - 4°32'2"N

Administration	Coordination provision(s)	Status(es)
B	RR9.19	COORD REQUIRED
GUY	RR9.19	COORD REQUIRED
SUR	RR9.19	COORD REQUIRED
TRD	RR9.19	COORD REQUIRED
VEN	RR9.19	COORD REQUIRED

4. Coordination under No. 9.19 (4)

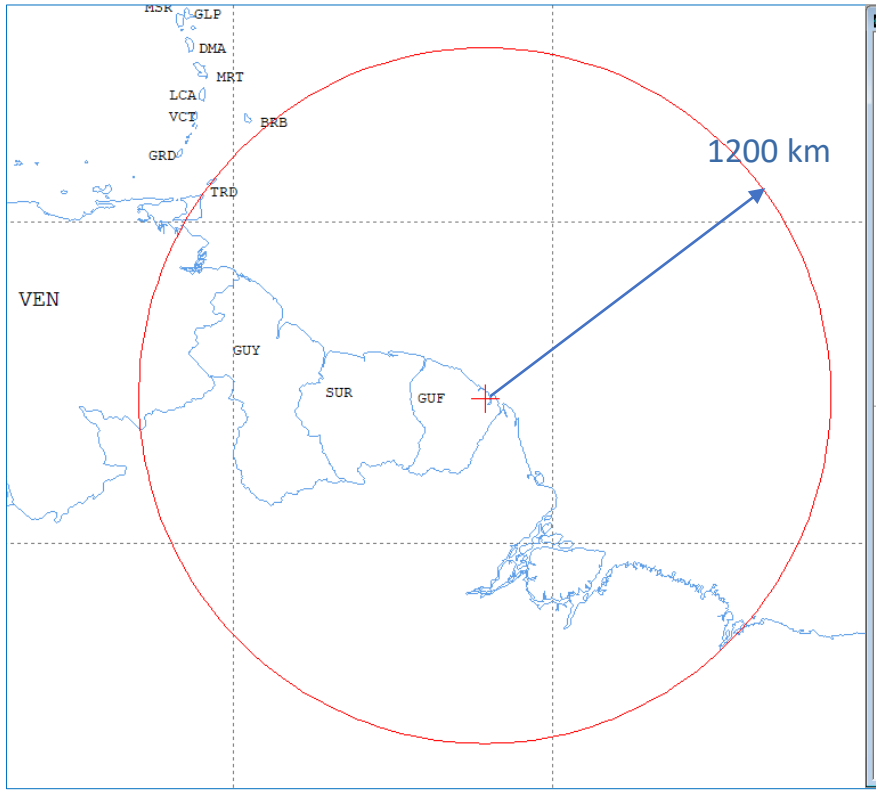
- Non-Planned BSS exam is applicable.
  - ✓ Coordination distance: 1200 km.
  - ✓ The following Administrations of space networks are involved : ARS, HOL, ISR, JOR, LUX, MLA, S, UAE, USA.
  - ✓ The following Administrations included in the service areas countries are involved : B, GUY, SUR, TRD, VEN.

- The following BSS networks are involved.

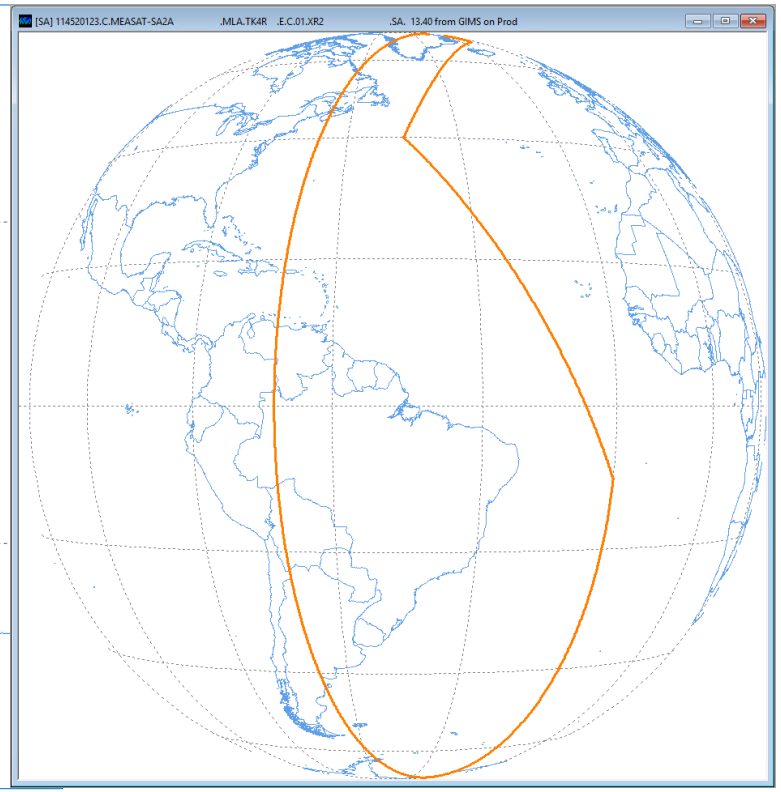
AFRIBSS	LUX-G12-1	MEASAT-SA2B
AMS-B7-13	LUX-G7	MEASAT-SA3C
ARABSAT-9L-1E	LUX-G9-10	MEASAT-SA4B
EMARSAT-12F	LUX-G9-37	MEASAT-SA4C
FUTURA-4	LUX-G9-38	NSS-G5-13
JORSAT-11E	LUX-G9-42	NSS-G6-10
LUX-G10-5	LUX-G9-49	NSS-G6-14
LUX-G10-7	LUX-G9-5	NSS-G6-7
LUX-G10-8	LUX-G9-6	NSS-G7
LUX-G11-2	LUX-G9-7	NSS-G7-131W
LUX-G11-49	LUX-G9-8	NSS-G7-50
LUX-G11-5	LUX-G9-9	NSS-G7-83W
LUX-G11-7	MEASAT-LA1B	NSS-G8-137W
LUX-G11-8	MEASAT-SA2A	SIRIUS-5E-8

4. Coordination under No. 9.19 (5)

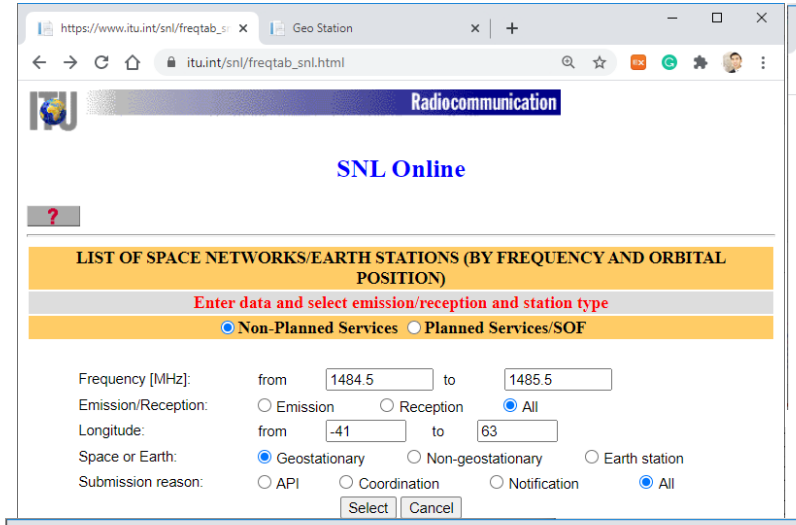
- Example 1 for RR9.19
  - ✓Coord area

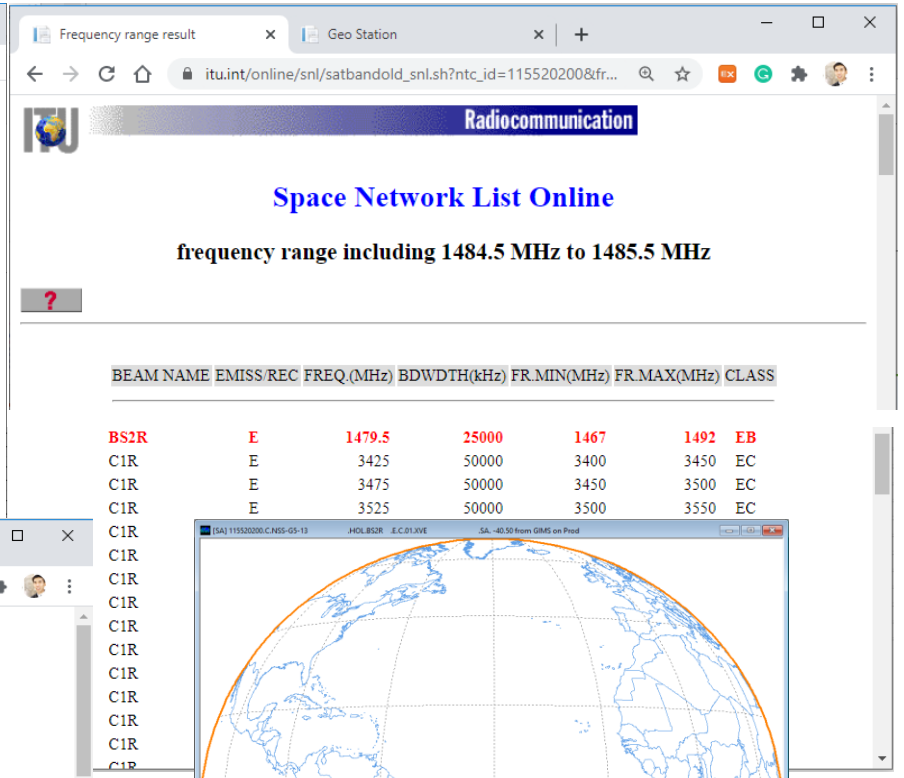


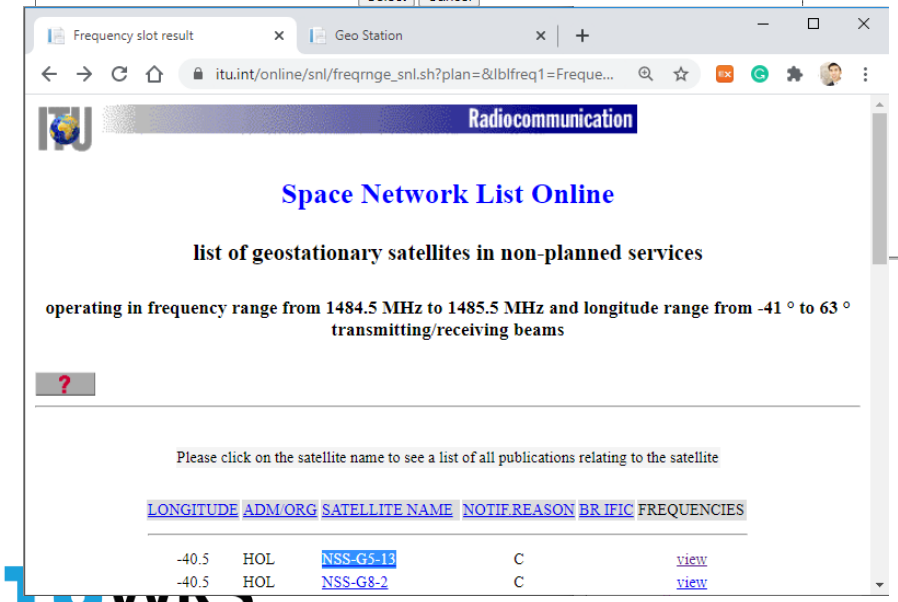
- Service area of MEASAT-SA2B



4. Coordination under No. 9.19 (6)







4. Coordination under No. 9.19 (7)

➢Example 2 for RR9.19

BR ID: 115153219
Administration: CAN
Administration's unique ID: FX000000010
Fragment: NTFD_RR
Provision: RR11.2
Notice type: T11
Date Rcv: 16 Dec 2015

Assigned frequency: 2311 MHz
Bandwidth: 5M00
Examination category: NBSS
Class of station: FX
Geographic area: CAN
Site name: GRAND BEACH MB
Coordinates: 96°34'42"W - 50°36'19"N

Administration	Coordination provision(s)	Status(es)
USA	RR6.7	COORD COMPLETED

➢Non-Planned BSS exam is applicable.

- Used coordination distance: 1200 km.
- No NBSS networks found, which require coordination within a range of 1200 km.

4. Coordination under No. 9.19 (8)

➢How to notify the successful coordination information.

✓in TerRaNotice text file

<COORD>

t_adm=B

t_adm=GUY

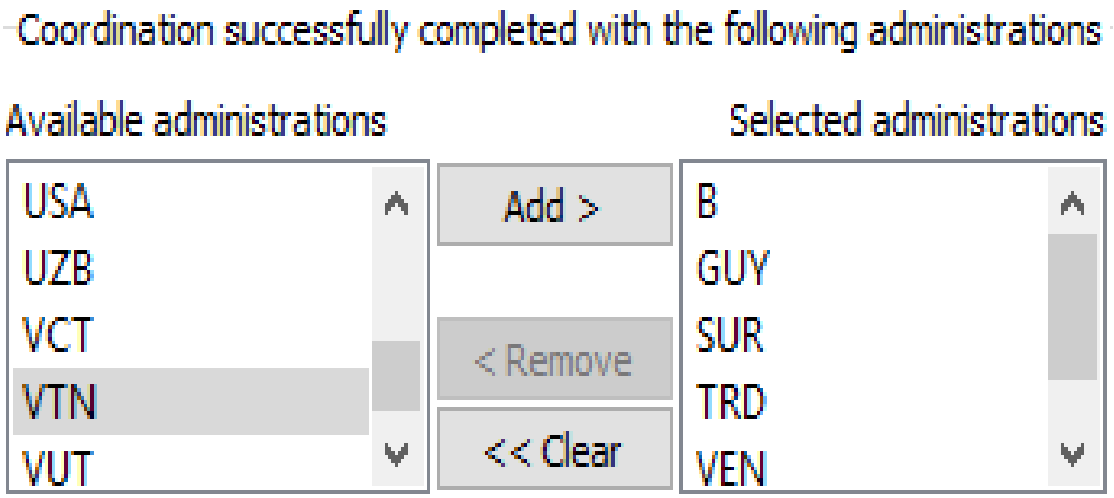
t_adm=SUR

t_adm=TRD

t_adm=VEN

</COORD>

on TerRaNotice user interface



5. Coordination under other provisions

- Mandatory coordination required by Worldwide Plans
  - ✓ (for example, App 25). The procedures to be followed in these cases are explicitly explained in the corresponding Plans.
- Mandatory coordination required by Regional Plans
  - ✓ (for example GE06). The procedures to be followed in these cases are explicitly explained in the corresponding Plans.
- Coordination required by some WRC Resolutions
  - ✓ e.g. Resolution 612 (WRC-12)

5. Coordination under other provisions

➢Coordination criteria (Res. **612 (Rev.WRC-12)**)

Reference	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Remarks
No. **5.132A** No. **5.145A** Res. **612 (Rev. WRC-12)**	4 438-4 488 kHz 5 250-5 275 kHz 9 305-9 355 kHz (R1, R3) 13 450-13 550 kHz 16 100-16 200 kHz 24 450-24 600 kHz (R1, R3) 24 450-24 650 kHz (R2) 26 200-26 350 kHz (R1, R3) 26 200-26 420 kHz (R2) 39-39.5 MHz (R1) 39.5-40 MHz (R3) 42-42.5 MHz (R1)	*resolves 6* of Resolution **612 (Rev. WRC-12) -** that the separation distances between an oceanographic radar and the border of other countries shall be greater than the distances specified in the following table, unless prior explicit agreements from affected administrations are obtained	

5. Coordination under other provisions

➢Coordination criteria (Res. 612 – *resolves 6*)

Frequency (MHz)	Land path (km)		Sea or mixed path (km)	
	Rural	Quiet rural	Rural	Quiet rural
5 (± 1 MHz)	120	170	790	920
9 (± 1 MHz)	100	130	590	670
13 (± 1 MHz)	100	110	480	520
16 (± 1 MHz)	80	100	390	450
25 (± 3 MHz)	80	100	280	320
42 (± 3 MHz)	80	100	200	230

✓ RoP 5.312A

- As the Bureau has no means for the identification of rural or quiet rural areas, the Board decided that for examination of the notified frequency assignment to a station in the radiolocation service from the view point of its conformity with *resolves* 6 of Resolution **612 (Rev.WRC-12)** the Bureau shall use the separation distances for quiet rural paths listed in Columns 3 and 5, as appropriate, of the Table of *resolves* 6.

5. Coordination under other provisions

➢Coordination criteria (Footnotes)

Reference	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Remarks
No. **5.388B**	2110-2170 MHz (Regions 1 and 3 countries listed in the footnote) 2110-2160 MHJz (Region 2 countries listed in the footnote)	HAPS operating as an IMT base station shall not exceed a co-channel power flux-density of −127 dB(W/(m^2 · MHz)) at the Earth's surface outside a country's borders unless explicit agreement of the affected administration is provided**)**	
No. 5.457 Res. **150 (WRC-12)**	6 440-6 520 MHz (HAPS-to-ground direction) and 6 560-6 640 MHz (ground-to-HAPS direction)	The use of HAPS gateway links in these bands requires explicit agreement with other administrations whose territories are located within 1 000 km from the border of an administration intending to use the HAPS gateway links.	

5. Coordination under WRC Resolutions

➢Coordination criteria (Resolutions for HAPS)

Footnote	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Remarks
5.530E	21.4-22 GHz (Region 2) HAPS-to-Ground	*resolves 1* of Resolution **165 (WRC-19)**	
5.532AA	24.25-25.25 GHz (Region 2) HAPS-to-Ground	*resolves* 2 of Resolution **166 (WRC-19)**	
5.534A	25.25-27 GHz (Ground-to-HAPS) 27-27.5 GHz (HAPS-to-Ground) (Region 2)	*resolves* 1, 3, 4 and 10 of Resolution **166 (WRC-19)**	
5.537A	27.9-28.2 GHz (countries listed in the footnote)	*resolves* 3 of Resolution **145 (Rev.WRC-19)**	
5.543B	31-31.3 GHz (HAPS-to-Ground)	*resolves* 1 of Resolution **167 (WRC-19)**	
5.550D	38-39.5 GHz	*resolves* 1, 3, 4, 5, 6 and 8 of Resolution **168 (WRC-19)**	
5.552A	47.2-47.5 GHz and 47.9-48.2 GHz	*resolves 3 and 4* of Resolution **122 (Rev. WRC-19)**	

6. Voluntary coordination

- When to coordinate?
  - ✓ Foreseen received interference > Permissible interference
- Initiation of the coordination
  - ✓ planning
  - ✓ operating
- General procedure
  - ✓ 1st stage: Coordination between operators
  - ✓ 2nd stage: Coordination between administrations
  - ✓ 3rd stage: Coordination with BR's assistance

6. Voluntary coordination

- Generic coordination criteria (e.g. IMT-2000 base station)

Item		1800 MHz band	900 MHz band
Bandwidth (B)		5 MHz	
Temperature (T)		290 degrees	
Boltzmann Coefficient (k)		1.38×10^{-23}	
Noise temp. (No)	=10 log(kTB)	-137 dBW	
Noise figure (Nf)		5 dB	
Protect. criteria (I/N)		-6 dB	
Permissible interference (Ip)	= No+Nf+I/N	-138 dBW	
Permissible field stren. (Ep)	= Ip+20*log(f)+77.2	34.3 dBuV/m	28.3 dBuV/m

- ✓ IMT-2000 receiving base station (UTRA FDD Macro) according to ITU-R M.2039

6. Voluntary coordination

➢What to include in a special agreement?

- ✓Frequency range and frequency categories defined when coordinating or planning (e.g. channeling arrangement)
- ✓Radiocommunication services and systems concerned, e.g. fixed or mobile service
- ✓Permissible interference level
  - Open called as coordination triggering level, e.g. Etrigger, pfd
  - Usually decided based on internationally, regionally, bi-directionally agreed documents (RR, ITU-R Recommendations, regional standard documents)
- ✓Propagation model and interference calculation method (to be used in the planning stage), e.g. ITU-R P.1546, ITU-R P.452, etc. agreed between the countries concerned

6. Voluntary coordination

- What to include in a special agreement?
  - ✓ Coordination procedure method (preferential frequencies, channeling separations, protection at the border, protection of specific stations)
  - ✓ Exchange of appropriate spectrum management information
  - ✓ Measurement method (to be used in the operation stage)
  - ✓ A means of resolving instances of unexpected harmful interference
  - ✓ Others agreed

7. Concluding remarks

- The radio signal spillover is unavoidable
- Mandatory (Article **9** or Plans) or Voluntary (Article **6** special agreement applies) coordination is required.
- The best solution is to have an agreement on channeling arrangement between concerning administrations.
- For frequencies not having channeling arrangements the practical solution is to coordinate between administrations taking into account the agreed criteria and methods.
- In accordance with No. **6.7** of Article **6** (special agreement) of Radio Regulations, two or more Member States coordinate the use of individual frequencies in any of the frequency bands covered by Article **5**, before notifying the frequency assignments concerned, they shall in all appropriate cases inform the Bureau of such coordination.

Thank you!

ITU – Radiocommunication Bureau

Questions to brmail@itu.int

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References for voluntary coordination

- RRB Rules of Procedure, Part B4 – coordination distances for protection of FS/MS vs. FS/MS in the bands 9kHz-28000kHz
- ITU-R Handbook on Guidance for bilateral/multilateral discussions on the use of frequency range 1 350 MHz – 43.5 GHz by fixed service systems
- Rec. ITU-R SM.1049 A method of spectrum management to be used for aiding frequency assignment for terrestrial services in border area
- Rec. ITU-R SM.1132 General principles and methods for sharing between radiocommunication services or between radio stations
- ERC/REC/(01)01 Cross-border coordination for mobile/fixed communications networks (MFCN) in the frequency bands: 1920-1980 MHz and 2110-2170 MHz
- ECC/REC/(05)08 Frequency planning and cross-border coordination between GSM Land Mobile Systems (GSM 900, GSM 1800 and GSM-R)
- ECC/REC/(08)02 Frequency planning and frequency coordination for GSM / UMTS / LTE / WiMAX Land Mobile systems operating within the 900 and 1800 MHz bands

References for voluntary coordination

- ECC/REC/(11)04 Cross-border Coordination for MFCN in the frequency band 790-862 MHz
- ECC/REC/(11)05 Cross-border Coordination for MFCN in the frequency band 2500-2690 MHz
- ECC/REC/(14)04 Cross-border coordination with MFCN in 2300-2400 MHz Cross-border coordination for MFCN and between MFCN and other systems in the frequency band 2300-2400 MHz
- ECC/REC/(15)01 Cross-border coordination for MFCN in the frequency bands: 694-790 MHz, 1452-1492 MHz, 3400-3600 MHz and 3600-3800 MHz
- ECC/REC/(16)03 Cross-border coordination for BB-PPDR systems in the frequency band 698 to 791 MHz
- HCM agreement 2017 – for frequencies between 29.7 MHz and 43.5 GHz for the fixed service and the land mobile service between 18 European administrations
- Arrangement to control cross border spillover and harmful interference in the mobile service between Saudi Arabia, Bahrain, United Arab Emirates, Iran (Islamic Republic of), Kuwait, Oman and Qatar (March 2013)