



International Telecommunication Union



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RADIOCOMMUNICATION
SEMINAR FOR AFRICA

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Organised by:



GE84 Compatibility Analysis on eTools

Bangaly Fodé TRAORE
BR/TSD/BCD



GE84 Compatibility Analysis on eTools

Goal

- 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

Results

- **FS calculations at the transmitter site** of the proposed modification wrt other assignments in the GE84 Plan (recorded assignments and, possibly, proposed modifications)

Analysis of the Results

- Assess the **impact to and from other emissions** of a new or existing FM service, using method in Annex 2 of Chapter 4.



Some definitions

- ***Usable field strength (E_u)***
 - **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).
- ***Nuisance field***
 - The field strength of the interfering transmitter (at its pertinent e.r.p.) modified by the relevant protection ratio.



GE84 Compatibility Analysis on eTools

- Replacing GE84PLN software
- Additional services:
 - Consideration of **ST61 TV stations** recorded in the ST61 Plan (87.5-100 MHz).
 - *Adms having ST61 entries: BLR, BUL, LTU, LVA, MDA, POL, ROU, RUS, SVK, UKR*
 - **Fixed, Mobile, ARNS** not considered
- Ease of use. You need:
 - ✓ *an Internet connection*
 - ✓ *A TIES account*
 - ✓ *An input notice file (BR SGML format – T01 notice)*
- Available at: <http://www.itu.int/ITU-R/eBCD/MemberPages/eCalculations.aspx>



GE84 Compatibility Analysis Initial stage

eTools

[eBCD statistics](#) Calculations on-demand

eCalculations Utility

SRTM3

[eTools Disclaimer](#)

[eTools Documentations](#)

The processing system is currently **ONLINE** (28 processes available)

Please select the calculation:

eTools Documentations

GE84

[WRS2012 presentation](#)

[eTools How To: Privacy and Job Sharing](#)

New Calculation

Calculations for testing and coordination purposes

Refresh

[GE06D Article 4 Plan modification \(Coordination and Conformity Examination\)](#)

[GE06A Coordination Examination](#)

[GE06D Compatibility Analyses](#)

[GE06D Compatibility Analyses for the ATU replanning](#)

[Propagation predictions using Rec. ITU-R P1812](#)

[RJ81 calculations](#)

[RJ81 Article 4 Plan modification: results description](#)

[GE84 Compatibility Analyses](#)

Jobs History for user: deg

Test Packages: click

Job Id	Job Name	Status	Category
31447	URR...		
31454	SUI_Reduc		
31419	test	Success	GE84_compat
31417	test	Success	GE84_compat
30869	tcd	Success	GE84_compat

▼

Beta Release

Date of Request	Date of Completion	Elapsed
30/11/2016 11:02:44	30/11/2016 11:09:38	7
30/11/2016 11:46:53	30/11/2016 11:50:33	4
29/11/2016 17:21:48	29/11/2016 17:33:13	11
29/11/2016 17:20:45	29/11/2016 17:29:34	9
09/11/2016 14:45:40	09/11/2016 14:46:24	1



GE84 Compatibility Analysis Options

➤ Label your submission

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))

- Consider only the top 20 contributors (or all the contributors)
- Consider only RECORDED assignments or also notices already published
- Consider TV stations recorded in the ST61 Plan (concerns RCC countries)
- Consider Polarization discrimination
- NFS value from proposed modification. If the NFS is lower, the Eu of the affected is not calculated.



GE84 Compatibility Analysis

Exercise 1 – Notice Preparation

No	Software	Task
1	TerRaQ Plus	<ol style="list-style-type: none">1. Open TerRaQ “General Purpose Query (GPQ)”2. <u>Query settings</u>:<ol style="list-style-type: none">a. Select FM/TV, TIP and non-TIP3. <u>Administrative data</u>:<ol style="list-style-type: none">a. Select Fragment GE84b. Select the administration of SUIc. Select to include only the notifications received after 10/06/2015

The screenshot shows the 'Receipt Date(s)' tab in the TerRaQ interface. It includes a checkbox for 'Include only transactions received' which is checked. Below this is a date selection calendar for June 2015. The date 10 is selected, and the 'After' radio button is chosen. The calendar grid shows dates from 1 to 31, with the 10th highlighted in grey.

Jun, 2015						
M	T	W	T	F	S	S
25	26	27	28	29	30	31
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5



GE84 Compatibility Analysis

Exercise 1 – Notice Preparation

No	Software	Task
1	<i>TerRaQ Plus</i>	3. Click on “Execute”. The query should return 45 entries. 4. Select (tick check box) MENZINGEN EDLIBACH BETHLEHEM 88.8 MHz & KRIENS SONNENBERG 96.2 MHz 5. Click on <i>TerRaNotices</i> to generate the corresponding notices in SGML format

Query_1: 45 rows

Sorting by [Site Name - ASC]

List view | World map view | Spectrum occupancy

Check all Uncheck

	Identifier assigned by the BR	Fragment	Administration	Unique identifier given by the Administration	Receipt Date	Assigned Frequency	Geographic Coordinates	Intent	Geographic Area	Class of Station	Site Name
20	<input type="checkbox"/> 116176888	GE84	SUI	SUI16042901	07/09/2016	94.1 MHz	8°45'59"E - 47°15'00"N	MODIFY	SUI	BC	HOMBRECHTIKON ROSENWEG
21	<input type="checkbox"/> 112114379	GE84	SUI	SUI08060200	26/01/2016	92 MHz	8°14'04"E - 47°02'10"N	MODIFY	SUI	BC	KRIENS SCHUERHOF
22	<input type="checkbox"/> 084003569	GE84	SUI	SUI15091400	17/12/2015	93.4 MHz	8°14'04"E - 47°02'10"N	RECORDED	SUI	BC	KRIENS SCHUERHOF
23	<input checked="" type="checkbox"/> 116122774	GE84	SUI	SUI16042902	23/06/2016	96.2 MHz	8°16'21"E - 47°02'40"N	MODIFY	SUI	BC	KRIENS SONNENBERG
24	<input type="checkbox"/> 116122775	GE84	SUI	SUI16042904	23/06/2016	94.8 MHz	7°27'18"E - 47°10'44"N	ADD	SUI	BC	LEUZIGEN METTLE
25	<input type="checkbox"/> 116122776	GE84	SUI	SUI16042903	23/06/2016	87.8 MHz	7°27'18"E - 47°10'44"N	MODIFY	SUI	BC	LEUZIGEN METTLE
26	<input type="checkbox"/> 090002553	GE84	SUI	SUI15061100	10/09/2015	90.8 MHz	8°44'21"E - 46°13'02"N	RECORDED	SUI	BC	MAGGIA FORCOLA DI DUNZIO
27	<input type="checkbox"/> 090002562	GE84	SUI	SUI15061101	10/09/2015	92.8 MHz	8°44'21"E - 46°13'02"N	RECORDED	SUI	BC	MAGGIA FORCOLA DI DUNZIO
28	<input type="checkbox"/> 090002572	GE84	SUI	SUI15061102	10/09/2015	94.8 MHz	8°44'21"E - 46°13'02"N	RECORDED	SUI	BC	MAGGIA FORCOLA DI DUNZIO
29	<input type="checkbox"/> 116184621	GE84	SUI	SUI16070106	10/10/2016	99.2 MHz	9°30'56"E - 46°49'46"N	MODIFY	SUI	BC	MALIX BRAMBRUEESCH
30	<input checked="" type="checkbox"/> 116071281	GE84	SUI	SUI15122200	18/02/2016	88.8 MHz	8°34'08"E - 47°10'25"N	RECORDED	SUI	BC	MENZINGEN EDLIBACH BETHLEH



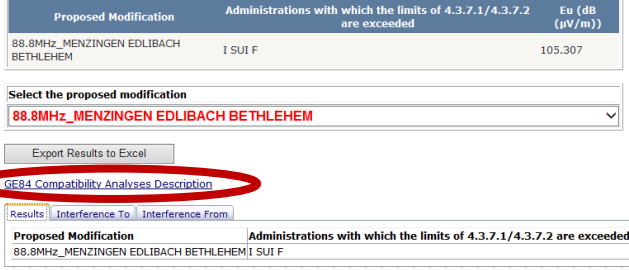
GE84 Compatibility Analysis

Exercise 1 – Notice Preparation

No	Software	Task
1	<i>TerRaNotices</i>	<p>5. <i>TerRaNotices</i> generates a MODIFY Notice from the MODIFY notice in the TIP (KRIENS SONNENBERG 96.2 MHz). When you submit it to the calculations, it will replace the TIP notice</p> <p>6. The RECORDED assignment is generated as in ADD notice. Change it to a MODIFY notice</p> <p><u><i>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.</i></u></p> <p>8. Save the file and close <i>TerRaNotices</i></p>



GE84 Compatibility Analysis Exercise 2 – Submit your file

No	Software	Task						
1	Web portal eTools	<p>1. Go to eTools at : http://www.itu.int/ITU-R/eBCD/MemberPages/eCalculations.aspx</p> <p>If you don't have any ties account : Username: user1 Password: user1</p> <p>2. Select GE84 compatibility analysis and New calculation</p> <p>3. Submit your file generated in TerRaNotices</p> <p>4. Pay attention to the job statuses (<i>PendingValidation, Validating, InProcess, Success or failed</i>)</p> <p>5. Analyze the results (for any help, consider the documentation)</p>  <p>The screenshot shows a table with the following data:</p> <table border="1"><thead><tr><th>Proposed Modification</th><th>Administrations with which the limits of 4.3.7.1/4.3.7.2 are exceeded</th><th>Eu (dB (µV/m))</th></tr></thead><tbody><tr><td>88.8MHz_MENZINGEN EDLIBACH BETHLEHEM</td><td>I SUI F</td><td>105.307</td></tr></tbody></table> <p>Below the table is a dropdown menu labeled "Select the proposed modification" with the selected item "88.8MHz_MENZINGEN EDLIBACH BETHLEHEM". Below the dropdown is a button "Export Results to Excel" and a link "GE84 Compatibility Analyses Description" which is circled in red. At the bottom, there are tabs for "Results", "Interference To", and "Interference From", and another table with the same data as above.</p>	Proposed Modification	Administrations with which the limits of 4.3.7.1/4.3.7.2 are exceeded	Eu (dB (µV/m))	88.8MHz_MENZINGEN EDLIBACH BETHLEHEM	I SUI F	105.307
Proposed Modification	Administrations with which the limits of 4.3.7.1/4.3.7.2 are exceeded	Eu (dB (µV/m))						
88.8MHz_MENZINGEN EDLIBACH BETHLEHEM	I SUI F	105.307						



GE84 Compatibility Analysis

Consideration of the results

Job Output

Input notice file validated by the OnlineValidation process on 01/12/2016 11:24:42

Proposed Modification	Administrations with which the limits of 4.3.7.1/4.3.7.2 are exceeded	Eu (dB (μV/m))
88.8MHz_MENZINGEN EDLIBACH BETHLEHEM	I SUI F	105.307
96.2MHz_KRIENS SONNENBERG	D I F AUT SUI	95.976

Select the proposed modification

88.8MHz_MENZINGEN EDLIBACH BETHLEHEM

Export Results to Excel

[GE84 Compatibility Analyses Description](#)

Results

Interference To

Interference From

Proposed Modification	Administrations with which the limits of 4.3.7.1/4.3.7.2 are exceeded
88.8MHz_MENZINGEN EDLIBACH BETHLEHEM	I SUI F

4.3.7 If the administration consulted is responsible for:

4.3.7.1 a sound broadcasting station, it should normally accept the proposed modification provided that:

- the resulting usable field strength is not greater than 54 dB(μV/m); or
- the resulting usable field strength is greater than 54 dB(μV/m), but is increased by 0.5 dB or less compared with the reference usable field strength. An increase of more than 0.5 dB is open to negotiations, in which more detailed calculation methods may be used.



GE84 Compatibility Analysis

Consideration of the results

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))	
108096825	SUI	RECORDED	BC	88.8	V	EINSIEDELN BRUNNEREN	13	0	0	0	10	287	45	100.07
084004000	SUI	RECORDED	BC	88.8	V	WIDEN GUGELHOLZ	27	0	0	0	26	145	45	95.032
107067239	SUI	RECORDED	BC	88.8	V	HORGEN SCHUEPENLOCH	9	0	0	0	16	181	45	85.688
084003634	SUI	RECORDED	BC	88.8	V	REICHENBACH NIESEN	91	0	0	0	14	50	45	83.072
108009635	SUI	RECORDED	BC	88.8	V	FRICK FRICKBERG	55	0	0	0	13.8	133	45	73.678
084000995	D	RECORDED	BC	88.8	H	HEIDELBERG	248	0	0	0	50	183	37	67.244
096001538	SUI	RECORDED	BC	88.8	V	NENZLINGEN EGGFLUE	81	0	0	0	20	112	37	65.583
084003394	SUI	RECORDED	BC	88.8	H	MT GENEROSO	142	0	0	0	27.5	346	37	65.251
084003602	SUI	RECORDED	BC	88.8	V	MOUTIER MT GRAITERY	90	0	0	0	17	96	37	64.13
105117026	SUI	RECORDED	BC	88.8	V	WILLISAU ANKENLOCH	43	0	0	0	2.8	82	45	63.954
084021163	F	RECORDED	BC	88.8	H	LYON MT PILAT	364	0	0	0	50	55	37	60.831
105105602	SUI	RECORDED	BC	88.8	V	OLIVONE SCAI	70	0	0	0	16.6	346	37	60.191
084001277	D	RECORDED	BC	88.7	H	Gruenten	138	0	0	0	37.9	253	25	59.439

Possible contributors selected as follows:

- Located at a radius up to 1000 km from the proposed modification (1500km for superrefractivity path)
- Consideration of 1st, 2nd and 3rd adjacent channels

Distance site to site & information concerning the various paths
For co-sites a distance of 1km is considered

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 (for pertinent erp) modified by pertinent protection ratio



GE84 Compatibility Analysis

Consideration of the results

NFS (dB (μV/m))	EU Ref (dB (μV/m))	Proposed EU (dB (μV/m))	Current EU (dB (μV/m))	EU increase (dB)
96.296	90.9	103.741	103.741	0
76.797	91.8	100.51	100.51	0
71.769	85.702	97.115	97.115	0
71.463	90.649	88.905	88.905	0
58.664	97.666	97.619	97.619	0
57.716	93.854	87.997	87.997	0
55.017	97.657	98.424	98.424	0
53.173	95.389	106.372	106.372	0

$NFS = F_s \text{ received} + PR$

Eu Ref: Eu calculated at the time the assignment entered the Plan (n/a if not yet RECORDED). It may be modified based on § 4.3.7.1 of the Agreement

Proposed Eu – Current Eu

You may want to know the impact of your proposed modification on other stations. Their Eu is calculated with (Proposed Eu) and without (Current Eu) consideration of the proposed modification. (n/c is displayed if NFS <= trigger NFS)



GE84 Compatibility Analysis

erp reduced to 10 dBW

NFS (dB (μV/m))	EU Ref (dB (μV/m))	Proposed EU (dB (μV/m))	Current EU (dB (μV/m))	EU increase (dB)
93.286	90.9	102.636	103.741	-1.105
73.787	91.8	100.403	100.51	-0.107
68.759	85.702	97.043	97.115	-0.072
68.453	90.649	88.632	88.905	-0.273
55.654	97.666	97.616	97.619	-0.003
54.706	93.854	87.974	87.997	-0.023
52.007	97.657	98.423	98.424	-0.001
50.163	95.389	106.372	106.372	0

NFS = Fs received + PR

Eu Ref: Eu calculated at the time the assignment entered the Plan (n/a if not yet RECORDED). It may be modified based on § 4.3.7.1 of the Agreement

Proposed Eu – Current Eu

You may want to know the impact of your proposed modification on other stations. Their Eu is calculated with (Proposed Eu) and without (Current Eu) consideration of the proposed modification. (n/c is displayed if NFS <= trigger NFS)



GE84 Compatibility Analysis & EuRef, Eu on the BRIFIC

- **Current Eu calculations**, made in accordance with § 4.3.7.1, 4.3.7.2 of Article 4 and § 3.8.3 of Chapter 3 of Annex 2 to the Agreement are the same but the Eu published on the BRIFIC are:
 - Considering only the recorded assignments.
 - Not considering polarization discrimination.
 - Considering ST61 TV stations, if present.
 - Considering the top 20 contributors only

→ The results of your compatibility analysis may differ from the values of Eu on the BRIFIC



GE84 Compatibility Analysis

Future enhancements

- To perform a detailed analysis on frequency assignments published in Part A of the GE84 Special Section by selecting from a list (no notice generation necessary)
- To be able to identify, in your planning process, available frequencies for new sound broadcasting services.



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**Thank you for
your attention!**

Further info:
bangaly-fode.traore@itu.int