

GE84 calculations available in eTools

<https://www.itu.int/ITU-R/eBCDMVC>

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BR/TSD/BCD

Some definitions

- ***Nuisance field (NFS)***
 - The field strength of the interfering transmitter (at its pertinent e.r.p.) modified by the relevant protection ratio.
- ***Usable field strength (Eu)***
 - **Minimum value of the field strength necessary to permit a desired reception quality, under specified receiving conditions, in the presence of natural and man-made noise and interference.**
 - For the application of the Article 4 procedure, the **simplified multiplication method is used** (for more details, see Chapter 4 of Annex 2).

GE84 tools

Please select the calculation type

GE84 ▼

GE84 Optimization ▼ **Beta Release**

New Calculation

- GE84 Compatibility Analyses
- GE84 Channel Search
- GE84 Optimization

*Basis of
calculations
common to
the 3 tools*

- Based on the coordinates of a station, the tool assesses all identified interference sources within a radius of **1'500 km** for a **given frequency and adjacent frequencies** up to ± 400 kHz.
- **Notices accepted: T01** (TB5 accepted in the 3 tools but impact only on the optimization tool. For the other 2 tools, TB5 are ignored)

Compatibility Analysis

Helping administrations for the planning and coordination of their VHF-FM sound broadcasting services, in the frequency band 87.5-108 MHz, in accordance with the GE84 Agreement

Analyzing the impact to and from other emissions for a new or existing FM service, using method in Annex 2 of Chapter 4, showing the NFS and Eu calculations at the transmitter site.

Taking into account the proposed modification and other assignments in the GE84 Plan (recorded assignments and, possibly, proposed modifications)

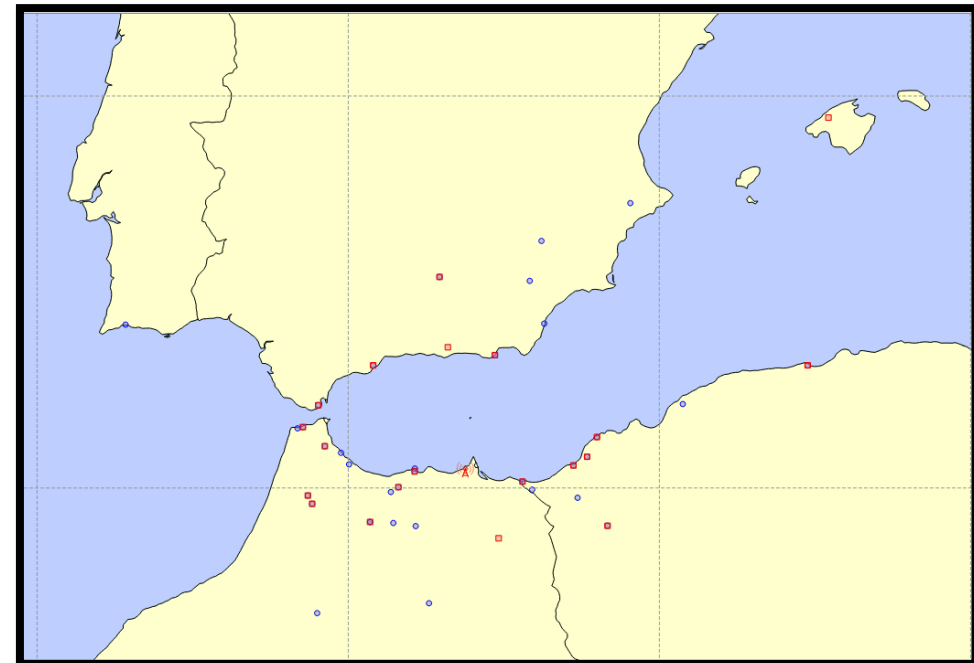
Caution: The analysis considers the notification forms submitted independently of each other

Coordination Exam and Compatibility analysis

Coordination
Examination



Compatibility
Analysis



Coordination Examination: Services likely to be affected



4.2 *Initiation of the modification procedure*

4.2.1 Any administration proposing to modify the characteristics of an assignment appearing in the Plan or to add a new assignment to the Plan shall obtain the agreement of any other administration whose services are likely to be affected.

4.2.2 a) The sound broadcasting stations of an administration are likely to be affected by a proposed modification to the Plan if the distance from the station under consideration to the nearest point on the boundary of the country of that administration is less than the limit indicated in Annex 4, Chapter 1.

Other VHF-FM sound
broadcasting stations

4.2.2 b) The television stations of an administration in the band 87.5 - 100 MHz which are in conformity with the Stockholm Agreement (1961) are likely to be affected by a proposed modification to the Plan if the distance from the station under consideration to the nearest point on the boundary of the country of that administration is less than the limit indicated in Annex 4, Chapter 2.

ST61 television
assignments in the
band 87.5 – 100 MHz

4.2.2 c) The stations in the fixed and mobile services of an administration of a Contracting Member in Region 3 in the band 87.5 - 100 MHz are likely to be affected by a proposed modification to the Plan if the appropriate limits indicated in Annex 4, Chapters 4 and 5, are exceeded.

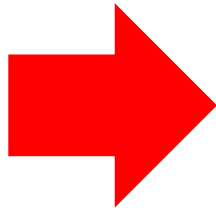
Fixed
and
Mobile
services

4.2.2 d) The stations in the land mobile service of an administration in Region 1 in the band 87.5 - 88 MHz, coordinated under Article 14 of the Radio Regulations, are likely to be affected by a proposed modification to the Plan if the limits indicated in Annex 4, Chapter 4, are exceeded.

4.2.2 e) The stations of the fixed and mobile services, except the aeronautical mobile (R) service, of an administration in Region 1, operating in the band 104 - 108 MHz in conformity with the Radio Regulations on a permitted basis until 31 December 1995, are likely to be affected by a proposed modification to the Plan if the appropriate limits indicated in Annex 4, Chapters 4, 5 and 6, are exceeded.

4.2.2 f) The stations in the aeronautical radionavigation service of an administration in the band 108 - 117.975 MHz are likely to be affected by a proposed modification to the Plan if the distance from the station under consideration to the nearest point on the boundary of the country of that administration is less than the limit indicated in Annex 4, Chapter 3. In this case, the procedure to be applied is contained in Article 5.

Aeronautical
radionavigation
services



Compatibility Analysis: Selection criteria

Configuration Information

Top 20 only Consider Tip TV also Polarization Discrimination (dB) Trigger NFS from proposed modification for EU calculations (dB ($\mu\text{V}/\text{m}$))

- Only the 20 main contributors are considered for the Eu calculations
- Consideration of notices present in the TIP
- Consideration of TV stations recorded in the ST61 Plan
- Polarization discrimination in case of orthogonal polarisation (V->H ou H->V)
- As a low NFS does not have a big impact on the Eu calculations, reasonably limited trigger NFS (by default 30 dB($\mu\text{V}/\text{m}$)) will increase the effectiveness of the analysis of the results for the interference generated by the proposed modification.



Compatibility Analysis : Results

Input notice file validated by the OnlineValidation process on 8/16/2020 10:52:11 AM

Proposed Modification	Administrations with which the limits of 4.3.7.1/4.3.7.2 are exceeded	Eu (dB(μV/m))
87.7MHz_AAZANEN	MRC E ALG	88.85

Select the proposed modification

87.7MHz AAZANEN

GE84 Compatibility Analyses Description

Result Interference To Interference From

Interference received by the proposed modification

Assign ID	Adm	Intent	Stn Cls	Assigned Frequency (MHz)	Polar	Site Name	Total Distance	Cold Sea Path (Km)	Warm Sea Path (Km)	Super refractivity Path (Km)	ERP (dBW)	Azimuth (deg)	Protection Ratio (dB)	NFS (dB(μV/m))	EU Ref (dB(μV/m))	Proposed EU (dB(μV/m))	Current EU (dB(μV/m))	EU increase (dB)
093005085	E	RECORDED	BC	87.7	M	EL EJIDO	167	0	153	0	35	9	37	81.37	88.68	91.57	88.98	2.59
105097287	MRC	RECORDED	BC	87.8	V	Hafa SAFA	203	0	195	0	35	278	25	66.69	97.79	88.37	87.91	0.46
084105732	E	RECORDED	BC	87.7	M	JEREZ DE LA FRONTERA	315	0	224	0	35	301	37	65.58	69.44	80.64	79.55	1.09
084100377	ALG	RECORDED	BC	87.7	H	BEN M'HIDI	86	0	75	0	30.7	102	37	61.18	83.27	95.12	95.09	0.03
115135358	E	RECORDED	BC	87.6	V	CUEVAS ALMANZORA	260	0	178	0	35	25	25	57.7	84.91	79.12	78.79	0.33
084009123	E	RECORDED	BC	87.6	H	MARBELLA	206	0	204	0	35	314	25	56.81	81.7	85.66	85.58	0.08
084009119	E	RECORDED	BC	87.6	M	CORDOBA	324	0	171	0	35	333	25	49.79	68.42	75.21	75.09	0.12
119085531	MRC	RECORDED	BC	87.6	V	Sefrou	226	0	15	0	35	225	25	48.97	79.93	72.89	72.69	0.2

Compatibility analysis: details concerning NFS calculations



Assign ID	Adm	Intent	Stn Cls	Assigned Frequency (MHz)	Polar	Site Name	Total Distance	Cold Sea Path (Km)	Warm Sea Path (Km)	Super refractivity Path (Km)	ERP (dBW)	Azimuth (deg)	Protection Ratio (dB)	NFS (dB(μV/m))
084004713	MRC	RECORDED	BC	87.6	H	ZAIO	58	0	6	0	38.1	323	33	86.41
084033664	ALG	RECORDED	BC	87.7	H	AIN-N'SOUR	389	0	289	0	50	260	37	67.58
105097287	MRC	RECORDED	BC	87.8	V	HAFSA SAFA	203	0	195	0	32	97	25	66.6
093005085	E	RECORDED	BC	87.7	M	EL EJIDO	167	0	153	0	22.8	189	37	65.71
084100377	ALG	RECORDED	BC	87.7	H	BEN M'HIDI	86	0	75	0	20	283	37	65.57
084105732	E	RECORDED	BC	87.7	M	JEREZ DE LA FRONTERA	315	0	224	0	37.8	120	37	65.08

Distance site to site & information concerning the various paths

- Total distance (land and sea)
- Cold sea path
- Warm sea path
- Super refractivity path

For co-sites, a minimum distance of 1 km is considered.

e.r.p at pertinent azimuth

NFS
see 3.5 of
Annex 2

Protection ratio (see Tables 2.1 to 2.3 of Annex 2 of GE84 Agreement) depending on:

- Frequency spacing
- Transmission System
- Steady/tropospheric interference

Compatibility Analysis : Results

Result		Interference To		Interference From												Search:				
Export to Excel																				
Assign ID	Adm	Intent	Stn Cls	Assigned Frequency (MHz)	Polar	Site Name	Total Distance	Cold Sea Path (Km)	Warm Sea Path (Km)	Super refractivity Path (Km)	ERP (dBW)	Azimuth (deg)	Protection Ratio (dB)	NFS (dB(μV/m))	EU Ref (dB(μV/m))	Proposed EU (dB(μV/m))	Current EU (dB(μV/m))	EU increase (dB)		
093005085	E	RECORDED	BC	87.7	M	EL EJIDO	167	0	153	0	35	9	37	81.37	88.68	91.57	88.98	2.59		
105097287	MRC	RECORDED	BC	87.8	V	Hafa Safa	203	0	195	0	35	278	25	66.69	97.79	88.37	87.91	0.46		
084105732	E	RECORDED	BC	87.7	M	JEREZ DE LA FRONTERA	315	0	224	0	35	301	37	65.58	69.44	80.64	79.55	1.09		
084100377	ALG	RECORDED	BC	87.7	H	BEN M'HIDI	86	0	75	0	30.7	102	37	61.18	83.27	95.12	95.09	0.03		
115135358	E	RECORDED	BC	87.6	V	CUEVAS ALMANZORA	260	0	178	0	35	25	25	57.7	84.91	79.12	78.79	0.33		
084009123	E	RECORDED	BC	87.6	H	MARBELLA	206	0	204	0	35	314	25	56.81	81.7	85.66	85.58	0.08		
084009119	E	RECORDED	BC	87.6	M	CORDOBA	324	0	171	0	35	333	25	49.79	68.42	75.21	75.09	0.12		
119085531	MRC	RECORDED	BC	87.6	V	Sefrou	226	0	15	0	35	225	25	48.97	79.93	72.89	72.69	0.2		
113097786	E	RECORDED	BC	87.6	M	CEHEGIN	341	0	174	0	35	22	25	48.08	80.42	81.53	81.52	0.01		

interference generated by the proposed modification

- NFS = interference generated by the proposed modification to the affected station
- Eu Ref = Eu calculated at the time the assignment entered the Plan (n/a if not yet RECORDED).
- Current Eu = Eu calculated for the affected station, considering all the interferers (or top 20), But NOT considering the proposed modification
- Proposed Eu = Eu calculated for the affected station, considering all the interferers (or top 20), AND considering the proposed modification

Analyse de Compatibilité: Résultats

Fiche de
Notification
AAZANEN

```
<HEAD>
t_adm=MRC
</HEAD>
<NOTICE>
t_notice_type=T01
t_fragment=GE84
t_action=ADD
t_freq_assgn=87.700000
t_long=-0030703
t_lat=+351507
t_site_name=AAZANEN
t_ant_dir=D
t_erp_v_dbw=35.000
t_hgt_agl=25
t_site_alt=184
t_bdwidth=300.000
t_d_adm_ntc=2010-10-12
t_polar=V
t_tran_sys=4
t_eff_hgtmax=209
t_ctry=MRC
```

```
<ANT_DTAGR_V>
t_attn@azm0=0
t_attn@azm10=0
t_attn@azm20=0
t_attn@azm30=0
t_attn@azm40=4.5
t_attn@azm50=9.5
t_attn@azm60=14.5
t_attn@azm70=19.5
t_attn@azm80=15.5
t_attn@azm90=10.5
t_attn@azm100=5.5
t_attn@azm110=0.5
t_attn@azm120=0
t_attn@azm130=0
t_attn@azm140=0
t_attn@azm150=0
t_attn@azm160=0
t_attn@azm170=0
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t_attn@azm240=0
t_attn@azm250=0
t_attn@azm260=0
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t_attn@azm310=0
t_attn@azm320=0
t_attn@azm330=0
t_attn@azm340=0
t_attn@azm350=0
</ANT_DTAGR_V>
```

Coordination examination & compatibility Analysis

ex: MT MUTUMBA BDI Polarization V à 87.9MHz

GE84											
Export to Excel		Export to PDF		Google Earth		Generate e-notices (Export to SGML)		Print		Search: <input type="text"/>	
BR Id	Adm	Site Name	Assigned Frequency	Intent	Coord Completed	Objection By	Coord Required				
115030707	BDI	MT MUTUMBA	87.9	ADD	KEN RRW TZA	UGA	COD KEN RRW TZA UGA				

Geographic area	Coordination provision(s)
AGL	
CAF	
COD	4.2.2.A, 4.2.2.F
COG	
ETH	
KEN	4.2.2.F
MOZ	
MWI	
RRW	4.2.2.A, 4.2.2.F
SDN	
SOM	
SSD	
TZA	4.2.2.A, 4.2.2.F
UGA	4.2.2.A, 4.2.2.F
XBY	
ZMB	
ZWE	

Coordination examination & compatibility Analysis

ex: MT MUTUMBA BDI Polarization V à 87.9MHz

87.9MHz MT MUTUMBA

GE84 Compatibility Analyses Description

Result Interference To Interference From

Export to Excel Search:

Assign ID	Adm	Intent	Stn Cls	Assigned Frequency (MHz)	Polar	Site Name	Total Distance	Cold Sea Path (Km)	Warm Sea Path (Km)	Super refractivity Path (Km)	ERP (dBW)	Azimuth (deg)	Protection Ratio (dB)	NFS (dB(μV/m))	EU Ref (dB(μV/m))	Proposed EU (dB(μV/m))	Current EU (dB(μV/m))	EU increase (dB)
084108077	BDI	RECORDED	BC	87.9	H	MT BIRIME	81	0	0	0	25	150	36	54.99	77.74	78.06	77.78	0.28
115030651	BDI	RECORDED	BC	87.9	H	BUJUMBURA	110	0	0	0	25	224	28	48.67	99.81	99.81	99.81	0
084044435	RRW	RECORDED	BC	88	H	MT KARISIMBI	140	0	0	0	25	334	25	42.84	74.02	74.08	74.03	0.05
084023860	TZA	RECORDED	BC	87.9	H	KASULU	240	0	0	0	25	167	28	33.14	64.58	64.71	64.68	0.03
084045095	UGA	RECORDED	BC	87.9	H	FT PORTAL	372	0	0	0	25	5	37	30.73	76.87	78.16	78.16	0

BRIFIC Publication concerning the Reference Situation

<https://www.itu.int/en/ITU-R/terrestrial/tpr/Pages/default.aspx>

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Questions relating to GE84 Compatibility analysis

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Channel Search

- The calculations are carried out frequency by frequency, in steps of 100 kHz for the frequency band captured by the user (Freq. From-Freq. To)
- They consider interference in the same channel and adjacent channels (± 400 kHz), in the frequency range specified by the user (max 87.6 to 107.9 MHz)
- NFS ≥ 30 dB(μ V/m) considered
- 1st step to identify additional frequencies because only **interference received** is considered

Note: The assigned frequency stored in the notice form is only important for validation purposes. It is disregarded by the calculations which will simulate the frequency assignment based on the information captured (see 2nd bullet)

Caution: The tool considers the notices submitted independently of each other



Channel Search:

Top 20 only Consider Tip TV also Polarization Discrimination (dB) Frequency (MHz) From To

ARIAMSVLEI (019°50'00"E-28°08'00"S) System 4 Polarization V

E84 Channel Search Description

Channel Search Summary

Excel

Freq (MHz)	Max NFS (dB(μV/m))	EU (dB(μV/m))	Top five interferers											
AssignID	Site Name	Adm	StnCls	Freq (MHz)	Polar	Azimuth (deg)	Distance (km)	Erp (dBW)	Protection Ratio (dB)	NFS (dB(μV/m))	Intent			
87.6	64.23	69.27	084002194	KEETMANSHOOP	NMB	BC	87.6	H	136.1	241	47	37	64.23	RECORDED
			084000411	AUGRABIES	AFS	BC	87.8	H	310.9	73	47	7	58.69	RECORDED
			084000279	GARIES	AFS	BC	87.6	H	35.4	296	37	37	50.92	RECORDED
			084000363	PRIESKA	AFS	BC	87.7	H	301.8	321	47	25	44.8	RECORDED
			084000255	BEAUFORT WEST	AFS	BC	87.6	H	330.1	525	47	37	37.92	RECORDED
87.7	79.16	79.72												

Live Demo

<https://www.itu.int/ITU-R/eBCDMVC>

Optimization Tool

- This tool has been primarily developed to achieve an efficient use of the 87.5-108 MHz (FM) band for analogue sound broadcasting and to allocate new frequencies to FM broadcasting to meet the increasing need for additional frequencies in African countries.
- This tool can also be used by all the administrations party to the GE84 Agreement.

Optimization Tool

Goal

- to allocate new frequencies to FM broadcasting to meet the growing need for additional frequencies

Results

- Nuisance Field strength (NFS) generated and received by a proposed requirement in view to identify additional frequencies

Analysis of the results

- Search for an assignable frequency based on predefined criteria



Optimization Tool

- **Compatibility between the requirements submitted to the calculations considered**
- Introduction of the notion of **requirements with a flexible frequency.**
- For requirements with a flexible channels, **the entire FM band (87.6 to 107.9 MHz) is analysed in steps of 100 kHz.**
- The objective is, **as a first step**, to submit **flexible frequency requirements** in order to identify the most suitable frequencies. **In the following steps**, the user can begin to fix/set frequencies until all requirements are assigned an **appropriate fixed frequency.**
- **IMPORTANT: Flexible frequency requirements should be removed before the end of the exercise.**



Optimization tool

**Flexible
Frequency
Requirement**

T01

Date of notification: ID1/ Unique identification code given by the Administration to the assignment:

Fragment: Article 11 GE84 ST61
Notification intended for: Addition Modification

12A/ Operating agency: 2C/ Date of bringing into use:

12B/ Address code: 10B/ Regular hours of operation (UTC): From To

Assignment characteristics | **Antenna characteristics**

Station information

4A/ Antenna site name: 4C/ Longitude:
4B/ Geographic area: Latitude:

9EA/ Altitude of site above sea level: m 3A1/ Call sign:

Emission characteristics

1A/ Assigned frequency: MHz 7D/ Transmission system:
7AB/ Bandwidth: kHz 9D/ Polarization:

8BH/ Horizontal e.r.p.: dBW
8BV/ Vertical e.r.p.: dBW

Antenna characteristics

9/ Antenna directivity: 9EB/ Maximum Effective Antenna Height: m
9E/ Height of Antenna Above Ground Level: m

Coordination successfully completed with the following administrations

Available administrations: AFG, AFS, AGL, ALB, ALG
Selected administrations:

13C/ Notified remarks:



Optimization tool

Calculation
criteria

Consider Tip TV also Polarization Discrimination (dB)

Criteria for
the definition
of assignable
frequencies

Ignore self interference Ignore interference received Acceptable NFS (dB (μ V/m))

Evaluate Statistics

Adm	Submitted	Assignable	Non Assignable
AFS	177	86	91
NMB	73	73	0

Online demo

<https://www.itu.int/ITU-R/eBCDMVC>



ONLY applied to Reqt's with a FIXED frequency!!!!

The coordination info of the Plan Entries is not taken into account

Optimization Tool

Introduction of Coordination

T01

Date of notification: [dropdown] ID1/ Unique identification code given by the Administration to the assignment: [text box]

Fragment: Article 11 GE84 ST61
Notification intended for: Addition Modification [...]

12A/ Operating agency: [dropdown] 2C/ Date of bringing into use: [dropdown]

12B/ Address code: [dropdown] 10B/ Regular hours of operation (UTC): From [dropdown] To [dropdown]

Assignment characteristics: **Antenna characteristics**

Station information:
4A/ Antenna site name: KIBWEZI 4C/ Longitude: 37° 55' 0" E 9EA/ Altitude of site above sea level: 1087 m 3A1/ Call sign: [text box]
4B/ Geographic area: KEN Latitude: 2° 22' 0" S 3A2/ Station identification: FLEX

Emission characteristics:
1A/ Assigned frequency: 87.7 MHz 7D/ Transmission system: 4 8BH/ Horizontal e.r.p.: 47.800 dBW
7AB/ Bandwidth: 300.000 kHz 9D/ Polarization: H 8BV/ Vertical e.r.p.: [text box] dBW

Antenna characteristics:
9/ Antenna directivity: D 9EB/ Maximum Effective Antenna Height: 342 m 9E/ Height of Antenna Above Ground Level: 100 m

Coordination successfully completed with the following administrations

Available administrations	Selected administrations
AFG	
AFS	
AGL	
ALB	
ΔI G	

3C/ Notified remarks: [text box]

AFS Augrabies – Agreement from NMB

Ignore self interference Ignore interference received Acceptable NFS (dB (μV/m))

Optimization Tool

Introduction of Coordination

Adm	Submitted	Assignable	Non Assignable
AFS	2	1	1
NMB	1	1	0

Showing results for submitted requirements from AFS

Select requirement:

104 MHz-AUGRABIES (020°24'00"E-28°34'00"S) System 4 Polarization V

GE84 Optimization Description

Summary [104 MHz-AUGRABIES (020°24'00"E-28°34'00"S) System 4 Polarization V]

Details of the requirement under consideration

Show top 5 interferers in the summary Show top 5 affected in the summary

Excel

Frequency (MHz)	Max NFS Generated (dB(μV/m))	Max NFS Received (dB(μV/m))	Top five affected																
			Assign ID	Adm.	Intent	Class	Freq.	Pol.	Site Name	Dist.	Cold Sea	Warm Sea	Sup. Refc.	ERP	Azim.	Prot. Ratio	NFS	Coord.	
104	58.15	50.21	3	NMB	ADD	BC	104.2	V	ARIAMSVLEI	73	0	0	0	37	310.9	7	58.15	Yes	
			2	AFS	ADD	BC	104	H	DE AAR	406	0	0	0	37	122.2	37	37.45	---	
			084002558	NMB	RECORDED	BC	103.7	H	ARIAMSVLEI	73	0	0	0	37	310.9	-7	34.15	Yes	



Optimization Tool

Introduction of Coordination

AFS AUGRABIES (Assign ID 1) – Agreement from NMB –
Impact on interference received for NMB ARIAMSVLEI

Select requirement:

104.2 MHz-ARIAMSVLEI (019°50'00"E-28°08'00"S) System 4 Polarization V

GE84 Optimization Description

Summary [104.2 MHz-ARIAMSVLEI (019°50'00"E-28°08'00"S) System 4 Polarization V]

Details of the requirement under consideration

Show top 5 interferers in the summary Show top 5 affected in the summary

Frequency (MHz)	Max NFS Generated (dB(μV/m))	Max NFS Received (dB(μV/m))	Top five interferers																
			Assign ID	Adm.	Intent	Class	Freq.	Pol.	Site Name	Dist.	Cold Sea	Warm Sea	Sup. Refr.	ERP	Azim.	Prot. Ratio	NFS	Coord.	
104.2	49.11	58.15	1	AFS	ADD	BC	104	V	AUGRABIES	73	0	0	0	37	310.9	7	58.15	Yes	
			084002199	NMB	RECORDED	BC	104.3	H	KEETMANSHOOP	241	0	0	0	47	136.1	25	52.23	---	
			084000416	AFS	RECORDED	BC	104.5	H	AUGRABIES	73	0	0	0	47	310.9	-7	44.69	---	
			084000284	AFS	RECORDED	BC	104.3	H	GARIES	296	0	0	0	37	35.4	25	38.92	---	

Analysis of NFS calculated using GE84 curves interference generated by AAZANEN at 87.7 MHz

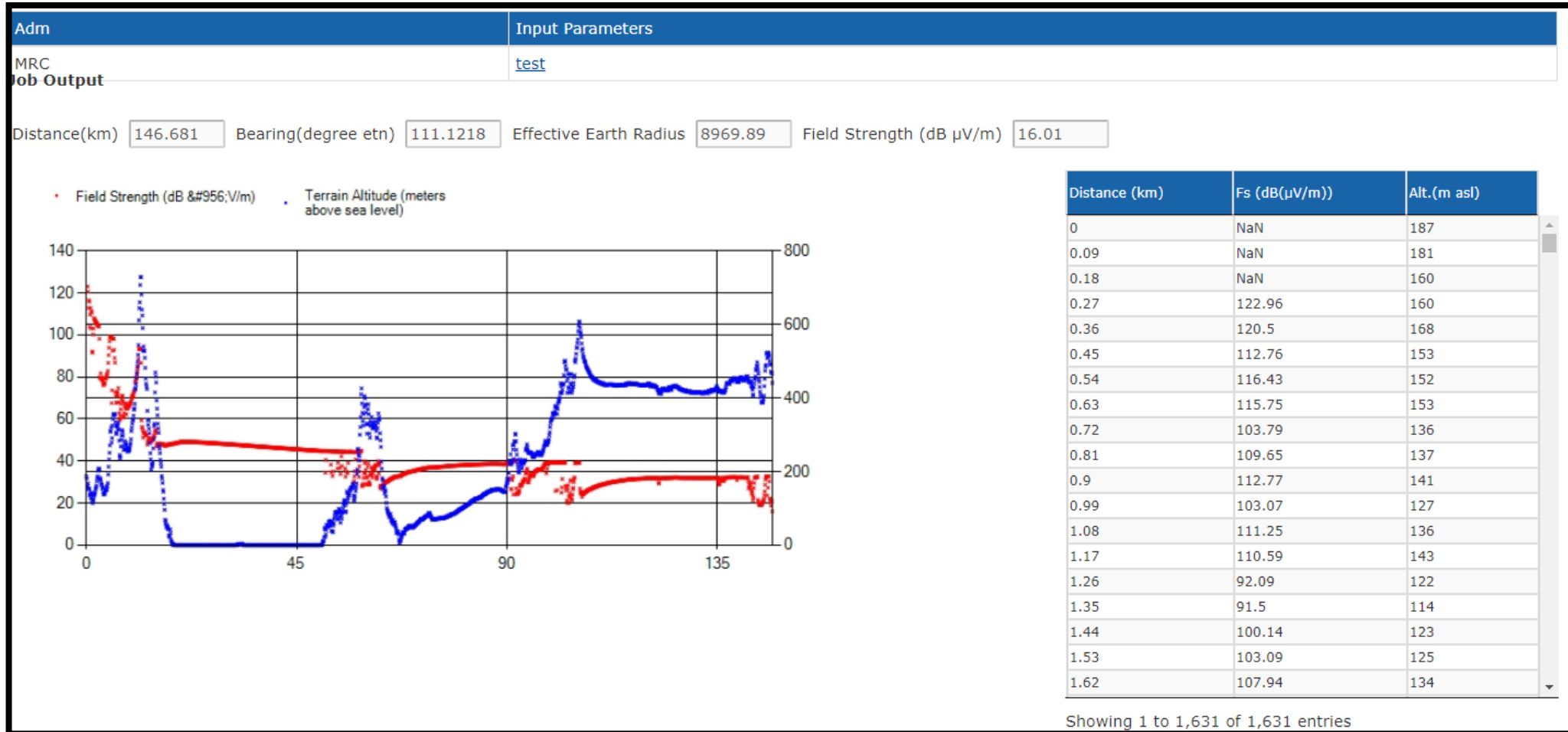


Site Characteristics			
Transmitting Antenna Site Name	AAZANEN		
Geographic Area	MRC		
Longitude	3° W 7' 3 "		
Latitude	35° N 15' 7 "		
Altitude of site above sea level (m)	184		
Emission Characteristics			
Assigned Frequency (MHz)	FLEX	Maximum effective radiated power(dBW), vertical component	35
Antenna Directivity	D	Transmission System	4
Polarization	V		
Height of Antenna Above Ground Level (m)	25		
Maximum Effective Antenna Height (m)	209		

Assign ID	Adm	Intent	Stn Cls	Assigned Frequency (MHz)	Polar	Site Name	Total Distance	Cold Sea Path (Km)	Warm Sea Path (Km)	Super refractivity Path (Km)	ERP (dBW)	Azimuth (deg)	Protection Ratio (dB)	NFS (dB(μV/m))
107105285	MRC	ADD	BC	87.7	V	AL HOCEIMA VILLE	74	0	74	0	35	270.5	37	94.43
093005085	E	RECORDED	BC	87.7	M	EL EJIDO	167	0	153	0	35	8.7	37	81.37
107105266	MRC	ADD	BC	87.7	V	AKNOUL	111	0	11	0	35	221.1	37	75
107106776	MRC	ADD	BC	87.7	V	TAHAR SOUK	125	0	28	0	35	238.2	37	72.44
107106988	MRC	ADD	BC	87.8	V	TARGUIST VILLE	114	0	58	0	35	253	25	69.18
120146601	MRC	ADD	BC	87.7	V	SAR SAR	250	0	143	0	35	261.3	37	68.9
105097287	MRC	RECORDED	BC	87.8	V	HAFA SAFA	203	0	195	0	35	277.9	25	66.69
117124793	ALG	ADD	BC	87.7	V	SIDI MEDJAHED	147	0	61	0	34.56	111.1	37	66.19



Analysis of NFS calculated using P1812 AAZANEN at 87.7 MHz in the direction of SIDI MEDJAHED at 87.7 MHz





Analysis of NFS calculated using P1812 AAZANEN at 87.7 MHz in the direction of SIDI MEDJAHED at 87.7 MHz

GE84 propagation curves

117124793	ALG	ADD	BC	87.7	V	SIDI MEDJAHED	147	0	61	0	34.56	111.1	37	66.19
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P1812 with terrain information

Distance(km)	146.681	Bearing(degree etn)	111.1218	Effective Earth Radius	8969.89	Field Strength (dB μ V/m)	16.01
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Interpretation of the results

Note that both frequencies are identical (co-channel) and that polarizations are identical: V

From the PR value, indicated in the results in the optimization tool , we can deduce that the tropospheric interference value is the highest RP= **37 dB** (co-channel)

Remember also that **NFS = FS + RP**

FS(1%time,50%loc) **GE84 curves: NFS = 66.19 dB(μ V/m)**

FS(1%time,50%loc) **P1812 with terrain: FS = 16.01 dB(μ V/m) \rightarrow NFS= 16.01 + 37 = 53.01 dB(μ V/m)**

Difference : 66.19 – 53.01 = **13.18 dB**

In addition..... 53.01 dB(μ V/m) is less than acceptable NFS of **54 dB(μ V/m)**

Analysis of NFS calculated using P1812 AAZANEN at 87.7 MHz in the direction of SIDI MEDJAHED at 87.7 MHz

Frequency spacing (kHz)	Radio-frequency protection ratio (dB) for a maximum frequency deviation of ± 75 kHz			
	Monophonic		Stereophonic	
	Steady interference	Tropospheric interference	Steady interference	Tropospheric interference
0	36	28	45	37
25	31	27	51	43
50	24	22	51	43
75	16	16	45	37
100	12	12	33	25
150	8	8	18	14
200	6	6	7	7
250	2	2	2	2
300	-7	-7	-7	-7
350	-15	-15	-15	-15
400	-20	-20	-20	-20



Analysis of NFS calculated using GE84 curves BOUKHOUALI 89.5 MHz to SOUK THLATA 89.6 MHz

Transmitting Antenna Site Name	BOUKHOUALI		
Geographic Area	MRC		
Longitude	2° W 35' 0 "		
Latitude	34° N 20' 0 "		
Altitude of site above sea level (m)	1720		
↑ Emission Characteristics			
Assigned Frequency (MHz)	FLEX	Maximum effective radiated power(dBW), horizontal component	40
Antenna Directivity	ND	Transmission System	4
Polarization	H		
Height of Antenna Above Ground Level (m)	50		
Maximum Effective Antenna Height (m)	903		

Show top 5 interferers in the summary Show top 5 affected in the summary

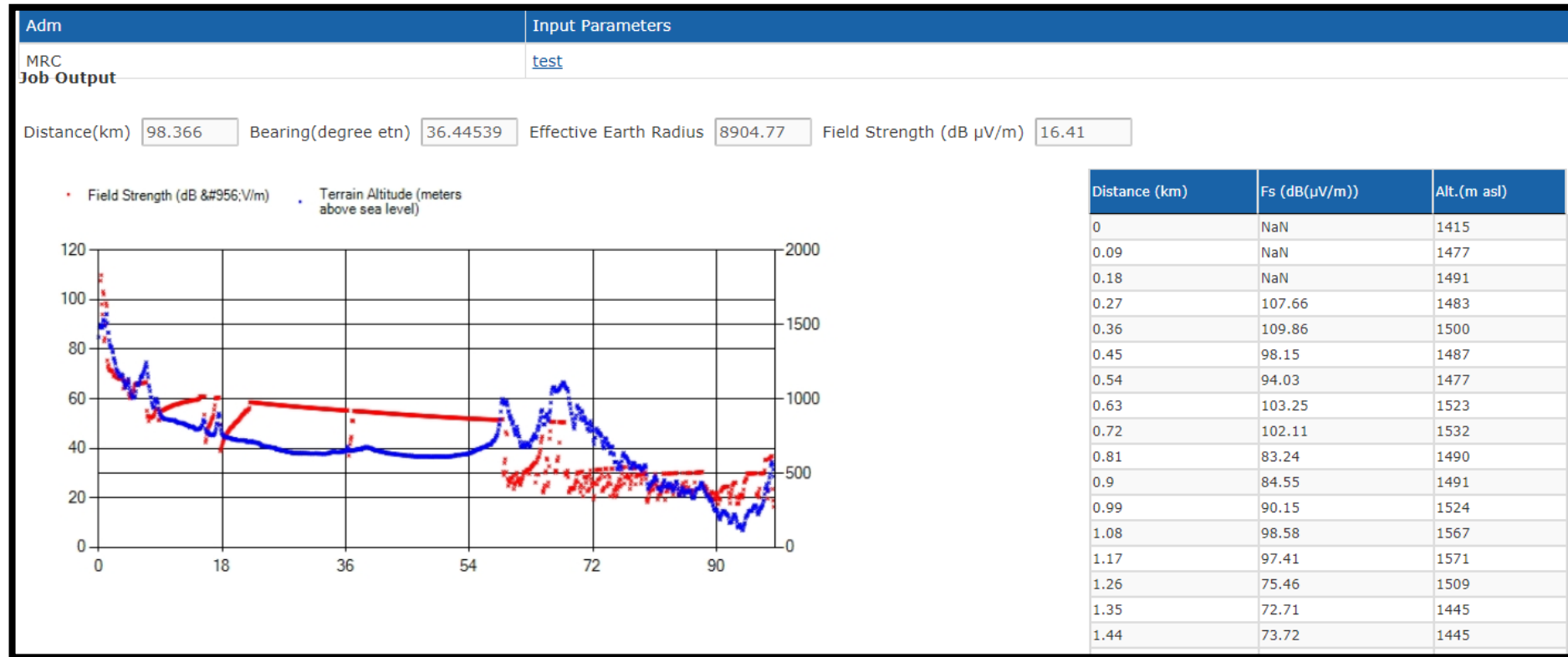
Excel

Frequency (MHz)	Max NFS Generated (dB(μV/m))	Max NFS Received (dB(μV/m))	Top five affected															
			Assign ID	Adm.	Intent	Class	Freq.	Pol.	Site Name	Dist.	Cold Sea	Warm Sea	Sup. Refr.	ERP	Azim.	Prot. Ratio	NFS	Coord.
107.9	80.77	54.87	107107306	MRC	ADD	BC	107.9	V	ZERZAIA	108	0	0	0	40	234.5	45	80.77	---
			107106670	MRC	ADD	BC	107.8	V	SAADIA	90	0	11	0	40	19.8	33	80.07	---
			107105295	MRC	ADD	BC	107.9	V	AL HOCEIMA VILLE	160	0	27	0	40	310.2	37	74.87	---
			107106808	MRC	ADD	BC	107.9	V	TAHAR SOUK	159	0	0	0	40	283.5	37	70.77	---
			084010633	E	RECORDED	BC	107.9	M	ADRA	271	0	181	0	40	352.1	28	69.79	---
89.5	86.12	77.11	107126521	ALG	ADD	BC	89.6	H	SOUK THLATA	98	0	12	0	40	36.4	33	86.12	---
			107126926	ALG	ADD	BC	89.6	H	GHAZAOUET	108	0	19	0	40	39.2	33	82.7	---
			107125948	ALG	ADD	BC	89.6	H	sidi djilali	94	0	0	0	40	82.5	33	82.25	---
			084009625	E	RECORDED	BC	89.6	H	MELILLA	113	0	11	0	40	342.8	25	81.67	---
			107106073	MRC	ADD	BC	89.6	V	GUERCIF	73	0	0	0	40	260.9	33	80.43	---



P1812

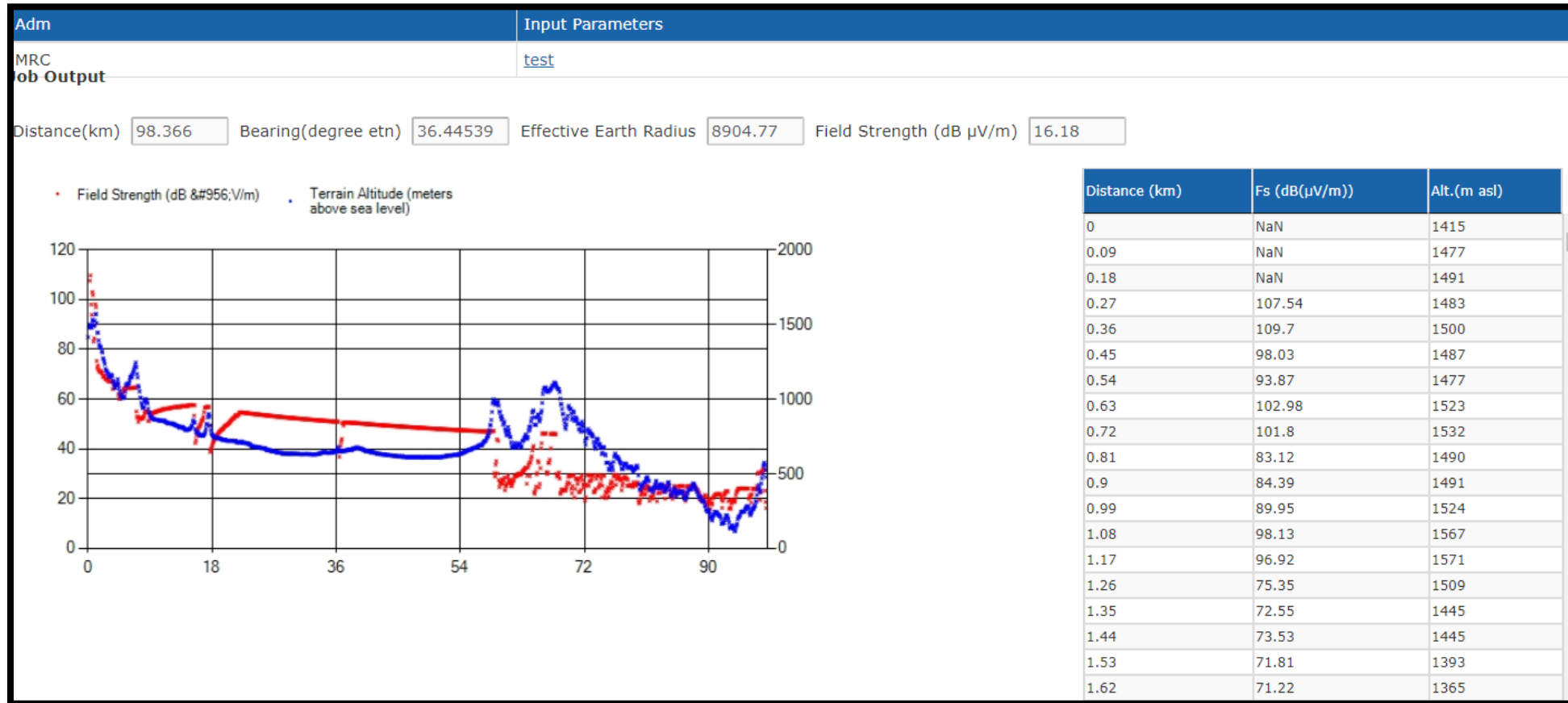
50% of locations & 1% of time





P1812

50% of locations & 50% of time





Analyse des valeurs de NFS avec P1812

BOUKHOUALI 89.5 MHz vers SOUK THLATA 89.6 MHz

GE84 Propagation curves

			084010533	E	RECORDED	BC	107.9	M	ADRA	271	0	181	0	40	352.1	28	69.79	---
89.5	86.12	68.11	107126521	ALG	ADD	BC	89.6	H	SOUK THLATA	98	0	12	0	40	36.4	33	86.12	---
			107126528	ALG	ADD	BC	89.6	H	GRAZOUET	108	0	19	0	40	39.2	33	82.7	---

P1812 Propagation model

Distance(km)	98.366	Bearing(degree etn)	36.44539	Effective Earth Radius	8904.77	Field Strength (dB μ V/m)	16.18
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Note that both frequencies are different (\neq of 100 kHz) and that polarizations are identical: H
From the PR value, indicated in the results in the optimization tool , we can deduce that the steady interference value is the highest $RP = 33$ dB (100 kHz offset)
Remember also that **$NFS = FS + RP$**

FS(50%time,50%loc.) **GE84 curves** -> **$NFS = 86.12$ dB(μ V/m)**

FS(50%time,50%loc.) **P1812 model**-> **$FS = 16.18$ dB(μ V/m) -> $NFS = 16.18 + 33 = 49.18$ dB(μ V/m)**

Difference between NFS : $86.12 - 49.18 = 36.94$ dB

Furthermore..... 49.18 dB(μ V/m) is less than the acceptable NFS value of **54 dB(μ V/m)**

Consideration of polarization discrimination in the calculations

Cf Annex 2 of the GE84 Agreement

3.8.3 *Polarization*

Administrations were free to choose the polarization to be used in their countries¹.

Polarization discrimination was not taken into account in the planning procedure, except in specific cases with the agreement of affected administrations. In such cases, a value of 10 dB was used for orthogonal polarization discrimination.

Interpretation of the results in case of orthogonal polarization

$$\text{NFS} = \text{FS} + \text{RP} - \text{polarization discrimination (10dB)}$$

In other cases, NO polarization discrimination is applied:

$$\text{NFS} = \text{FS} + \text{PR}$$

Thank you for your attention
Questions ?