

**3<sup>rd</sup> and final frequency coordination meeting  
on the GE84 Plan Optimization for Africa**

**3<sup>ème</sup> et dernière réunion de coordination  
des fréquences sur l'optimisation  
du Plan GE84 pour l'Afrique**

**24 - 28 January 2022**



AFRICAN TELECOMMUNICATIONS UNION  
UNION AFRICAINE DES TÉLÉCOMMUNICATIONS



# ***GE84 Plan Optimization ATU/ITU***

## **Procedures of GE84 Agreement**

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# *The Geneva 84 Agreement*



- relating to the Use of the Band 87.5 - 108 MHz for FM Sound Broadcasting (Region 1 and Part of Region 3)

- 204 channels;
- 100kHz channel spacing



# *GE84 in summary*

- **Article 13:**
  - Entry into force on 1 July 1987, at 0001 hours UTC.
  - established for a period of 20 years from the date of entry into force of the Agreement.
  - This Agreement shall remain in force until it is revised by a competent *administrative radio conference*.
- **Number of assignments:**
  - 1987 : 51 168 recorded frequency assignments
  - Now : > 86 000 recorded assignments

# *Procedure of Article 4*

- The agreement provides for a Plan modification procedure described in Article 4. The procedure allows a frequency assignment's characteristics to be modified or a new assignment to be entered.
- The procedure of Article 4 considers not only sound broadcasting stations, but also other services (BT, ILS / VOR, fixed, mobile)

## *Services likely to be affected (Coordination required)*

- ✓ Other VHF-FM sound broadcasting stations(4.2.2 a)
- ✓ ST61 television assignments in the band 87.5 – 100 MHz (4.2.2 b)
- ✓ Fixed and mobile services (4.2.2 c, d)
- ✓ Aeronautical radionavigation services above 108 MHz (4.2.2 f)



# Services likely to be affected (Coordination required)



Administration	Provision	Coordination status	Source of status	Date of status	Declared affected by
BIH	4.2.2.A	COORD REQUIRED	ITU	08/10/2020	ITU
BIH	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
CZE	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
D	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
F	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
HNG	4.2.2.A	COORD REQUIRED	ITU	08/10/2020	ITU
HNG	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
HRV	4.2.2.A	COORD REQUIRED	ITU	08/10/2020	ITU
HRV	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
I	4.2.2.A	COORD REQUIRED	ITU	08/10/2020	ITU
I	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
LIE	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
POL	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
ROU	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
SMR	4.2.2.A	COORD REQUIRED	ITU	08/10/2020	ITU
SMR	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
SRB	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU
SUI	4.2.2.F	COORD REQUIRED	ITU	08/10/2020	ITU

# Services likely to be affected (Coordination required)



## 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.

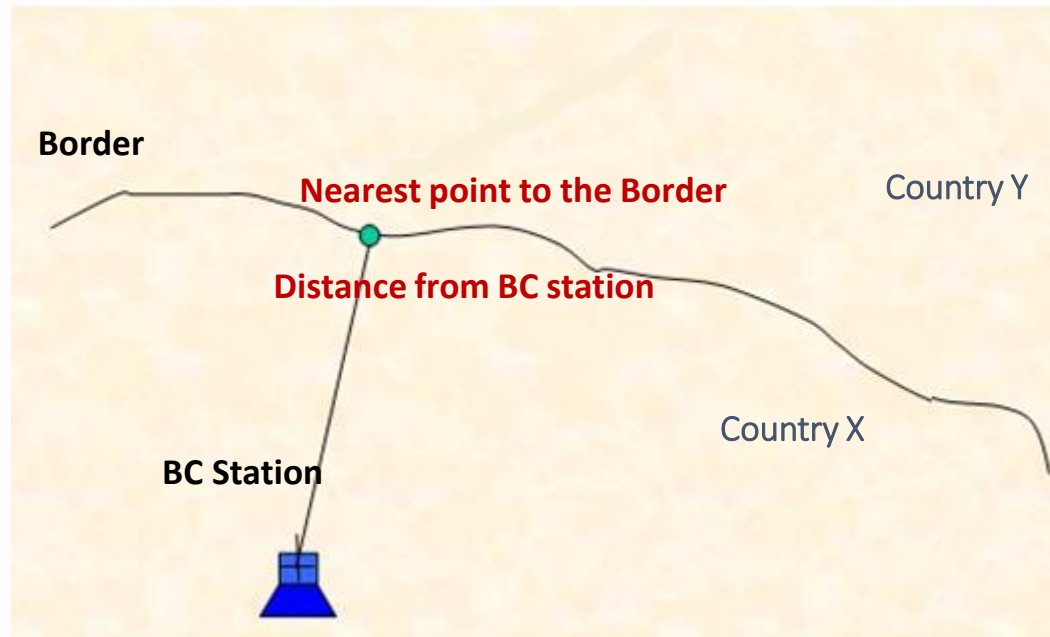
4.2.2 e) The stations of the fixed and mobile services, except the aeronautical mobile (R) service, of an administration in Region 1, operating in the band 104 - 108 MHz in conformity with the Radio Regulations on a permitted basis until 31 December 1995, are likely to be affected by a proposed modification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

## *Coordination with other sound/TV broadcasting services VHF-FM*

- distances between the broadcasting station and the nearest point on the boundary of any other administration shall be used to identify administrations whose sound broadcasting services may be considered as affected





# *BC to BC/BT coordination distance*

- Coordination distances depend on:
  - Effective radiated power of the proposed BC station
  - Effective antenna height
  - Propagation path (land, warm/cold seas and areas of super refractivity)
- See Chapters 1 and 2 of **Annex 4** of the Agreement:
  - Tables 4.1- 4.4 : limits for sound
  - Tables 4.5 to 4.7: limits for television

# *BC to BC/BT coordination distance*

Note:

Limits for television consider

- Corrected ERPs to take account the variation in the protection ratios depending on frequency separation between FM and television frequency carriers
- Propagation path (land, warm/cold seas and areas of super refractivity)
- See Chapters 2 of **Annex 4** of the Agreement:
  - Tables 4.5- 4.8

TABLE 4.1

*Coordination distances,  $D_L$ , in km, for propagation paths over land*

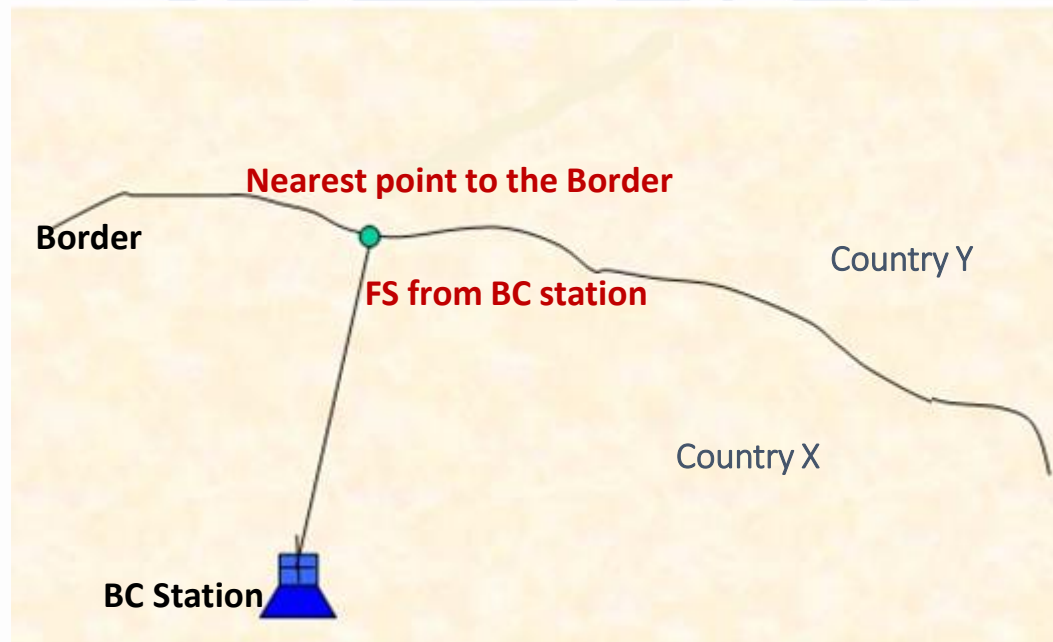
Effective radiated power		Effective antenna height (m)							
		10	37.5	75	150	300	600	1200	1800
dBW	W	Coordination distances (km)							
55	300k	520	520	530	540	560	600	630	670
50	100k	460	460	470	490	510	540	580	610
45	30k	410	410	420	430	450	480	520	560
40	10k	350	350	370	380	400	430	470	500
35	3k	300	300	310	330	340	380	420	450
30	1k	250	250	260	270	290	320	360	400
25	300	140	190	210	220	240	280	320	350
20	100	70	140	160	180	190	230	270	300
15	30	45	100	130	140	150	190	230	260
10	10	35	65	90	100	120	150	190	220
5	3	30	45	65	75	95	120	160	180
0	1	20	35	50	60	80	100	140	150

## *Agreement to proposed BC station*

- Coordination between administrations on the basis of a table of distances (Annex 4)
  
- Plan modification should normally be accepted by affected administration on the basis of the following technical criteria for the protected station:
  - a) Resulting  $E_u \leq 54$  dB( $\mu$ V/m) (sound)
  - b) Resulting  $E_u \leq 52$  dB( $\mu$ V/m) (television)
  - c) Resulting  $E_u$  increase  $\leq 0.5$  dB relative to reference  $E_u$  ( $E_{u-ref}$ ) if limit a) or b) is exceeded.

# Coordination with fixed & mobile services

- *Fixed & mobile services are considered as to be affected if field strength (FS) of BC at the nearest point on the boundary of another administration exceeds established limits*





# *Coordination with Fixed and Mobile services*

- **Fixed service** : 0 dB ( $\mu\text{V}/\text{m}$ )
- **Land mobile service**: limits depend on the polarization of the BC station.

In Region 3 (87.5-100 MHz) and Region 1 (104-108 MHz), FS is:

- 18 dB( $\mu\text{V}/\text{m}$ ) for FM with horizontal polarization:
- 0 dB( $\mu\text{V}/\text{m}$ ) for FM with vertical or mixed polarization:

# Coordination with ARNS in the band 108 - 117.975 MHz



Distance to the nearest  
point on  
the border < 500 km  
  
(Chapter 3 of Annex 4)



# *Quick Modification Procedure*

No agreement required if modifications involve:

- Less interference – lower ERP
- Distance to border  $\geq$  coordination limits
- Small change in site location
  - ✓ 15 km ERP  $\geq$  1kW
  - ✓ 5 km  $<$  1kW

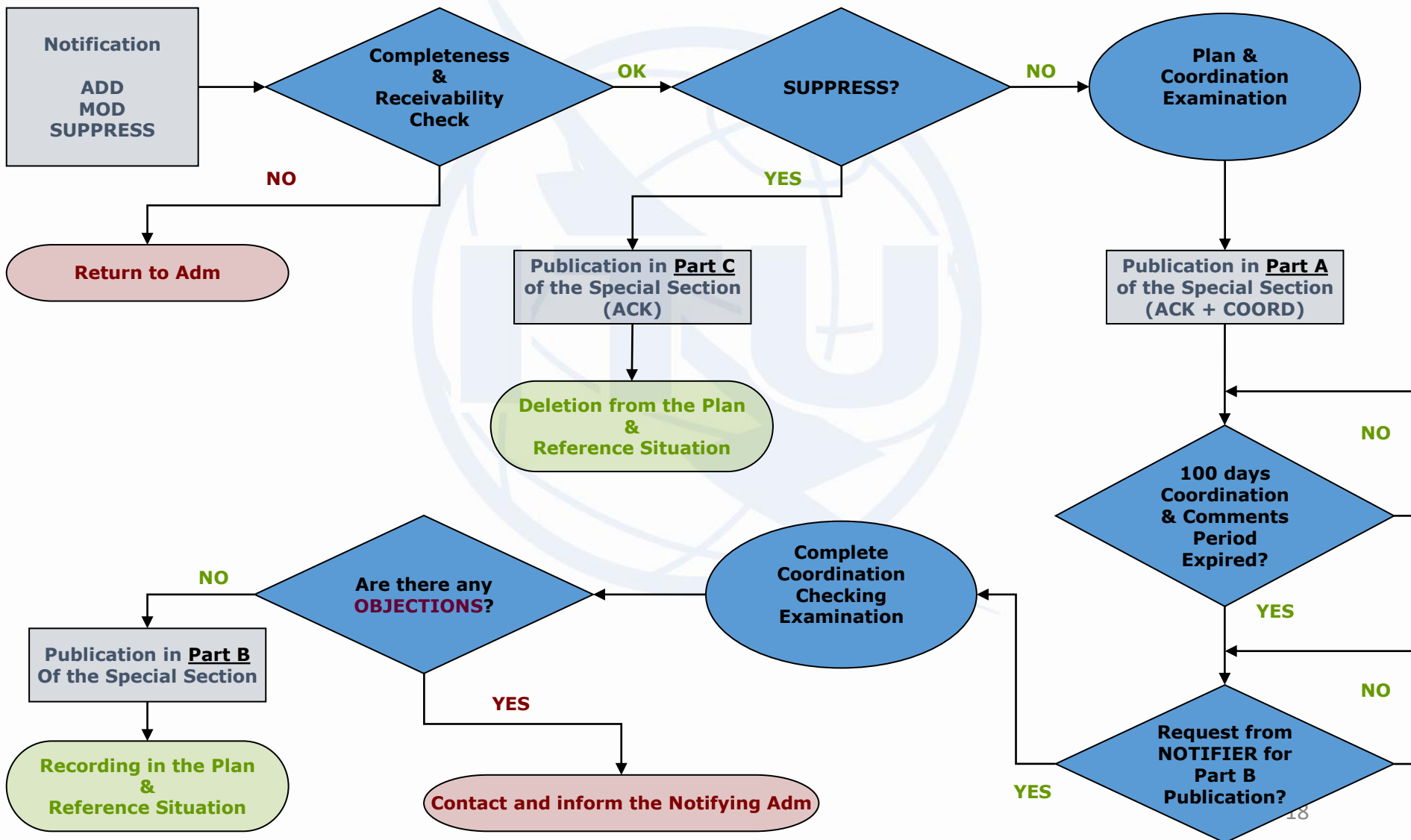
**provided that the change in topographical conditions does not increase the probability of interference caused to the stations of other countries.**

# Plan modification Procedure



- *Notification:*
  - T01 notice form for Addition or Modification to the Plan
  - TB5 notice for Suppression or Withdrawal
- *Coordination:*
  - No comment = AGREEMENT
- *Publication*
  - Must be requested for publication in Part B (TB3 notice)
  - Publication in Part B only if no objections
- *Important*
  - Pursuant to paragraphs 1.3 of Part A2 and 4.6.1 of Part A5 of the Rules of Procedure (RoP) the frequencies pending in coordination stage are deleted after 2 years and 100 days

# Plan modification Procedure





# Resolution 4 of the Agreement



- For Non-Contracting Members outside the planning area having aeronautical radionavigation services (108 - 117.975 MHz)
  - **Limit in Chapter 3 of Annex 4 applies.**
- Notifying administration has:
  - to consult with Adm of non-Contracting Member
  - to resolve any incompatibility, if reported by the non-Contracting Member.

# *Introduction of Digital Modulation according to the GE84 Agreement*

- **Provision 3.1 of Chapter 3 of Annex 2** provides, in addition to the 5 transmission systems defined as variants, the introduction of Digital Modulation on the conditions that this:
  - **does not cause higher interference and**
  - **does not require greater protection than the reference system mentioned in the Plan.**

# The Reference Situation

- Extract of the GE84 Agreement :
  - *“The **reference Eu** of an assignment to be protected is the FS which results from the Plan at the time this assignment was first recorded in the Plan. The reference situation is re-evaluated after each GE84 Special Section for the notices published in Part B when they are recorded into the Plan.”*
  - *If, following the introduction of new contributors in the Plan, the usable field strength of an assignment recorded in the Plan becomes higher than the Eu Ref, the Eu Ref calculated at the time an assignment is recorded in the Plan remains unchanged.*
  - *But “If, due to deletions or modifications, the usable field strength becomes lower, then this lower value becomes the new  $E_{u-ref}$ ”.*

# *The Reference Situation (cont'd)*

- The Eu calculations are performed at the transmitter site of the affected station.
- They are considering the 20 highest contributors RECORDED in the Plan.
- They are *not* considering the notices in process in the Plan and not yet RECORDED (TIP notices)
- No polarization discrimination is applied.

# The Reference Situation (cont'd)

- The details of the Eu and Eu Ref calculations (details of the top 20 contributors) are published in the BR IFIC. The updated reference situation is visible in the BR IFIC following a Part B publication.
- Example : Extract of Reference Situation following GE84 SS 293 published on BR IFIC 2933

Recorded assignment - ALG - GE84 - 084033157

Administrative Data	Emission Characteristics	Antenna Characteristics	Station and Site Inf
Assigned frequency	98.7 MHz		
Frequency stability	NORMAL		
Class of emission	F8EHF		
Bandwidth	300 kHz		
Effective radiated power e.r.p	Maximum 37.00000 dBW		
	Horizontal 37.00000 dBW		
Azimuth of maximum radiated power			
Maximum power density			
Usable field strength	75.89503 dB(μV/m) <a href="#">(View details)</a>		
Reference field strength	73.42163 dB(μV/m)		
Transmission system	4		





# The Reference Situation (details of the contributors)

Recorded assignment - ALG - GE84 - 084033157

Administrative Data | Emission Characteristics | Antenna Characteristics | Station and Site Information | Coordination Information | Finding Information | Publication History | Status Information | Remarks | Field Strength Details

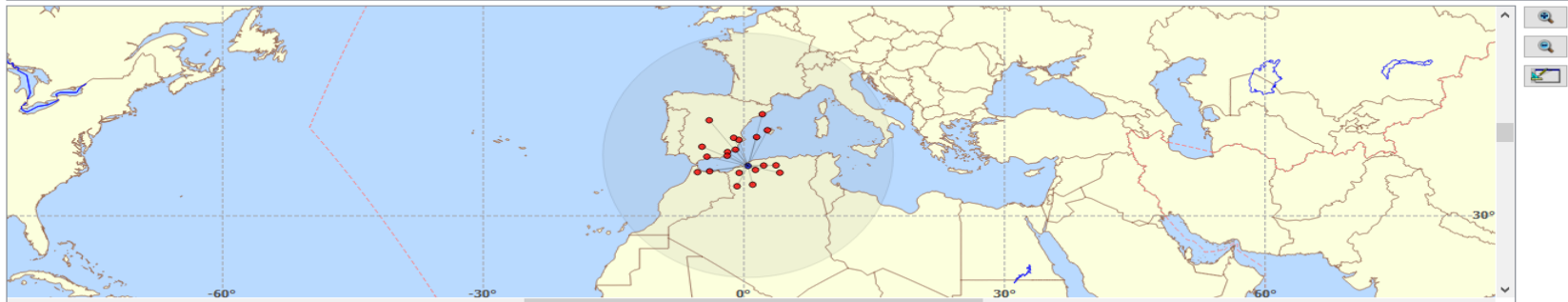
Date of entry into the GE84 Plan: 01/02/1993  
Site name: RELIZANE - Assigned frequency: 98.7 MHz  
Transmission system: 4  
Minimum reference field strength: 54 dB( $\mu$ V/m)

Recorded usable field strength: 75.89503 dB( $\mu$ V/m)  
Calculated usable field strength: 75.89503 dB( $\mu$ V/m)  
Recorded reference usable field strength: 73.42163 dB( $\mu$ V/m)

Print

Top contributors to the usable field strength (eu) calculation

	Adm	Fragment	Assign ID	Date of entry	Assigned Frequency	Site Name	Interference [dB( $\mu$ V/m)]
1	E	GE84	084009283	18/09/1990	98.7 MHz	TIBIDABO	64.182
2	E	GE84	084009647	07/12/1984	98.7 MHz	VELEZ MALAGA	61.412
3	E	GE84	115134559	21/03/2017	98.7 MHz	CUEVAS ALMANZORA	60.871
4	E	GE84	112107116	13/10/2020	98.7 MHz	EIVISSA	59.574
5	E	GE84	084009567	07/12/1984	98.7 MHz	ALCOY	57.637
6	ALG	GE84	084033722	08/10/1991	98.6 MHz	EL BAYADH	52.846
7	MRC	GE84	084004602	07/12/1984	98.6 MHz	PALOMAS	52.736
8	E	GE84	110117858	17/04/2012	98.8 MHz	CARTAGENA	52.287
9	E	GE84	084009029	17/04/2012	98.8 MHz	PALMA DE MALLORCA	50.113
10	ALG	GE84	084033739	01/02/1993	98.8 MHz	HAFID	49.829
11	ALG	GE84	084100704	07/12/1984	98.6 MHz	TENIRA	48.855
12	ALG	GE84	084100380	07/12/1984	98.8 MHz	BORDJ EMIR ABDELKADE	47.158
13	ALG	GE84	112062388	18/08/2020	98.6 MHz	DJ ZERGA	46.418
14	E	GE84	093003225	02/12/1994	98.6 MHz	MESA ROLDAN	46.164
15	ALG	GE84	084033367	08/10/1991	99 MHz	TIARET	45.876
16	E	GE84	084009284	07/12/1984	98.6 MHz	CORDOBA	45.475
17	E	GE84	084105860	07/12/1984	98.6 MHz	ALMANSA	43.623
18	MRC	GE84	084004452	07/12/1984	98.8 MHz	CHEFCHAOUEN	43.325
19	E	GE84	084009285	18/09/1990	98.8 MHz	NAVACERRADA	43.262
20	ALG	GE84	084033341	01/02/1993	98.8 MHz	SIDI AISSA	42.971



59°46'22" E - 21°20'37" N - sea

The IDWM - Mercator map projection

# The Reference Situation (details of the contributors)

**New contributor** →

	Adm	Fragment	Assgn ID	Date of entry	Assigned Frequency	Site Name	Interference [dB(μV/m)]
1	E	GE84	084009283	18/09/1990	98.7 MHz	TIBIDABO	64.182
2	E	GE84	084009647	07/12/1984	98.7 MHz	VELEZ MALAGA	61.412
3	E	GE84	115134559	21/03/2017	98.7 MHz	CUEVAS ALMANZORA	60.871
4	E	GE84	112107116	13/10/2020	98.7 MHz	EIVISSA	59.574
5	E	GE84	084009567	07/12/1984	98.7 MHz	ALCOY	57.637
6	ALG	GE84	084033722	08/10/1991	98.6 MHz	EL BAYADH	52.846
7	MRC	GE84	084004602	07/12/1984	98.6 MHz	PALOMAS	52.736
8	E	GE84	110117858	17/04/2012	98.8 MHz	CARTAGENA	52.287
9	E	GE84	084009029	17/04/2012	98.8 MHz	PALMA DE MALLORCA	50.113
10	ALG	GE84	084033739	01/02/1993	98.8 MHz	HAFID	49.829
11	ALG	GE84	084100704	07/12/1984	98.6 MHz	TENIRA	48.855
12	ALG	GE84	084100380	07/12/1984	98.8 MHz	BORDJ EMIR ABDELKADE	47.158
13	ALG	GE84	112062388	18/08/2020	98.6 MHz	DJ ZERGA	46.418
14	E	GE84	093003225	02/12/1994	98.6 MHz	MESA ROLDAN	46.164
15	ALG	GE84	084033367	08/10/1991	99 MHz	TIARET	45.876
16	E	GE84	084009284	07/12/1984	98.6 MHz	CORDOBA	45.475
17	E	GE84	084105860	07/12/1984	98.6 MHz	ALMANSA	43.623
18	MRC	GE84	084004452	07/12/1984	98.8 MHz	CHEFCHAOUEN	43.325
19	E	GE84	084009285	18/09/1990	98.8 MHz	NAVACERRADA	43.262
20	ALG	GE84	084033341	01/02/1993	98.8 MHz	SIDI AISSA	42.971



# *Notification to the Master Register (Article 7 of GE84 Agreement)*

When an administration proposes to bring into use an assignment, it shall notify its characteristics to the BR in accordance with the provisions of Article 11 of the Radio Regulations.



## *Notification to the Master Register (Article 7 of GE84 Agreement)*

When the assignment brought into use conforms to the technical characteristics described for this assignment in the Plan, it is then recorded in the Master International Frequency Register (commonly called the **MIFR**).

## *Assistance from BR (4.3.13)*

Administration may request BR assistance in:

- ❖ Seeking agreement from another ADM
- ❖ Applying of the Article 4 procedure at any stage
- ❖ Carrying out technical studies in relation to this procedure
- ❖ GE84 compatibility analysis and GE84 Optimization available on eTools at  
<https://www.itu.int/ITU-R/eTerrestrial/eBroadcasting>

*Thank you for your attention!*

*Questions?*

*[brbcd@itu.int](mailto:brbcd@itu.int)*