

FM Broadcasting compatibility analysis tool based on Article 4 of the GE84 Agreement

1. Introduction:

The **GE84 compatibility analysis tool** is designed to assist administrations in 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.

The summary of the GE84 procedure on article 4 and the relevant flowchart are available on: <http://www.itu.int/en/ITU-R/terrestrial/broadcast/Pages/FMTV.aspx>

This new functionality, which can be accessed via a TIES user account, is part of **eBroadcasting** and can be found under **eTools** at: <https://www.itu.int/ITU-R/eTerrestrial/ECalculations>

The software is running field strength calculations at the transmitter site of the proposed modification with respect to other assignments in the GE84 Plan (recorded assignments and, possibly, proposed modifications), in the frequency band 87.5-108 MHz. The examination is also considering the ST61 Plan entries recorded in the frequency band 87.5-100 MHz.

An additional GE84 functionality will be delivered at a later stage a
to allow users to perform a detailed analysis on frequency assignments published in Part A of
a specific GE84 Special Section to assess their impact on your own frequency assignments.

2. Modules:

2.1. Compatibility analysis

2.1.1. Purpose

Assess the impact to and from other emissions of a new or existing FM service, in accordance with Article 4 procedure of the Agreement. The values are calculated by the method contained in Annex 2, Chapter 4, at the transmitter site of the stations which are likely to be affected.

2.1.2. Options:

- Consider only the 20 Top major contributors:

It is set by default, based on provision §6.2 of Chapter 6 of Annex 2 to of the GE84 Agreement for calculation of the usable field strength (Eu) of your proposed modification. If this option is disregarded, all the contributors are considered.

- Consider Tip:

By default, the ongoing modifications to the GE84 Plan (TIP notices) are not considered. Only the assignments recorded in the GE84 Plan are considered, in accordance with Article 4 procedure for determining the reference usable field strength of an assignment to be protected, published on the BRIFIC as part of the Reference Situation.

If this option is considered, TIP notices are considered in the calculations.

- Consider TV station:

By default, the television stations recorded in the ST61 Plan, are considered in the calculations.

If this option is not considered, only FM stations are considered.

- Consider Polarization discrimination:

By default, a polarization discrimination of 10 dB is considered in the calculations, in accordance with §3.8.3 of Chapter 3 of Annex 2 to the GE84 Agreement. This value can be changed.

If this option is not considered, no polarization discrimination shall be applied.

- Use P.1812 propagation model:

If this option is selected, the detailed calculations will be performed using the propagation model described in Recommendation ITU-R P.1812 taking into account SRTM3 terrain data. Please note that, for this mode, the calculation time is significantly longer. For that reason, the tool accepts a file with a maximum of **50 notices**.

2.1.3 Input:

Electronic Notice File (one file per job). The electronic notice file can be created using **TerRaNotices** from the BRIFIC DVD or, if you are an **eBroadcasting** user, you can generate it from **myAdmin** or **eQry** as follows:

eQry: define the selection criteria (one administration only), push the button *Apply Filter* to display the summary list and the selected notices appear or,

myAdmin: click on the number of notices corresponding to the group of notices of interest. When the summary list appears, it is possible to further refine the selection criteria by ticking the checkbox Use Filter.

Push the button Generate e-notices (Export to SGML).

When the notice file is ready, an email is sent to the TIES user mailbox and the output notice file is available for download from eTools (Notice Generation option).

Important: It is highly recommended to previously validate the file using the web-based on-line validation tool available at:

<https://www.itu.int/ITU-R/eTerrestrial> or
<https://www.itu.int/ITU-R/eTerrestrial/eValidation>

2.1.4 Output:

Interference field strength to and from your proposed modification(s) to other stations (identified as contributors) and resulting usable field strength at transmitter site.

2.2 Analysis of Plan entries based on query filter (without generating electronic notices).

will be proposed at a later stage

3. How to use GE84 compatibility analysis:

3.1. Electronic notice preparation

Prepare and validate your notice file as mentioned in section 2.1.3 above and save the file on your computer.

Note: *If your file contains a frequency assignment (frequency & coordinates) already RECORDED in the Plan, make sure that you are submitting a "MODIFY" notice targeting the RECORDED entry if you do not want it to be considered twice in the calculations.*

3.2. Start the compatibility analysis

1. Login to <https://www.itu.int/ITU-R/eTerrestrial/ECalculations> (TIES account needed).
2. Push the button **New Calculation**.
3. Select the **GE84 Compatibility Analyses** option.
4. Submit the electronic notice file to **eTools** for GE84 Compatibility Analyses by uploading the notice file prepared for the GE84 Compatibility Analyses.
5. Push the button **New Calculation**, check the options in the configuration information.
6. Upload the electronic notice file and submit it (**Submit** button).

Note: You will be notified at your TIES email account when the job is complete. You can also monitor the status of your submission by going back to the calculation history.

Please select the calculation type

GE84 ▼ **GE84 Compatibility Analyses** ▼ **Beta Release**

[Back to calculation history](#)

Please label your submission

test

Configuration Information

Top 20 only
 Consider Tip
 TV also
 Polarization Discrimination (dB)
 Use P.1812 propagation model

Provision 6.2 of Chapter 6 of Annex 2 to the GE84 Agreement

TV stations recorded in the ST61 Plan are considered

10 dB discrimination is applied for orthogonal polarization.

Calculations will be performed in accordance with the P.1812 propagation prediction method. The option is disabled by default

Eu calculation of the wanted assignment considers not only the recorded assignments but also the ongoing plan modifications already published in Part A. The option is disabled by default

4. Analysis of the Compatibility Results

Description of calculation results made in conformity with 4.3.7.1/4.3.7.2 of the Regional Agreement, Geneva 1984

1. General Results:

☑ Test Packages 27216: click to show all

Job summary [Delete](#) [Share](#)

job id	job name	job status
27216	test	Success

Job Input

Adm	E-notice file	Number of Notices
F	E_Add_amends_MOD.txt	1

Configuration Information

Top 20 only Consider Tip TV also Polarization Discrimination (dB) Trigger NFS from proposed mo

Job Output

Input notice file validated by the [OnlineValidation process](#) on 16/06/2016 14:05:48

Proposed Modification	Administrations with which the limits of 4.3.7.1/4.3.7.2 are exceeded	Eu (dB (μV/m))
105.3MHz_SAINTE BEAULIEU	E F G	118.734

Select the proposed modification

105.3MHz_SAINTE BEAULIEU

List of proposed modifications submitted in the file (frequency _ station name)

List of administrations with potentially affected stations according to 4.3.7.1/2. This is not the list of administrations identified under 4.2 of Article 4 of the Agreement.

Minimum value of the field strength necessary to permit a desired reception. Eu calculated by the simplified multiplication method, considering the interfering stations listed in "interferers".

2. Interference to other emissions: "affected"

Proposed Modification	Administrations with which the limits of 4.3.7.1/4.3.7.2 are exceeded	Eu (dB(μV/m))
102.2MHz_SOROCA CRT_028°16'32"E-48°09'13"N-Id:1	MDA ROU UKR	75.62

Select the proposed modification

102.2MHz_SOROCA CRT_028°16'32"E-48°09'13"N-Id:1

GE84 Compatibility Analyses Description

Result **Affected** Interferers

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)
109103682	MDA	RECORDED BC		102.1	V	BALTI 0	51	0	0	0	26.5	214	33	62.43	90.82	83.05	83.05	0
114002081	UKR	RECORDED BC		102.3	V	NOVODNISTROVSK	77	0	0	0	26.5	308	25	58.79	84.81	92.03	92.03	0
101006476	ROU	RECORDED BC		102.2	V	SUCEAVA	160	0	0	0	26.5	251	37	57.19	89.93	80.63	80.63	0
084008472	UKR	RECORDED BC		102.2	V	NOVOUKRAINKA	240	0	0	0	26.5	85	37	52.19	76.76	75.25	75.25	0
103002724	UKR	RECORDED BC		102.2	V	ZHYTOMYR	237	0	0	0	24	7	37	49.35	77.14	78.21	78.21	0
107105387	UKR	RECORDED BC		102.1	V	FRUNZIVKA	143	0	0	0	26.5	129	25	49.27	81.32	80.45	80.45	0
084007366	ROU	RECORDED BC		102.2	H	PASCANI	154	0	0	0	26.5	229	37	48.23	90.31	90.32	90.32	0
102003733	UKR	RECORDED BC		102.2	V	ODESA	266	0	0	0	26.5	135	37	48.17	89.97	83.03	83.03	0
102001271	UKR	RECORDED BC		102.1	V	UMAN 0	158	0	0	0	26.5	65	25	48.02	69.57	83.68	83.68	0

The documentation is available and easy to access from the portal.

Distance site to site & information concerning the various paths

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

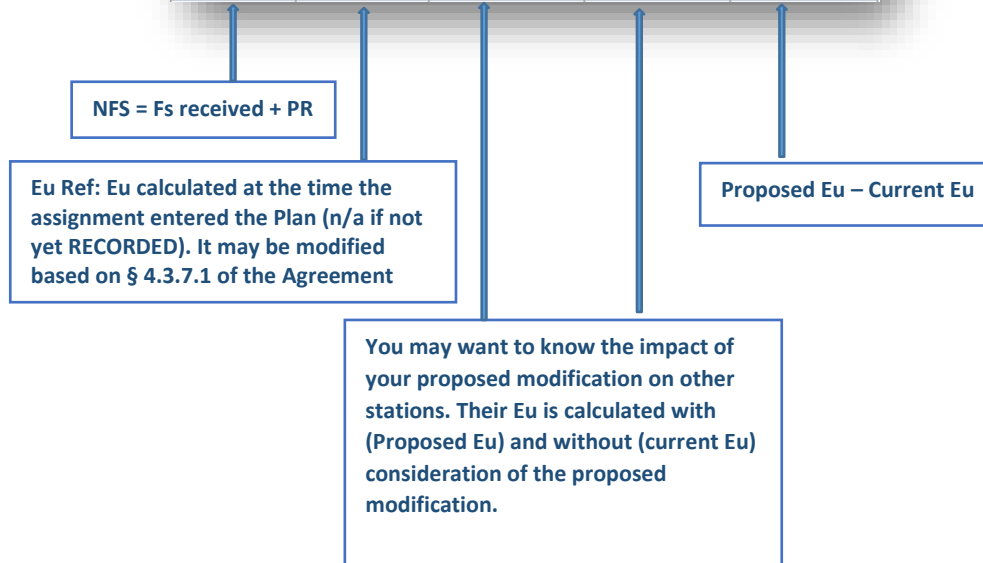
For co-sites, a minimum distance of 1 km is considered. Sea paths are not displayed for P.1812 calculations

ERP at pertinent azimuth

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

- Frequency spacing
- Transmission System
- Steady/tropospheric interference

NFS (dB (μV/m))	EU Ref (dB (μV/m))	Proposed EU (dB (μV/m))	Current EU (dB (μV/m))	EU increase (dB (μV/m))
66.74	85.488	86.031	85.569	0.462
63.995	85.29	85.758	85.476	0.282
61.921	96.353	96.369	96.353	0.016
61.538	79.694	80.883	80.489	0.394
60.74	86.838	87.364	87.27	0.094
60.664	97.625	98.441	98.435	0.006
60.2	88.597	89.331	89.268	0.063
59.935	102.53	102.537	102.534	0.003



Note:

The line is red:

- When the resulting “Proposed Eu”, taking into consideration the proposed modification, is greater than 54 dB(μV/m), for protection of FM stations and 52 dB(μV/m), for protection of TV stations,
- and,
- the same proposed Eu is increased by more than 0.5 dB compared with the reference usable field strength, as described in §4.3.7.1 and 4.3.7.2 of the Agreement.

These limits are also applied to identify the potentially affected administrations.

Eu Ref calculations are:

- Considering only the recorded assignments.
- Not considering polarization discrimination.
- Considering ST61 TV stations, if present.

Current and Proposed Eu calculations:

- Their calculation depends on the filters chosen. If polarization discrimination or notices in process are considered, the values of Eu may be lower than the Eu Ref. The results will not be in line with the Article 4 calculations published on the BRIFIC. However, they are very useful during the planning and coordination process.

If the proposed modification is a MODIFY notice, its target is considered in the evaluation of the current Eu. It is replaced by the MODIFY notice for the evaluation of the proposed Eu.

3. Interference from other emissions: list of interferers (only 20 if top 20 contributors selected in the configuration)

102.2MHz_SOROCA CRT_028°16'32"E-48°09'13"N-Id:1

84 Compatibility Analyses Description

Result Affected Interferers

Export to Excel Search:

Design 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))
14038621	MDA	RECORDED	BC	102.3	H	KISHINEV	136	0	0	0	43	341	25	61.35
14036227	ROU	RECORDED	BC	102.2	H	PLOIESTI	370	0	0	0	50	34	37	60.74
14038472	UKR	RECORDED	BC	102.2	V	NOVOUKRAINKA	240	0	0	0	34.5	267	37	59.04
14038560	UKR	RECORDED	BC	102.1	V	KHMELNYTSKYI	172	0	0	0	38	146	25	58.82
12003733	UKR	RECORDED	BC	102.2	V	ODESA	266	0	0	0	34	316	37	56.6
13002724	UKR	RECORDED	BC	102.2	V	ZHYTOMYR	237	0	0	0	32.5	187	37	56.48
14012081	UKR	RECORDED	BC	102.3	V	NOVODNISTROVSK	77	0	0	0	17	128	33	54.38
19103682	MDA	RECORDED	BC	102.1	V	BALTI 0	51	0	0	0	12.7	34	33	53.9
14037366	ROU	RECORDED	BC	102.2	H	PASCANI	154	0	0	0	27	48	37	53.06
12185730	UKR	RECORDED	BC	102.2	V	ANTOPIL	303	0	0	0	32.5	153	37	52.93
14036070	ROU	RECORDED	BC	102.1	H	DARABANI	123	0	0	0	33	92	25	49.42
14038458	UKR	RECORDED	BC	102.1	V	MYKOLAIV	307	0	0	0	41	297	25	47.99
14038490	UKR	RECORDED	BC	102.3	V	POLONNE	224	0	0	0	34	166	25	47.82

Distance site to site & information concerning the various paths

ERP at pertinent azimuth

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

- Frequency spacing
- Transmission System
- Steady/tropospheric interference

Field Strength of the interfering transmitter (at pertinent erp) modified by pertinent protection ratio