

Terrestrial Services Department

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 **eBCD2.0** and can be found under **eTools** at: <http://www.itu.int/ITU-R/eBCD/MemberPages/eCalculations.aspx>.

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.

The GE84 functionalities are under development and will be delivered in a phased approach. They can be performed in the following context:

- 1) When coordinating with affected administrations you may want to perform a more precise examination in order to identify the potentially affected stations and the administrations with which you need to seek agreement. You can then start coordination activities in order to obtain all the necessary agreements before officially notifying the notices to the BR via WISFAT, streamlining the overall process and reducing the time needed for recording them into the Plan.
- 2) To perform a detailed analysis on frequency assignments published in Part A of the GE84 Special Section in order to assess their impact on your own frequency assignments. This functionality is under development.
- 3) To identify, in your planning process, available frequencies for new sound broadcasting services. This functionality is under development.

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 on the basis of 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 taken into account.

- 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 taken into account, 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 taken into account in the calculations.

- Consider TV station

By default, the television stations recorded in the ST61 Plan, are taken into account 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.

- Trigger nuisance field strength (NFS) from proposed modification for Eu calculation

To limit Eu calculations for affected stations to assess the impact of the proposed modification on the Eu or other emissions, you can set a limit value for the nuisance field generated by the proposed modification. If NFS is lower than this value, the Eu of the affected site is not recalculated.

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 eBCD2.0 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 *TerRaNotices* or *TerRaNV* software tools, available on the BR IFIC DVD, or the web-based on-line validation tool available at:

<http://www.itu.int/ITU-R/terrestrial/OnlineValidation/MemberPages/OnlineValidation.aspx>

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 Search for available frequencies

Under development

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

Under development

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 <http://www.itu.int/ITU-R/eBCD/MemberPages/eCalculations.aspx> (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.

[Tools Disclaimer](#) [Tools Documentations](#)
The processing system is currently **ONLINE** (28 processes available)

Please select the calculation type

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

[Back to calculation history](#)

Please label your submission:

Configuration Information

Top 20 only Consider Tip TV also Polarization Discrimination (dB) Trigger NFS from proposed modification for EU calculations (dB (μV/m))

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

As a low-NFS does not have a big impact on the Eu-calculations, reasonably limited trigger-NFS will increase the effectiveness of the analysis results

Eu-calculation of the wanted assignment considers not only the recorded assignments but also the ongoing plan modifications already published in Part A

Section Break (Next Page)

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

4.1 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 | F 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

105.3 MHz_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 "interference from".

4.2 Interference to other emissions

Configuration Information
 Top 20 only Consider Top TV also Polarization Discrimination [dB] Trigger NFS from proposed modification for EU calculations [dB (µV/m)]

Job Output
 Input notice file validated by the OnlineValidation process on 12/10/2018 14:27:41

| Proposed Modification | Administrations with which the limits of 4.3.7.1/4.3.7.2 are exceeded | Eu (dB(µV/m)) |
|-----------------------|---|---------------|
| 103.4MHz_PAINBLANC | D BEL I F LLUX SUI | 91.289 |

Select the proposed modification
 103.4MHz_PAINBLANC

Export Results to Excel

GE84 Compatibility Analysis Description

| Assign ID | Adm | Intent | Stn Cls | Assigned Frequency (MHz) | Polar | Site Name | Total Distance (km) | 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 (µV/m)) |
|-----------|------|--------|-------------|--------------------------|-------|---------------------------|---------------------|--------------------|--------------------|------------------------------|-----------|---------------|-----------------------|-----------------|--------------------|-------------------------|------------------------|-------------------------|
| 0960 | 635 | F | RECORDED BC | 103.5 | V | TONNERRE 2 | 93 | 0 | 0 | 0 | 34 | 327 | 25 | 66.74 | 85.488 | 86.031 | 85.569 | 0.462 |
| 0960 | 634 | F | RECORDED BC | 103.5 | H | AUXERRE VENOV | 107 | 0 | 0 | 0 | 34 | 314 | 25 | 63.995 | 85.29 | 85.758 | 85.476 | 0.282 |
| 1120 | 867 | F | RECORDED BC | 103.4 | V | MESOU LA DEMISE | 123 | 0 | 0 | 0 | 25.8 | 66 | 37 | 61.921 | 96.353 | 96.369 | 96.353 | 0.016 |
| 0840 | 5315 | F | RECORDED BC | 103.4 | H | REIMS HAUTVILL | 222 | 0 | 0 | 0 | 34 | 346 | 37 | 61.538 | 79.694 | 80.883 | 80.489 | 0.394 |
| 0970 | 806 | F | RECORDED BC | 103.3 | V | VENDEURIE SUR BARSE | 122 | 0 | 0 | 0 | 33.7 | 353 | 25 | 60.74 | 86.838 | 87.364 | 87.27 | 0.094 |
| 0840 | 3230 | SUI | RECORDED BC | 103.4 | H | CHAUX DE FONDS | 167 | 0 | 0 | 0 | 29.1 | 91 | 37 | 60.664 | 97.625 | 98.441 | 98.435 | 0.006 |
| 0840 | 3047 | F | RECORDED BC | 103.4 | H | ETREBOY | 237 | 0 | 0 | 0 | 34 | 310 | 37 | 60.2 | 88.597 | 89.331 | 89.268 | 0.063 |
| 1080 | 3363 | F | RECORDED BC | 103.4 | V | STE MENHOULD | 217 | 0 | 0 | 0 | 32.6 | 4 | 37 | 59.935 | 102.53 | 102.537 | 102.534 | 0.003 |
| 0840 | 3169 | F | RECORDED BC | 103.4 | H | PONTOISE | 286 | 0 | 0 | 0 | 34 | 319 | 37 | 55.412 | 91.607 | 92.046 | 92.04 | 0.006 |
| 0840 | 3300 | SUI | RECORDED BC | 103.4 | V | DELEMONT MEXIQUE | 205 | 0 | 0 | 0 | 27.4 | 82 | 37 | 54.472 | 99.91 | 99.927 | 99.927 | 0 |
| 1100 | 488 | F | RECORDED BC | 103.4 | V | S DIE FOURCHARUPT | 212 | 0 | 0 | 0 | 27 | 53 | 37 | 54.27 | 106.721 | 106.73 | 106.73 | 0 |
| 0840 | 3295 | F | RECORDED BC | 103.4 | H | LYON MT PILAT | 196 | 0 | 0 | 0 | 24.6 | 181 | 37 | 53.672 | 75.416 | 77.906 | 77.8 | 0.106 |
| 0840 | 3426 | F | RECORDED BC | 103.4 | V | CHARLEVILLE MEZIERES SURY | 291 | 0 | 0 | 0 | 33.1 | 359 | 37 | 53.261 | 95.71 | 95.724 | 95.723 | 0.001 |
| 0840 | 3722 | F | RECORDED BC | 103.7 | H | NUITS SOEGORGES | 19 | 0 | 0 | 0 | 29.5 | 95 | -7 | 52 | 81.071 | 82.953 | 82.953 | 0 |

This 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
- Superrefractivity path

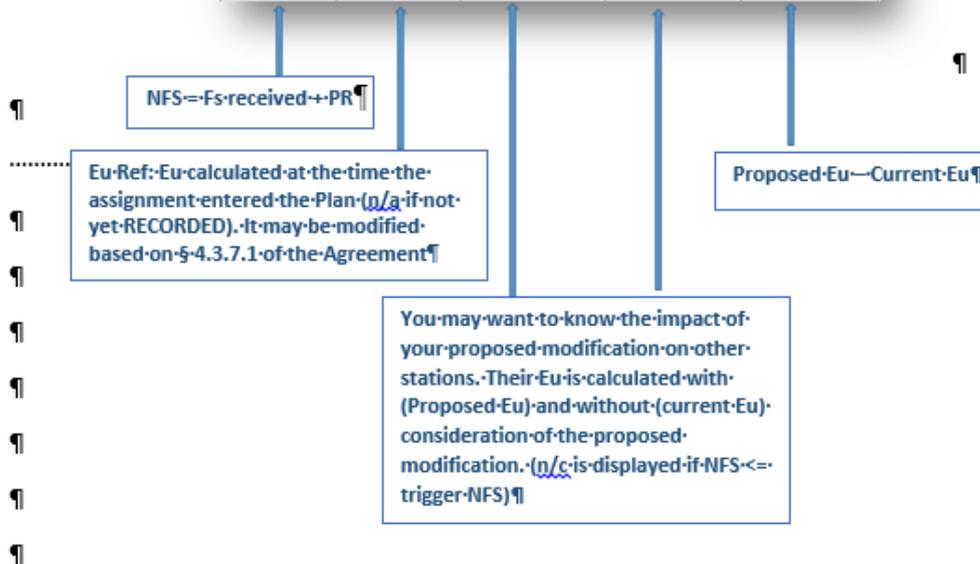
For co-sites, a minimum distance of 1 km is considered.

ERP at pertinent azimuth - 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:

- If the NFS \geq 54 dB(μV/m), for protection of FM stations and (52 dB(μV/m), for protection of TV stations, or
- If the resulting Eu, taking into consideration the proposed modification –“Eu with wanted”, is increased by more than 0.5 dB Eu Ref by 0.5 dB compared with the reference usable field

Eu Ref calculations are:

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

Current and Proposed Eu calculated:

- 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.

4.3 Interference from other emissions (only 20 if top 20 contributors selected in the configuration)

| Assign ID | Adm | Intent | Stn Cls | Assigned Frequency (MHz) | Polar | Site Name | Total Distance (km) | Cold Sea Path (km) | Warm Sea Path (km) | Super refractivity Path (km) | ERP (dBW) | Azimuth (deg) | Protection Ratio (dB) | NFS (dB (μV/m)) |
|-----------|-----|----------|---------|--------------------------|-------|----------------------------|---------------------|--------------------|--------------------|------------------------------|-----------|---------------|-----------------------|-----------------|
| 084021689 | F | RECORDED | BC | 93,5 | H | CHAMBERY | 38 | 0 | 0 | 0 | 33 | 56 | 33 | 98,171 |
| 084021746 | F | RECORDED | BC | 93,7 | V | POINTE DE LA MASSE | 65 | 0 | 0 | 0 | 24 | 339 | 33 | 83,423 |
| 084003629 | SUI | RECORDED | BC | 93,6 | H | NIEDERHORN | 153 | 0 | 0 | 0 | 45,2 | 231 | 37 | 79,44 |
| 084022325 | F | RECORDED | BC | 93,6 | V | VALENCE | 147 | 0 | 0 | 0 | 30 | 49 | 37 | 71,303 |
| 084022556 | F | RECORDED | BC | 93,7 | V | GRENOBLE 3 | 89 | 0 | 0 | 0 | 30 | 30 | 33 | 66,201 |
| 084105946 | F | RECORDED | BC | 93,8 | V | ANNEMASSE CROZET | 53 | 0 | 0 | 0 | 26,6 | 160 | 7 | 65,748 |
| 112025605 | F | RECORDED | BC | 93,6 | V | BOURG S MAURICE LA ROSIERE | 54 | 0 | 0 | 0 | 20 | 296 | 37 | 60,484 |
| 084020728 | F | RECORDED | BC | 93,7 | H | NUITS SGEORGES | 175 | 0 | 0 | 0 | 47 | 145 | 25 | 59,579 |
| 094004522 | F | RECORDED | BC | 93,7 | V | LYON 2 | 109 | 0 | 0 | 0 | 30 | 85 | 25 | 59,025 |
| 084010941 | I | RECORDED | BC | 93,6 | M | RIVALTA | 135 | 0 | 0 | 0 | 27,8 | 312 | 37 | 55,05 |
| 084013048 | I | RECORDED | BC | 93,5 | H | SESTRIERE | 108 | 0 | 0 | 0 | 20,6 | 332 | 33 | 54,911 |
| 084013383 | I | RECORDED | BC | 93,7 | M | MILANO | 232 | 0 | 0 | 0 | 41,8 | 281 | 25 | 54,383 |

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