

ITU World Radiocommunication Seminar

Regulatory and Technical Examination- GSO

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Space Service Department Radiocommunication Bureau

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Outline

- Introduction
- Regulatory Exam
- Technical Exam
- CR/C
- GIBC
 - PFD/EIRP GSO
 - Appendix 8
- Exercise
 - Appendix 8





- Big increase in satellite and terrestrial networks filings
 - Radiofrequency spectrum congestion
 - Interference scenarios
- Radiofrequency spectrum and orbits are limited natural resources
 - Rational and efficient use
- Principal objective of the Radio Regulations
 - Services operate in scenarios free of interferences



- Frequency assignments must be registered in the International Frequency Register, MIFR
- International recognition
- They will be considered by other administrations
- Avoid harmful interferences







Networks subject to coordination in the non panned bands







Regulatory exam: Conformity with Radio Regulations (No. 9.35 of RR)



<u>Technical exam:</u> Coordination Requirements (No. 9.36 of RR)

CR/C Publication in BR IFIC



Regulatory Exam

Conformity with Radio Regulations (No. 9.35 of RR)

- Table of Frequency Allocations
- Hard Limits (PFD/EIRP Limits) Nos. 9.35, 11.31 of RR, RoP 11.31



Technical Exam

Coordination requirements (No. 9.36 of RR)

 Identify the list of administrations with which coordination may need to be effected



Conformity with Radio Regulations (No. 9.35)





Conformity with Radio Regulations (No. 9.35)

Region 1					
1 518-1 525					
FIXED					
MOBILE except aeronautical mobile					
MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A					
5.341 5.342					

5.348 The use of the band 1 518-1 525 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. In the band 1 518-1 525 MHz stations in the mobile-satellite service shall not claim protection from the stations in the fixed service. No. 5.43A does not apply. (WRC-03)

5.348A In the band 1 518-1 525 MHz, the coordination threshold in terms of the power flux-density levels at the surface of the Earth in application of No. **9.11A** for space stations in the mobile-satellite (space-to-Earth) service, with respect to the land mobile service use for specialized mobile radios or used in conjunction with public switched telecommunication networks (PSTN) operating within the territory of Japan, shall be $-150 \text{ dB}(W/m^2)$ in any 4 kHz band for all angles of arrival, instead of those given in Table 5-2 of Appendix **5**. In the band 1 518-1 525 MHz stations in the mobile-satellite service shall not claim protection from stations in the mobile service in the territory of Japan. No. **5.43A** does not apply. (WRC-03)

5.348B In the band 1 518-1 525 MHz, stations in the mobile-satellite service shall not claim protection from aeronautical mobile telemetry stations in the mobile service in the territory of the United States (see Nos. 5.343 and 5.344) and in the countries listed in No. 5.342. No. 5.43A does not apply. (WRC-03)

5.351A For the use of the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 5.341 1 646.5-1 660.5 MHz, 1 668-1 675 MHz, 1 980-2 010 MHz, 2 170-2 200 MHz, 2 483.5-2 520 MHz and 2 670-some c 2 690 MHz by the mobile-satellite service, see Resolutions 212 (Rev.WRC-23) and 225 (Rev.WRC-23). (WRC-23)

5.342 Addination Addination Selarus, the Russian Federation, and Ukraine, the free RESOLUTION 212 (REV.WRC-23)

exclusively for the frequency band 1 4 Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz

RESOLUTION 225 (REV.WRC-23)

Use of additional frequency bands for the satellite component of IMT

invites the ITU Radiocommunication Sector

1 to study the sharing and coordination issues in the above bands related to use of the mobile-satellite service allocations for the satellite component of IMT and the use of this spectrum by the other allocated services, including the radiodetermination-satellite service;

1 that, in addition to the frequency bands indicated in *considering a*) and *resolves* 2, the frequency bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 626.5 MHz, 1 626.5-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz and 2 483.5-2 500 MHz may be used by administrations wishing to implement the satellite component of IMT, subject to the regulatory provisions related to the mobile-satellite service in these frequency bands;





Conformity with Radio Regulations (No. 9.35) Hard Limits in the RR





Conformity with Radio Regulations (No. 9.35)





UNFAVOURABLE FINDING

Nos. 9.35 or 11.31

Conformity with Radio Regulations (No. 9.35)







Record	for	info	only	(No.	8.4)
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No international recognition (No. 8.3)



Cannot cause or claim protection from harmful interference (No. 4.4)



New Submission

Remedy



New Date of Receipt



New Cost Recovery Invoice



Conformity with Radio Regulations (No. 9.35)



OBSERVATIONS DU BUREAU DES RADIOCOMMUNICATIONS	RADIOCOMMUNICATION BUREAU COMMENTS	OBSERVACIONES DE LA OFICINA DE RADIOCOMUNICACIONES
Relatives à la Conclusion conformément au Nº 11.31	Relating to the Findings with respect to No. 11.31	Relativas a la Conclusión según N.º 11.31
FAVORABLE pour toutes les assignations de fréquence.	FAVOURABLE for all frequency assignments.	FAVORABLE para todas las asignaciones de frecuencia.
无线电通信局的意见	ЗАМЕЧАНИЯ БЮРО РАДИОСВЯЗИ	تعليقات مكتب الاتصالات الراديوية
根据第11.31款的审查结果	Относительно Заключения по п. 11.31	المتعلقة بالنتيحة وفقاً للرقم 31.11
所有频率指配均合格。	БЛАГОПРИЯТНОЕ для всех частотных присвоений.	مؤاتية لجميع تخصيصات التردد.



Conformity with Radio Regulations (No. 9.35)

CR/C Reality









Coordination requirements (No. 9.36 of RR)

Identify any administration with which coordination may need to be effected

Where in the RR?

- Article 9
- Article 5 Footnotes
- Appendix 5
- Rules of Procedures
- Articles 7.1 of Appendices 30 and 30A

Coordination requirements (No. 9.36 of RR)



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Coordination requirements (No. 9.36 of RR)



Scenario	Provisions
GSO -> GSO	9.7, Art7.1 AP30/30A
Some ES GSO -> NGSO	9.7A
NGSO -> Some ES GSO	9.7B
BSS (GSO/NGSO) -> Terrestrial Services	9.11
NGSO -> NGSO	9.11A/9.12
NGSO -> GSO	9.11A/9.12A
GSO -> NGSO	9.11A/9.13
NGSO/GSO -> Terrestrial services	9.11A/9.14
Requirement to seek the agreement of other administration is included in a footnote in the ToFA	9.21A,B,C

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Coordination requirements (No. 9.36 of RR)

Article 9, Footnotes in Article 5

Radio Regulations Articles

Edition of 2024



	Section II – Procedure for effecting coordination ^{13, 14}
	Sub-Section IIA – Requirement and request for coordination
9.6 frequency other adm	Before an administration ^{15, 16, 17} notifies to the Bureau or brings into use a assignment in any of the cases listed below, it shall effect coordination, as required, with inistrations identified under No. 9.27 : (wRC-03)
9.7	a) for a station in a satellite network using the geostationary-satellite orbit, in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a plan, in respect of any other satellite network using that orbit, in any space radiocommunication service in a frequency band and in a Region where this service is not subject to a plan, with the exception of coordination between earth stations operating in the opposite direction of transmission.
9.7A	<i>b</i>) ^{18, 19} for a specific earth station in a geostationary-satellite network in the fixed-satellite service in certain frequency bands, in respect of a non-geostationary-satellite system in the fixed-satellite service; (wrc-2000)
9.7B	c) $^{18, 19}$; 5.218 Additional allocation: the band 148-149.9 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. 9.21. The bandwidth of any individual transmission shall not exceed ± 25 kHz.
9.11	d) f equal pr is not su d 5.219 The use of the band 148-149.9 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. The mobile-satellite service shall not constrain the development and use of the fixed, mobile and space operation services in the band 148-149.9 MHz.
9.11A	e) f the Table to 9.16 a 5.220 The use of the frequency bands 149.9-150.05 MHz and 399.9-400.05 MHz by the mobile-satellite service is subject to coordination under No. 9.11A. (WRC-15)
9.12	<i>f)</i> for a station in a satellite network using a non-geostationary-satellite orbit, for which the requirement to coordinate is included in a footnote to the Table of Frequency Allocations referring to this provision or to No. 9.11A , in respect of any other satellite network using a non-geostationary-satellite orbit, with the exception of coordination between earth stations operating in the opposite direction of transmission; (WRC-2000) WW.itu.int/WrS-24

/RS



Coordination requirements (No. 9.36 of RR)

Appendix 5



		Techni	cal conditions for coordination (see Article 9)		
Reference of Article 9	Case	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Calculation method	Remarks
No. 9.7 GSO/GSO	A station in a satellite network using the geostationary-satellite orbit (GSO), in any space radiocommunication service, in a frequency band and in a Region where this service is not subject to a Plan, in respect of any other satellite network using that orbit, in any space radiocommunication service in a frequency band and in a Region where this service is not subject to a Plan, with the exception of the coordination	 3 400-4 200 MHz 5 725-5 850 MHz (Region 1) and 5 850-6 725 MHz 7 025-7 075 MHz 10.95-11.2 GHz 11.45-11.7 GHz 11.7-12.2 GHz (Region 2) 12.2-12.5 GHz (Region 3) 12.5-12.75 GHz (Regions 1 and 3) 	 i) Bandwidth overlap, and ii) any network in the fixed-satellite service (FSS) and any associated space operation functions (see No. 1.23) with a space station within an orbital arc of ±7° of the nominal orbital position of a proposed network in the FSS ii) Bandwidth overlap, and iii) any network in the FSS or broadcasting- satellite service (BSS), not subject to a Plan, and any associated space operation functions (see No. 1.23) with a space station within an orbital arc of ±6° of the nominal orbital position of a proposed network in the FSS or BSS. 	With serv three in th 2), 2 7) ar may No. requ indi calc \$ 2 App Whe	n respect to the space ices listed in the shold/condition column the frequency bands in 1), <i>ibis</i>), 3), 3 <i>bis</i>), 4), 5), 6), and 8), an administration request, pursuant to 9.41, to be included in sets for coordination, cating the networks for the the value of $\Delta T/T$ ulated by the method in 2.1.2 and 3.2 of endix 8 exceeds 6%. In the Bureau, on request a offected administration
Referen of Article	ce Case	Frequency bands (and Region) of the set for which coordinati is sought	vice Threshold/condition on	Calculation method	Remarks
No. 9.14 Non-GS terrestria GSO/ terrestria	A space station in a satell of network in the frequency bands for which a footnot refers to No. 9.11A or to al No. 9.14, in respect of stations of terrestrial serv where threshold(s) is (are exceeded	 ite 1) Frequency bands for which a footnote refers t e No. 9.11A; or ites 2) 11.7-12.2 GHz (Reginstream) GSO FSS) 3) 5 030-5 091 MHz 	 See § 1 of Annex 1 to this Appendix; I the bands specified in No. 5.414A, the detailed conditions for the application of No. 9.14 are provided in No. 5.414A for MSS networks or In the band 11.7-12.2 GHz (Region 2 GSO FSS): -124 dB(W/(m² · MHz)) for 0° ≤ θ ≤ 5° -124 + 0.5 (θ - 5) dB(W/(m² · MHz)) for 5° < θ ≤ 25° -114 dB(W/(m² · MHz)) for θ > 25° where θ is the angle of arrival of the incident wave above the horizontal plane (degrees) Bandwidth overlan 	n 1) See § 1 of Annex to this Appendix	(1

TABLE 5-1 (Rev.WRC-23)



Coordination requirements (No. 9.36 of RR)

Rule of Procedures 9.11A

ITUPublicaciones

Unión Internacional de Telecomunicaciones Sector de Radiocomunicaciones

Reglas de Proced

aprobadas por la Junta de Radiocomunicacione

Edición 2021

Para la aplicación, por la Oficina de Radiocomunicaciones, de las dispo del Reglamento de Radiocomunica los Acuerdos Regionales, las Resolu y las Recomendaciones de las Conf Mundiales y Regionales de Radioco TABLE 9.11A-1 (continued)

1	2	3		4		5	6	7
Frequency band (MHz)	Footnote No. in Article 5	Space services mentioned in a footnot referring to Nos. 9.11A, 9.12, 9.12A, or 9.14, as appropriate	9.13	Other space services or systems to which Nos. 9.12 to 9.14 provisions(s) apply equally, as appropriate		Applicable Nos. 9.12 to 9.14 provision(s), as appropriate	Terrestrial services in respect of which No. 9.14 apply equally	Notes
1 621.35–1 626.5	5.365	MARITIME MOBILE SATELLITE	Ť	MOBILE-SATELLITE RADIODETERMINATION-SATELLITE (Region 2 (except country in No. 5.370), countries in No. 5.369) AERONAUTICAL MOBILE-SATELLITE (R) (5.367)	↑ ↓↑	9.12, 9.12A, 9.13, 9.14	FIXED (5.359)	
1 610-1 613.8	5.364	Radiodetennination-satellite (Region 1 (5.371), Region 3, country in No. 5.370))	Ť			9.12, 9.12A, 9.13		
1 613.8-1 621.35	5.364	Radiodetermination-satellite (Region 1 (5.371), Region 3, country in No. 5.370))	Ť	Mobile-satellite	Ļ	9.12, 9.12A, 9.13		
1 621 35-1 626 5	5.364	Radiodetennination-satellite (Region 1 (5.371), Region 3, country in No. 5.370))	Ť	Mobile-satellite except maritime mobile satellite	Ļ	9.12, 9.12A, 9.13	3 <u></u>	12
1 613.8-1 621.35	5.365	Mobile-satellite	4	Radiodetermination-satellite (Region 1 (5.371), Region 3, country in No. 5.370))	Ť	9.12, 9.12A, 9.13, 9.14	Fixed (5.355)	
1 621 35-1 626 5	5.365	Mobile-satellite except maritime mobile satellite	4	Radiodetermination-satellite (Region 1 (5.371), Region 3, country in No. 5.370))	1	9.12, 9.12A, 9.13, 9.14	Fixed (5.355)	363







Coordination requirements (No. 9.36 of RR)

Articles 7.1 of Appendices 30 and 30A











CR/C is published in the BR-IFIC

RÉS SAT REI	SEAU À SATELLITE FELLITE NETWORK D DE SATÉLITE	HISPAS	AT-26A		SECTION SPÉCIALE Nº SPECIAL SECTION No. SECCIÓN ESPECIAL N.º		CR/C/3736
ST/ EAR	ATION TERRIENNE RTH STATION FACIÓN TERRENA	-			BR IFIC / DATE BR IFIC / DATE BR IFIC / FECHA		2798 / 07.07.2015
ADI RES ADI	M. RESPONSABLE SPONSIBLE ADM. M. RESPONSABLE	E LONGITUDE N NOMINAL LO LONGITUD N	NOMINALE NGITUDE 26 OMINAL	w	NUMÉRO D'IDENTIFICATION IDENTIFICATION NUMBER NÚMERO DE IDENTIFICACIÓN		115520013
RE	NSEIGNEMENTS REÇUS PAR LE E	BUREAU LE / INFORMATION	RECEIVED BY THE BURE	AU ON / INFO	ORMACIÓN RECIBIDA POR LA C	FICINA	EL 14.01.2015
Cett verti titre	e demande de coordination, reçue par le 8 u du numêro 9.30 du Règlement des radio des numèros 9.35 et 9.36 et est publiée u ubortonnée au two de coordination indi	Sureau des radiocommunications er communications, a été examinée a conformément au numéro 9.38. Ella qué dans la colonne de paude par	This request for coordinal pursuant to No. 9.30 of the 9.35 and 9.36 and is public	tion, received e Radio Regulat	by the Radiocommunication Bureau tions, has been examined under Nos. ance with No. 9.38. It is subject to the	Radioco Reglam	comunicaciones de conformidad con el punto Nª 9.30 del ento de Radiocomunicaciones, se ha examinado de conformidad Nº 9.35 y 9.36 y se publica de conformidad con el Nº 9.38. Está
un X	(dans la case pertinente.	que cans la colorine de gauche pa	form of coordination indicat	led in the left-ha	nd column by an X in the relevant box	sujeta izquierd	al formulario de coordinación indicado en la columna de la la con una X en la casilla correspondiente.
un X	i dans la case pertinente.	eau I / Form of coordination referred	form of coordination indicat d to in Table I / Forma de coordi	inación mencion	nd column by an X in the relevant box	sujeta izquierd	al formulario de coordinación indicado en la columna de la la con una X en la casilla correspondiente.
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un X	dans la case pertinente. e de coordination mentionné dans le Tabl 9.7 9.7A 9.7B AP30#7 1	eau // Form of coordination referre	form of coordination indicat form of coordination indicat d to in Table I / Forma de coordi xs 9.50 à 9.52 du Réglement les Administrations identifiées sont priées de communiquer	In accordance In accordance In accordance the Administr	nd column by an X in the relevant box nada en el cuadro I e with Nos. 9.50-9.52 of the Radio Reg ations identified in Table I below are re	sujeta izquierd ulations, quested	al formulario de coordinación indicado en la columna de la ta con una X en la casilla correspondiente. De conformidad con los N ^{er} 9,50-9,52 del Reglamento de Radiocomunicaciones, se solicita a las administraciones señaladas a di cuardo la continuación una comunicariones
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un X X X	i dans la case pertinente. e de coordination mentionné dans le Tabl 9.7 9.7A 9.7B AP30#7.1 AP30A#7.1 RS539	eau I / Form of coordination referre Conformément aux numéro des radiocommunications, l dans le Tableau I ci-après leur décision à l'Administrat avant la date limite indiquée	form of coordination indicat form of coordination indicat d to in Table 1 / Forma de coord os 9.50 à 9.52 du Règlement les Administrations identifiées sont priées de communiquer tion responsable et au Bureau i-d-desous.	In accordance In accordance the Administr- to communi administration below.	nd column by an X in the relevant box hada en el cuadro I e with Nos. 9.50-9.52 of the Radio Regu- ations identified in Table I below are re- icate their decision to the Resp n and the Bureau by the deadline in	sujeta izquierd ulations, quested ponsible ndicated	al formulario de coordinación indicado en la columna de la a con una X en la casilla correspondiente. De conformidad con los N ⁱⁱⁱ 9.50-9.52 del Reglamento de Radiocomunicaciones, se solicita a las administraciones señaladas en el cuadro I a continuación que comuniquen su decisión a la administración responsable y a la Oficina antes del plazo indicado más abajo.
un X X X	i dans la case pertinente. e de coordination mentionné dans le Tabl 9.7 9.7A 9.7A 9.7B AP30#7.1 AP30A#7.1 RS539 RS33#3	eau I / Form of coordination referre des radiocommunications, leur décision à l'Administrat avant la date limite indiquée	form of coordination indicat form of coordination indicat d to in Table I / Forma de coord os 9.50 à 9.52 du Règlement les Administrations identifiées sont priées de communiquer tion responsable et au Bureau i ci-dessous.	In accordance In accordance the Administration below.	nd column by an X in the relevant box nada en el cuadro I e with Nos. 9.50-9.52 of the Radio Regi ations identified in Table I below are re- icate their decision to the Resp n and the Bureau by the deadline in	sujeta izquierd ulations, quested ponsible ndicated	al formulario de coordinación indicado en la columna de la la con una X en la casilla correspondiente. De conformidad con los N ^{es} 9.50-9.52 del Reglamento de Radiocomunicaciones, se solicita a las administraciones señaladas en el cuadro la continuación que comuniques decisión a la administración responsable y a la Oficina antes del plazo indicado más abajo.
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un X X X X X X X X X X X	i dans la case pertinente. e de coordination mentionné dans le Tabl 9.7 9.7A 9.7B AP30#7.1 AP300#7.1 RS539 RS33#3 e de coordination mentionné dans le Tabl 9.11 9.11A 9.12 9.12A X 9.13	eau I / Form of coordination referre Conformément aux numéro des radiocommunications, l dans le Tableau I c'agrés leur décision à l'Administrat avant la date limite indiquée eau II / Form of coordination referre Les Administrations, énumé le Tableau II c'agrés, qui n' coordination au titre des n RS3382.1, sont priese de co à l'Administration responsat limite indiquée d'descrut	form of coordination indicat form of coordination indicat d to in Table I / Forma de coord s 9.50 à 9.52 du Règlement les Administrations identifiées sont priées de communiquer bion responsable et au Bureau c-dessous. Ed to in Table II / Formulario de co irrèes ou non-énumèrées dans acceptent pas la demande de uméros 9.11 à 9.14, 9.21 et immuniquer leurs observations ble et au Bureau avant la date	In accordance In accordance the Administratio administration below.	nd column by an X in the relevant box hada en el cuadro I e with Nos. 9.50-9.52 of the Radio Reg ations identified in Table I below are re- icate their decision to the Resp n and the Bureau by the deadline in mitido al cuadro II mitido al cuadro II ns listed or not listed in Table II below, w the request for coordination under Nos. d R53392.1 are requested to communic the responsible administration and the line indicated below. Any administra-	sujeta izquierd ulations, quested ponsible ndicated vhich do 9.11 to ate their Bureau tion not	al formulario de coordinación indicado en la columna de la ta con una X en la casilla correspondiente. De conformidad con los Nº 9.50-9.52 del Reglamento de Radiocomunicaciones, se solicita a las administraciones señaladas en el cuadro la continuación que comuniquen su decisión a la administraciones, enumeradas o no en el cuadro II, que no estén de acuerdo con la solicitud de coordinación de conformidad con los Nº 9.11 a 9.14, 9.21 y RS3382.1 que comuniquen sus observaciones a la administración responsable y a la Oficina dentro del plazo
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un X X X X X X X X	dans la case pertinente. e de coordination mentionné dans le Tabl 9.7 9.7A 9.7A 9.7B AP30#7.1 AP30#7.1 RS539 RS539 RS33#3 e de coordination mentionné dans le Tabl 9.11 9.12 9.12A 9.12A X 9.13 X 9.14 9.21/A 0.24P	eau I / Form of coordination referre Conformément aux numéro des radiocommunications, i dans le Tableau I o -aprês leur décision à l'Administrations leur décision à l'Administration avant la date limite indiquée eau II / Form of coordination referre Les Administrations, énumé le Tableau II c-aprês, qui n coordination au titre des n R\$3382.1, sont priées de co à l'Administration responsat limite indiquée ci-dessous réaging pas au titre du numé sera considérée comme	form of coordination indicat form of coordination indicat d to in Table I / Forma de coord os 9.50 à 9.52 du Règlement les Administrations identifiées sont priées de communiquer tion responsable et au Bureau o ci-dessous. et to in Table II / Formulario de of brèes ou non-énumérées dans facceptent pas la demande de uméros 9.11 à 9.14, 9.21 et immuniquer leurs observations te et 3.52 avant cette date limite n'étant pas défavorablement	In accordance inación mencion In accordance the Administration below. coordinación rer Administration below. coordinación rer Administration ont agree to t 9,14, 9,21 am comments to by the dead responding u responding u	Ind column by an X in the relevant box hada en el cuadro I e with Nos. 9.50-9.52 of the Radio Reg. ations identified in Table I below are re- cicate their decision to the Ress n and the Bureau by the deadline in mitido al cuadro II mitido al cuadro II Ins listed or not listed in Table II below, w the request for coordination under Nos. d RS3392.1 are requested to communic the responsible administration and the line indicated below. Any administration under No. 9.52 within this deadline s unaffected and, in the cases of Nos. 9.11 - the common for Nos. 9.11	sujeta izquierd ulations, quested ponsible dicated which do 9.11 to ate their Bureau bion not hall be 1 to 9.14 40 schai	al formulario de coordinación indicado en la columna de la la con una X en la casilla correspondiente. De conformidad con los N ^{es} 9.50-9.52 del Reglamento de Radiocomunicaciones, se solicita a las administraciones señaladas en el cuadro la continuación que comuniquen su decisión a la administracion responsable y a la Oficina antes del plazo indicado más abajo.
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List of administrations, earth stations and networks affected

		Та	bleau I /Table I /Cuadro I /表一 /Таблица I /	الجدول ا
	Disposition / Provision / Disposición / 茶款 /	Résumé des conditions régissant la coordination	Summary of coordination requirements	Resumen de los requisitos de coordinación
	الحكم / Положение	协调要求概述	Сводные потребности в координации	موجز بمتطلبات التنسيق
x	9.7	ALG, ARG, ARM, ARS/ARB, AZE, B, BLR, BUL, CAN, CHN, NIG, NOR, PAK, PNG, QAT, RUS/IK, RUS, S, SNG, TUR, U	CLM, CTI/RAS, CYP, D, EGY, F/EUT, F, G, GRC, JAE, USA	HOL, I, IND, INS, IRN, IRQ, ISR, J, KAZ, KOR, LUX, MLA, MNG,
	9.7A		May .	Affected ADM (compulsory)
	9.7B	(Commonto with
x	AP30#7.1	AGL, ALG, BFA, CTI, DNK, GHA, GNB, ISR, LBY, LUX, MN	E, MRC, RUS/IK, TGO, TUN, UAE, USA	- Comments with
х	AP30A#7.1	EGY, F, GHA, HOL, ISR, LUX, NOR, QAT, RUS/IK, S, UAE		SPACECOM- No 9.41 CR/E
	RS539			-
	RS33#3			

			T	ableau II /Table II /Cuadro II /表二 /Таблица II	الجدول 11 /		
	Disposition / Provision / Disposición / 条款 / Положение / بنک		Administrations susceptibles d'être défavorablement influencées (à titre d'information uniquement, voir numéro 9.36.1) Potentially affected administrations (for infor		only, Administraciones posiblemente afectadas (sólo para información, véase el N° 9.36.1)		
			可能受影响的主管部门(仅供参考,见第9.36.1款)	Потенциально затрагиваемые администраци (исключительно для информации, см. п. 9.36.	إدارات يحتمل أن تتأثر نأثراً غير مؤات (انظر الرقم 1.36.9، على سبيل الاطلاع فقط)		
x	9.1	i	AFS/MRN, AFS, ARG*, ARM, ARS, AUT*, AZE*, BHR, E EST*, ETH, F/CRO, F/MYT*, F/REU*, FIN, G, GEO, GR MEX*, MKD, MOZ, MWI, NCG, NOR, OMA*, POL, QAT, XZZ/XWB, YEM, ZMB, ZWE	3IH, BLR*, BLZ, BUL*, CAN, CHL, COM, CTR, CUB, C C*, GTM, HND, HNG*, HOL, HRV*, IRN*, IRQ, ISL, ISI ROU, RUS*, S, SDN, SEY, SLV, SOM, SRB, SSD, SV	YP, CZE, D, DJI, DNK/FRO, DNK/GRL, DNK, EGY, EQA, ERI, R, JOR, KAZ, KEN, KWT*, LBN, LSO, LTU*, LVA*, MDA*, MDG, /K, SWZ, SYR, TUR, TZA, UAE, UGA, UKR, USA*, XZZ/XGZ,		
X	9.1	1A					
		9.12		Affected	Affected ADM (information only)		
		9.12A		Confirma	tion with		
	X	9.13	CAN, F, G, LIE, NOR, USA	SPACECO)M- No 9 11-9 12/9 21 CR/D		
	X 9.14			317(8280			
	9.2	1/A1					
	9.21/B ¹ 9.21/C ¹						
	RS	33#2.1					



Coordination requirements at group level

Relatives à l'examen conformément au Nº 9.36

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Voir les pages 3-4 pour le résumé. Pour plus de détails, voir les pages qui suivent. Relating to the examination with respect to

<u>No. 9.36</u> See pages 3-4 for the summary. Details are provided on pages that follow. Relativas al examen según N.º 9.36

Véanse las páginas 3-4 para el resumen. Se indican los detalles en las páginas siguientes.

I. Nécessité d'une coordination au niveau du groupe	I. Coordination requirements at group level	I. Requisitos de c
一、需要在组的层次进行的协调	І. Потребности в координации на уровне группы	

os de coordinación a nivel de grupo 1. متطلبات التنسيق على مستوى المجموعة

Administrations identifiées au titre du N° 9.7 par : 根据第9.7款识别的主管部门:			÷	Administrations identified under No. 9.7 by : Администрации, идентифицированные согласно п. 9.7:				: Administraciones identificadas según N.° 9.7 por الإدارات المحددة وفقاً للرقم 7.9 تموجب:									
B1a Beam designation	B2 Emi-Rcp	BR7a Group id.	GHz		Delta T/T Delta T/T		д	Delta T/T ельта T/T		Delt T/T	a T/T دلتا	Arc de d	coordination 协调弧	Coordinat Дуга коорд	ion Arc цинации	Arco de coordinación قوس التنسيق	
RAA	R	R 115622467	R 115622467 2					•					ALG I TUR	B ISR UAE	F LUX	G NOR	HOL RUS/IK
		115622468	27									ALG I TUR	B ISR UAE	F LUX	G NOR	HOL RUS/IK	
		115622469	29	ALG GRC S	ARM HOL TUR	CAN J UAE	CHN KOR	CYP LUX	D NOR	F PAK	G QAT	ALG I TUR	B ISR UAE	F LUX	G NOR	HOL RUS/IK	
		115622470	27									ALG I TUR	B ISR UAE	F LUX	G NOR	HOL RUS/IK	
		115622471	27									ALG I TUR	B ISR UAE	F LUX	G NOR	HOL RUS/IK	
		115622472	27									ALG I	BISR	F LUX	G NOR	HOL RUS/IK	

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II. Liste des réseaux à satellite (voir N° 9.36.2) 二、卫星网络清单(见第9.36.2款) II. List of satellite networks (see No. 9.36.2) II. Список спутниковых сетей (см. п. 9.36.2) II. Lista de redes de satélite (véase el N.° 9.36.2) II. قائمة بالشبكات الساتلية (انظر الوقم 2.36.9)

Liste des réseaux à satellite pour lesquels Delta T/T > 6% ou situés à l'intérieur de l'arc de coordination (au titre du N° 9.7) List of satellite networks for which Delta T/T > 6% or which are within the coordination arc (under No. 9.7) Lista de redes de satélite para las que Delta T/T > 6% o que están dentro del arco de coordinación (según N.° 9.7) Delta T/T > 6% 的卫星网络清单或位于协调弧内的卫星网络清单(依据 9.7)

Список спутниковых сетей, для которых Дельта Т/Т > 6% или которые находятся внутри дуги координации (согласно № 9.7)

قائمة بالشبكات الساتلية التي تكون فيها قيمة دلتا T/T > 6% أو التي تقع داخل قوس التنسيق (بموجب الرقم 7.9)

A1f1 Notifying adm.	A1f3 Inter. sat. org.	A1a Sat. Network	A4a1 Orbital long.	BR3b Category of notif.	BR25 A/T	BR6a Id. no.	BR26 Causing interference	BR27 Receiving interference	BR28 Detected by coord. arc
ALG	20	ALCOMSAT-24.8W	24.8 W	C	A	113520121	C	R	A
18	2	ALCOMSAT-27.6W	27.6 W	C	A	114520218	C	R	A
ARG		ARSAT-C	81 W	C	A	110520406	C		
873×3674		ARSAT-D	81 W	с	A	113520066	C		
ARM	6	ARMSAT1	71.4 E	с	A	113520013	C	j. j	
ARS	ARB	ARABSAT 5A-30.5E	30.5 E	N	A	110500040	C	22	
879216775	200743000	ARABSAT 5B-26E	26 E	N	A	111500061	C		
		ARABSAT 5C-20E	20 E	N	A	111500210	C	10 10	· · · · · ·
		ARABSAT 6E-34.5E	34.5 E	Ň	A	111500139	C	8	
		ARABSAT-KA-26E	26 E	N	A	108501204	C		
		ARABSAT-KA-30.5E	30.5 E	N	A	109500199	C	20	: :
AZE	35	AZERSAT 45E	45 E	C	A	114520269	С		
122001200		AZERSAT 95.9	95.9 E	C	A	110520152	C		
		AZERSAT A1	43.2 E	С	A	110520123	C		
		AZERSAT B1	58.5 E	с	A	110520124	C	ŝ	
		AZERSAT C	62 E	C	A	111520481	C	22	
		AZERSAT D	44 E	С	A	112520446	C		
		AZERSAT E	38 E	C	A	112520447	C		
В	26	B-SAT-1A-1	45 W	C	A	112520279	C	R	
2000		B-SAT-1L	37 W	C	A	109520007	C		
		B-SAT-1W-1	48 W	C	A	112520148	C	8	
		B-SAT-1W-2	47 5 W	C	T	114520219	C	p	() () () () () () () () () ()

Notes provided by the Administration

NOTE DE L'ADMINISTRATION

NOTE BY THE ADMINISTRATION

NOTA DE LA ADMINISTRACIÓN

L'administration responsable s'engage à respecter les limites de puissance surfacique indiquées au numéro 21.16, en se conformant à la Règle de procédure du Règlement des Radiocommunications et à l'Annexe de ladite Règle, conformément au numéro 21.16.

The responsible administration undertakes to comply with the power flux-density limits specified in No. 21.16 of the Radio Regulations in accordance with the Rule of Procedure and annex thereto on No. 21.16. La Administración responsable se compromete a respetar los límites de densidad de flujo de potencia especificados en el número 21.16 ajustándose a la Regla de procedimiento del Reglamento de Radiocomunicaciones y su anexo con respecto al número 21.16.

<u>主管部门的说明</u>

ПРИМЕЧАНИЕ АДМИНИСТРАЦИИ

负责主管部门愿根据《程序规则》和第21.16 款的附件, 遵守《无线电规则》第21.16款中规 定的功率通量密度。 Ответственная администрация обязуется соблюдать пределы плотности потока мощности, указанные в п. 21.16, согласно Правилу процедуры Регламента радиосвязи и Дополнению к упомянутому Регламенту в соответствии с п. 21.16. تتعهد الإدارة المسؤولة بالتقيد بحدود كثافة تدفق القدرة المنصوص عليها في الرقم 16.21 من لوائح الراديو وفقاً للقاعدة الإجرائية المتعلقة بالرقم 16.21 والملحق بحذه القاعدة.

ملاحظة من الإدارة





Graphical information

الشكل Figure / Figura / 🖪 / Рисунок / 1

CR/C

ZONE DE SERVICE ET CONTOURS DE GAIN DE L'ANTENNE DE RECEPTION DE LA STATION SPATIALE SPACE STATION RECEIVING ANTENNA GAIN CONTOURS AND SERVICE AREA ZONA DE SERVICIO Y CONTORNOS DE GANANCIA DE LA ANTENA RECEPTORA DE LA ESTACION ESPACIAL 空间台站接收天线增益等值线和业务区 ЗОНА ОБСЛУЖИВАНИЯ И КОНТУРЫ УСИЛЕНИЯ ПРИЕМНОЙ АНТЕННЫ КОСМИЧЕСКОЙ СТАНЦИИ

منطقة الخنعة وأكفة الكسب لهوائي الاستقبال للمحطة الفضائية



Zone de service / Service area / Zona de servicio / 业务区 / Зона обслуживания / منطقة الخنعة (GLOBAL(ELEV5) (No. 01)

CR/C/3736



CR/C Comments from BR

OBSERVATIONS DU BUREAU DES	RADIOCOMMUNICATION BUREAU	OBSERVACIONES DE LA OFICINA DE
RADIOCOMMUNICATIONS	COMMENTS	RADIOCOMUNICACIONES
Relatives à la Conclusion conformément au No 11.31	Relating to the Findings with respect to No. 11.31	Relativas a la Conclusión según N.º 11.31
Assignations de fréquence dans la bande 18 100 – 18 400 MHz	Frequency assignments in the 18 100 - 18 400 MHz band	Asignaciones de frecuencia en la banda 18 100 - 18 400 MHz
DEFAVORABLE Hors bande. Non conforme au Tableau d'attribution des bandes de fréquences au Service Fixe par Satellite (Terre-vers-Espace) pour D, DNK, UAE et GRC (No. 5.521).	UNFAVOURABLE Out-of-band. Not in accordance with the Table of Frequency Allocations to the Fixed-Satellite Service (Earth-to-Space) in D, DNK, UAE and GRC (No. 5.521).	DESFAVORABLE Fuera de banda. No se ajusta al Cuadro de Atribución de Bandas de Frecuencias al Servicio Fijo por Satélite (Tierra-Espacio) en D, DNK, UAE y GRC (No. 5.521).
FaisceauxorientablesTUA1etTUA2,assignationsdefréquence11 075,11 452,5,11 575 MHzavecunedensitémaximalepuissance≤-52,2 dBW/Hzet unevaleurmaximalede la puissanceen crête ≤17 dBW	Steerable beams TUA1 and TUA2, frequency assignments 11 075, 11 452.5, 11 575 MHz with maximum power density ≤-52.2 dBW/Hz and maximum peak power ≤17 dBW	Haces orientables TUA1 y TUA2, asignaciones de frecuencia 11 075, 11 452,5, 11 575 MHz con una densidad máxima de potencia <-52,2 dBW/Hz y un valor máximo de la potencia de cresta <17 dBW
FAVORABLE <u>Note</u> : La conclusion est fondée sur la Règle de Procédure du Comité du Règlement des Radiocommunications et son annexe concernant le numéro 21.16.	FAVOURABLE <u>Note</u> : The finding is based on the Radio Regulations Board Rule of Procedure and its annex concerning No. 21.16.	FAVORABLE <u>Nota</u> : La conclusión se funda en la Regla de procedimiento de la Junta del Reglamento de Radiocomunicaciones y su anexo con respecto al número 21.16.
Il existe au moins une position des faisceaux orientables où les limites de puissance surfacique applicables sont respectées sans réduction de la densité de puissance notifiée.	There is at least one position of the steerable beams where the applicable PFD limits are met without any reduction of the notified power density.	Existe al menos una posición de los haces orientables en la que se cumplen los límites de DFP aplicables sin ninguna reducción de la densidad de potencia notificada.



stifted.

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GIBC- Graphical Interface for Batch Calculations

GIBC

Scenario	Provision	GIBC SW
GSO PFD Limits	Art 21	PFD Hard Limits
NGSO wrt GSO	Art 22	EPFD
GSO -> GSO	9.7, Art7.1 AP30/30A	Appendix 8
Some ES GSO -> NGSO	9.7A	
NGSO -> Some ES GSO	9.7B	
BSS (GSO/NGSO) -> Terrestrial Services	9.11	FOT
NGSO -> NGSO	9.11A/9.12	FOS
NGSO -> GSO	9.11A/9.12A	FOS
GSO -> NGSO	9.11A/9.13	FOS
NGSO/GSO -> Terrestrial services	9.11A/9.14	FOT
Requirement to seek the agreement of other administration is included in a footnote in the ToFA	9.21A, 9.21B, 9.21C	Appendix 8 FOS FOT





GIBC-PFD/EIRP GSO



GIBC PFD/EIRP GSO Hard Limits

1	Tools / Options PFD/EIRP GSO PFD/EIRP NGSO PFD/EIRP Earth Station	
2	Network Start Cancel	3
	Examination Hard Limits Power Control (dBW) Perform "Before" Comparisons Image: Worst Case Only Add Image: Use RoP 21.16 Image: Comparison state st	
	Messages Filter	
	Meessage	
	Message	
	Message Calculation Results	
	Message Calculation Results Open Database View Log File Open Folder Open Report	4



PFD/EIRP GSO

Hard Limits

- GSO only
- PFD hard limits¹
- EIRP density towards horizon or off-axis limits²
- PFD limit at GSO³
- Minimum antenna diameter⁴
- Commitment or Compliance checks⁵
- Minimum elevation angle checks⁶
- Rule of Procedure on No.21.16

- ² Nos. 5.264A, 5.364, 5.503, 5.506A, 5.538, 21.8 (Warning), 21.13A, [Res169 (WRC-19)]
- ³ No. 22.40
- ⁴ Nos. 5.502, 5.532B, 5.506A, 5.509C, 5.555C
- 5 Ap4 A.16.a, A.16.c, A.17.a, A.17.b.1, A.17.b.2, A.17.d, A.17.e.2, A.18.a, A.19.b, A.20.a, A.21.a, A.22.a
- ⁶ Nos 21.14, 21.15

Appendix / Appe	ndix 30B	Appendix 30 30A	
PFD Power Control FO: PFD/EIRP GSO	Ap8 & PFD PFD/EIRP NGSO	Space AP30B E	SIM
		1	
D/EIRP limits applicable to GSU net	work	Quet Causa	- L
twork 122320120 HISFASATOTA	D-6 "E	Start Cance	
Examination Uptions	Before Exar	nination	
Power Control (dBW)	Perform	"Before" Comparisons	
Worst Case Only	Add 1		
Use RoP 21.16		<u> </u>	
		Delete	
Messages Filter		Clear Al	1
Thogeas is maning i Debi	·a 1		
lessage			
alculation Results			-
Calculation Results			
Calculation Results		P	
Calculation Results	Open Folder	Open Report	
Calculation Results Open Database View Log File Version	Open Folder	Open Report	
Calculation Results Open Database View Log File Version 10.0.0.0 PFD/EIRP GSO - Beta	Open Folder	Open Report	
Acculation Results Copen Database View Log File Version 10.0.0.0 PFD/EIRP GSO - Beta	Open Folder	Open Report View Notes	

¹ Table 21-4 of Art. 21, Nos. 5.268, 5.407, 5.418, 5.446, 5.462A, 5.493, 5.556A, 5.558A, 5.562C, 5.562H, Res903 (REV.WRC-19) & 761 (REV.WRC-19)

GIBC PFD/EIRP GSO

PFD Hard Limits Report



PFD/EIRP GSO

PFD Hard Limits Report

Beam | Tx. Direction | Steerable or Fixed | Maximum Gain

Group ID | Class of Station | Date of Protection

SPACE STATION PFD VALUES WILL BE CHECKED AGAINST HARD LIMITS AND ROP21.19 IS ONLY APPLIED WHERE APPLICABLE



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GIBC PFD Hard Limits- Steerable beams



A satellite antenna beam that can be repositioned **Position 2** Higher angle of arrival PFD limits usually less stringent **Position 1** Favourable finding under Rules of Procedure Low angle of arrival No. 21.16 if: PFD limits usually more stringent **1. One position** where pfd limits are met

2. Description of method to meet pfd limits

rs-24 **4**3



PFD Hard Limits- Steerable beams

GIBC









PFD EIRP/GSO

Triggers

SSO only

- No. 9.11 BSS vs terrestrial stations
- 🤣 No. 9.14 GSO vs terrestrial stations
- No. 9.21/C Seeking agreement wrt terrestrial stations

Where to find the PFD threshold values in RR:

- Appendix 5 Annex 1 : Method for determination of the need for coordination between MSS and RDSS space stations (space-to-Earth) and other terrestrial services sharing the same frequency band in the 1-3 GHz range
- Footnote 5.348A

SIBC SNS V1	0 BETA			-		×	
Appen EPFD	dix 7	Appendix 3	80B Ap8 & PFC	Append Space	dix 30 30A AP30B E	SIM	IEVA2024
PFD/EIRP I	imits applicable t	o GSO network)/EIRP NGSO	PFD/EIF	RP Earth S	tation	
Network 12	22520128 HISP	ASAT-1-12.5W	Before "Exa	Start	Cance	1	
Examinati Power Co	on Triggers	-	Perform	"Before" Cor lix 30 Art.4.1.	mparisons 11		
I Worst I Use F	Case Only RoP 21.16		Add		-		
Messages	Filter ess 🔽 Warning	Debug			Delete Clear A		
		TABLE 5-2	(Rev.WRC-19)				 -
Frequency band	Terrestrial service		Coordination t	hreshold values			

Frequency band (MHz)	Terrestrial service to be protected	Coordination threshold values					
		GSO space str	tions	Non-GSO space stations			
		pfd (per space sta calculation fa (NOTE 2	ition) ctors)	pfd (per space station) calculation factors (NOTE 2)		% FDP (in 1 MHz) (NOTE 1)	
		P	<i>r</i> dB/ degrees	Р	r dB/ degrees		
1 518-1 525	Analogue FS telephony (NOTE 5)	-146 dB(W/m ²) in 4 kHz and -128 dB(W/m ²) in 1 MHz	0.5	-146 dB(W/m ²) in 4 kHz and -128 dB(W/m ²) in 1 MHz	0.5		
	All other cases FS telephony (NOTES 4 and 8)	-128 dB(W/m²) in 1 MHz	0.5	-128 dB(W/m ²) in 1 MHz	0.5	25	

5.348A In the band 1 518-1 525 MHz, the coordination threshold in terms of the power flux-density levels at the surface of the Earth in application of No. 9.11A for space stations in the mobile-satellite (space-to-Earth) service, with respect to the land mobile service use for specialized mobile radios or used in conjunction with public switched telecommunication networks (PSTN) operating within the territory of Japan, shall be -150 dB(W/m²) in any 4 kHz band for all angles of arival, instead of those given in Table 5-2 of Appendix 5. In the band 1 518-1 525 MHz stations in the mobile-satellite service shall not claim protection from stations in the mobile service in the territory of Japan. No. 5.43A does not apply. (WRC-03)

PFD EIRP/GSO

Rec. 608

- SSO only
- PFD limit of Rec. 608 (REV.WRC-07) for RNSS in 1164-1215 MHz
- For information to the ADM

IBC SNS V10 BETA		-		×	_ ITUM
Appendix 7 App EPFD Power Control FC	bendix 30B DS Ap8 & PFD	Append Space	x 30 30A AP30B E	SIM	GENEVA2024
PFD/EIRP limits applicable to GSO n Network 122520128 HISPASAT-1- Examination Options Examination Rec.608 Power Control (dBW) IV Worst Case Only IV Use RoP 21.16	etwork 12.5W Before "Exar Perform Add	Start	Cance		
Messages Filter Progress V Warning De Message	bug		Delete Clear All		
Calculation Results				1	
Calculation Results	le Open Folder	Oper	N Report		
Calculation Results Calculation Results Open Database View Log Fi Version 10.0.0 PFD/EIRP GSO - Beta	le Open Folder	Oper	► n Report w Notes		
Calculation Results	le Open Folder	Oper	N Report		

PFD/EIRP GSO

GIBC

HARD LIMITS vs TRIGGER

GIBC "Hard Limits" option

To establish findings under Nos. 9.35/11.31

Excess = Unfavourable



To identify coordination requirements under No. 9.36

GIBC "Trigger" option



Excess = Coordination may be required, Aff Adm needs to confirm, CR/D

Provisions: 9.11, 9.14, 9, 21, Cnt/wrs-24 48



e - EXAMINATION

Online integration of GIBC (Graphical Interface for Batch Calculations) PFD (power fluxdensity) hard limits software tool for GSO/NGSO and Earth station on e-Submission

Purpose: Assists in verifying compliance with PFD and EIRP limits during satellite network filings

Supports:

GSO/NGSO space stations and Earth stations. Coordination and notification in non-planned bands.

Automation:

Examinations are conducted automatically on a remote server via e-Submission and Users can easily download the e-Examination results from e-Submission interfaced.

Only for informational purposes !!

A definitive finding will be established by the Bureau during its examination under No. 9.35/11.31 of the Radio Regulations. www.itu.int/wrs-24 49



GIBC e - EXAMINATION

e-Submission of Satellite Network Filings				
		Reference:		Details Frequencies Communications History
As-Received Users Help		Station/Satellite Name:		
New All Filings Comments Withdrawals Archived Archived comments		Type of submission: Coordinatio	on Request	
Upload Coordination Request for Validation				
All users are strongly requested to use Space Software v9.1 and submit notice in v9.1 The system only accepts uploaded filings in SNS 9.1 format.		Report name	State	Actions
 Please don't forget to upload files before submitting for validation. Click the '+' button to upload other than SNS and GIMS mdb files. 		Validation report V9.1	In progress	
SNS(MDB) : MDB file with Notice Data *		e-Examination report	In progress	
.mdb	×	The e-Examination beg	ins automatically after sul	bmitting and PFD report is generated.
GIMS(MDB) : MDB with GIMS data. *				
.mdb	×			
Other : Other relevant documents	8			
Browse	O Upload	Report name	State	Actions
"Attachments n "other" fields are for information only and should relate to MDB files		Validation report V9.1	Done	Download
+ Add additional documents or drag files here	Upload All	e-Examination report	Done	Download (for information only)
Upload MDB file(s) (SNS, GIMS) and submit them for Validation	Submit for Validation	Once completed, e-Exam	mination generates a repo	ort via the online <u>interface</u> and it can be downloaded.

Exceed the limits ? You can withdraw and replace your notice anytime, but cost recovery charges apply after 15 days

https://www.itu.int/en/ITU-R/space/support/Pages/e-examination-guide.aspx.itu.int/wrs-24 50

GIBC-Appendix 8



Appendix 8: GSO-> GSO, Art 9.7

Appendix 5: Frequency bands, methodologies, thresholds, conditions

Coordination methodologies:

<u>**Trigger arc</u>**: Networks in the FSS, BSS, MSS, Space Research, Meteorological-Satellite and associated SO within a Window from the nominal orbital position with Frequency Overlap in the same direction of Transmission.</u>

 $\Delta T/T$: Increase of the noise temperature at the receiver due to an interference

Coordination methodology	Orbital arc	Scenario	Frequency band
Triger arc	\pm 6 degrees \pm 7 degrees \pm 8 degrees \pm 12 degrees \pm 16 degrees	FSS/BSS → BSS/FSS or FSS/SRS → SRS/FSS FSS→FSS FSS→FSS FSS/Meteo. Sat. → Meteo. Sat./FSS FSS/BSS → BSS/FSS MSS/FSS → MSS/FSS BSS → BSS FSS→ BSS FSS→ BSS, BSS→ FSS, BSS→BSS	Ku C Ka and above Ka (18 GHz) Ka Ka Ka (21.4-22 GHz R1&3) Ka
∆t/t		Any other service or sharing scenario where Trigger Arc is not applicable	Any other frequency where Trigger Arc is not applicable

GIBC SNS \	/10 BET	TA			-	o x
Tools / Op	tions	PFD/EIRP	GSO PFD	EIRP NGSO	PFD/E	IRP Earth Station
App	endix 7		Appendix 3	0 <mark>B Ì</mark>	Appe	ndix 30 30A
EPFD	Pov	ver Control	FOS	Ap8 & PFD	Space	AP30B ESIM
Network				•	Start	Cancel

Appendix 8:GSO-> GSO, App30 and 30A Art 7.1, Art 9.21/A

Provision AP30A#7.1

FSS and BSS with respect to feeder links in the BSS(E-s) planned bands

Coordination method in Annex 4 of AP30A#7.1- Method $\Delta T/T$

Provision AP30#7.1

FSS or BSS (s-E) with respect to BSS planned bands

Coordination method in Annex 4 of AP30#7.1- PFD limit

Provision 9.21/A

SRS with respect to FSS

Coordination Method: Orbital arc (±20°)

Appendix 8 △T/T Method: General Concept Interfering sat. network Wanted sat. network Interfering signal **△T (K** T (K) Transmission gain γ : Valid for Simple Freq. Changing Transponders (Bent Pipe) only. Ts Not applicable when satellite has on-board signal processing **p**_{rs} (digital regenerating transponders, change of modulation, etc). This case requires separate treatment of up and downlinks. = p_{re} / p_{rs} = <u>Power received at the earth stn.</u> Power received at the satellite γ **p**_{re} **Equivalent Satellite Link Noise Temperature:** Tx ES **Rx ES** T= Te + γ Ts (K)



AP8 describes the method including definitions

 $\triangle T / T = (p' g_t' g_r) / KLT$ Interfering power density level



Appendix 8 △T/T Case I: Frequency Overlap Co-Directional

Separate treatment of Up- and Downlink (Wanted Satellite has on-board signal processing)





 $\triangle T/T= (\triangle T_e + \gamma \triangle T_s) / T$

 $\Delta T / T = (p'_{s} g'_{3} g_{4}^{(\theta_{w})}) / (k I_{D} T) + \gamma (p'_{e} g'_{1}^{(\theta_{i})} g_{2}) / (k I_{U} T)$



(dB)



 $\Delta T / T = \Delta T_s / T_s$

 $\Delta T / T = 10 \log(p'_{s}) + G'_{3}(\eta_{s}) - L_{s} + G_{2}(\delta_{s}) - K - T_{s}$

 $\Delta T/T = 10 \log \gamma + 10 \log(p'_s) + G'_3(\eta_s) - L_s + G_2(\delta_s) - K - T(dB)$ $\eta_s = \text{Direction in the GSO Orbit, from Interfering Satellite S' to Wanted Satellite S}$ $\delta_s = \text{Direction in the GSO Orbit, from Wanted Satellite S to Interfering Satellite S'}$

GIBC Appendix 8



 Δ T/T method is described in Appendix 8 of RR.

Criteria is based on computing the increase in noise temperature at the receiver due to interference.

DT/T > 6% triggers coordination.

Harmful interference "may" occur when above this threshold level

Below this threshold, it is considered that the interference level is negligible and there is no need for coordination.

Appendix 8 Δ T/T is used by the BR to establish coordination requirements and by Administrations under 9.41 to be included or excluded from the coordination process.

GIBC/Appendix 8 software for Δ T/T analysis and the coordination arc approach (see Appendix 5 of the RR).

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Summary

- Regulatory and Technical Exam
- Importance of running GIBC SW before submitting your Coordination Request
 - Download the SW
 - During the e-submission
- To avoid unfavourable findings
- To know in advance the coordination requirements



Exercise: Appendix 8





Thank you! ITU Radiocommunication Office belen.montenegro.villacieros@itu.int