



**3rd and final frequency coordination meeting
on the GE84 Plan Optimization for Africa**

**3^{ème} 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**



Compatibility analysis for new frequency requirements and optimization of planning using BR software tools

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BR/TSD/BCD



Overview

- Tools to be used
- Frequency band and assigned frequencies
- Technical basis for the GE84 Opt process
- Process diagrams
- Creation of a FLEX requirement
- Compatibility calculations
- Analysis of the results



BR Tools to be used



eBCD 2.0
Broadcasting Online

eQry **ePub**
eTools **myAdmin**

TerRaQ
TerRaNotices

WISFAT



Frequency band and assigned frequencies

- ✓ Frequency band: 87.6 - 107.9 MHz
- ✓ Assigned frequencies: 87.6; 87.7;...; 107.8; 107.9 MHz (100 kHz step)
- ✓ Special case (“flexible frequency (flexible channel)”):

“flexible channel” – means that during compatibility calculations, the software will scan all frequencies in the frequency band mentioned above and show electromagnetic situation on each co- and adjacent frequencies.

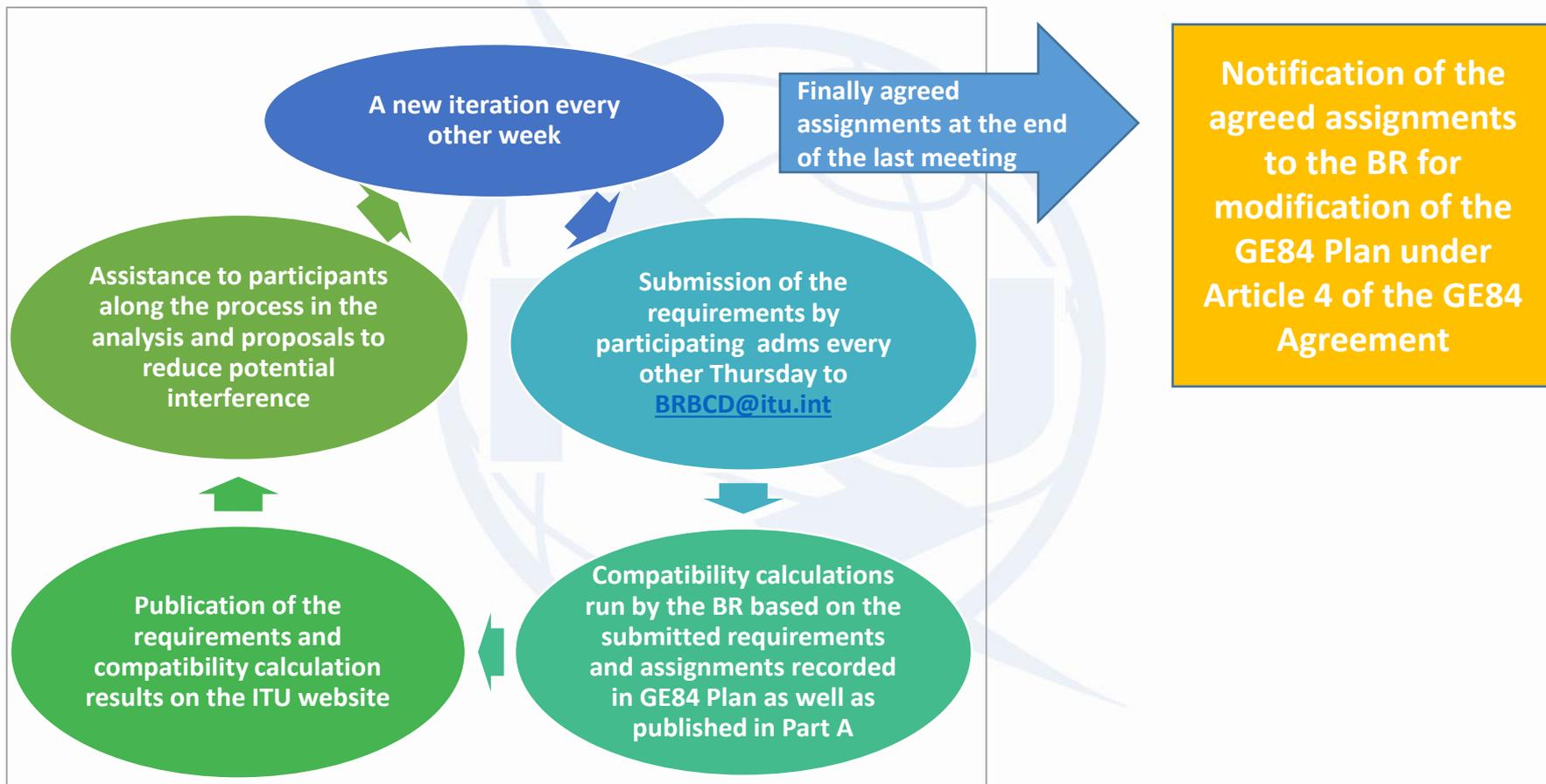


Technical basis for GE84 Optimization process

- Technical criteria used for compatibility calculations – GE84 Agreement (uniform 100 kHz frequency step, protection ratios etc.)
- Propagation models: GE84 curves/ITU-R Rec. P.1812
- Assignments recorded in the GE84 Plan and as well as assignments published in Part A of Special Sections GE84 are taken into account
- Assignments to other primary services in adjacent bands are not taken into account
- Some criteria agreed by administrations at the 1st Frequency Coordination meeting:
 - To stop submissions of new modifications to the GE84 Plan until the end of the coordination meetings;
 - To submit requirements every other Thursday by 18:00 Geneva time to brbcd@itu.int for the next iteration. If an administration does not submit its requirements, the requirements used for the previous iteration will be taken;
 - General maximum acceptable Nuisance Field Strength (NFS) value is **54 dB(μV/m)**. This value can be reviewed by involved administrations during bi- or multi-lateral negotiations

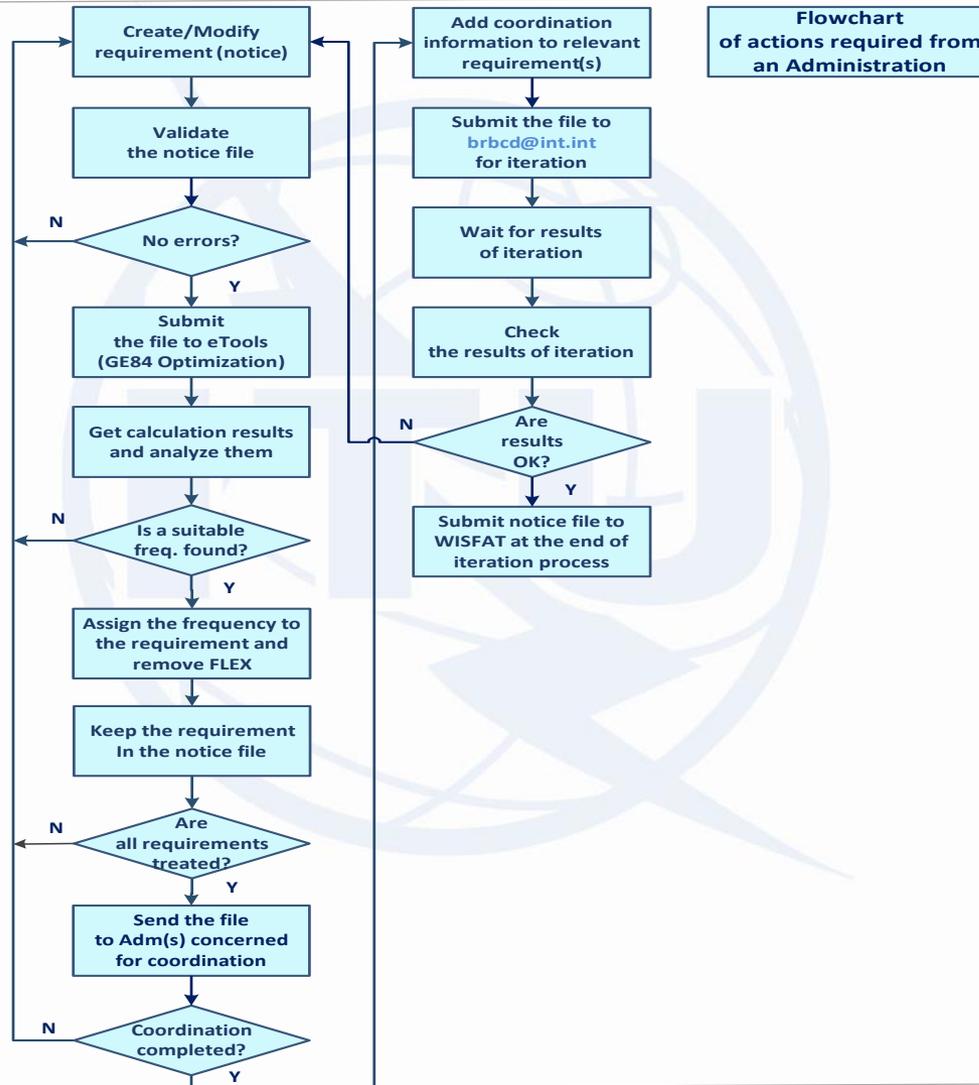


GE84 Optimization process and BR assistance





GE84 Optimization process and activity of administrations





Creation of a flex requirement

terRaNotices 1.2 (BR IFC: 2946) - [NMB_iter9_Fix plus NKURENKURU flex.txt - 101]

File Tools View Language Options Window Help

office browser

office type	Description
✓ T01 ADD	BR_KATIMA MULILO_7
✓ T01 ADD	BR_KATIMA MULILO_8
✓ T01 ADD	BR_KONGOLA
✓ T01 ADD	BR_KONGOLA_1
✓ T01 ADD	BR_KONGOLA_2
✓ T01 ADD	BR_KONGOLA_3
✓ T01 ADD	BR_KONGOLA_4
✓ T01 ADD	BR_OMEGA
✓ T01 ADD	BR_OMEGA_1
✓ T01 ADD	BR_OMEGA_2
✓ T01 ADD	BR_OMEGA_3
✓ T01 ADD	BR_KATIMA MULILO_9
✓ T01 ADD	BR_KATIMA MULILO_10
✓ T01 ADD	BR_KATIMA MULILO_11
✓ T01 ADD	BR_KATIMA MULILO_12
✓ T01 ADD	BR_KATIMA MULILO_13
✓ T01 ADD	BR_RUNDU
✓ T01 ADD	BR_RUNDU_1
✓ T01 ADD	BR_RUNDU_2
✓ T01 ADD	BR_RUNDU_3
✓ T01 ADD	BR_RUNDU_4
✓ T01 ADD	BR_RUNDU_5
✓ T01 ADD	BR_RUNDU_6
✓ T01 ADD	BR_RUNDU_7
✓ T01 ADD	BR_RUNDU_8
✓ T01 ADD	BR_ANDARA_MUKWE_5
✓ T01 ADD	BR_ARENSNES_10
✓ T01 ADD	BR_ARENSNES_9
✓ T01 ADD	BR_NKURENKURU_5

Date of notification: [dropdown]
ID1/ Unique identification code given by the Administration to the assignment: BR_NKURENKURU_5

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: NKURENKURU 4C/ Longitude: 18° 36' 6" E 9EA/ Altitude of site above sea level: 1132 m 3A1/ Call sign: [dropdown]
4B/ Geographic area: NMB Latitude: 17° 40' 39" S 3A2/ Station identification: FLEX

Emission characteristics

1A/ Assigned frequency: 87.7 MHz 7D/ Transmission system: 4 8BH/ Horizontal e.r.p.: 30 dBW
7AB/ Bandwidth: 300.000 kHz 9D/ Polarization: H 8BV/ Vertical e.r.p.: [dropdown] dBW

Antenna characteristics

9/ Antenna directivity: ND 9EB/ Maximum Effective Antenna Height: 56 m 9E/ Height of Antenna Above Ground Level: 30 m

Coordination successfully completed with the following administration: selected administration: AFG Add > AFS < Remove AGL << Clear

13C/ Notified remarks: [text area]



Validation and Submission of notice file(s) to eBroadcasting

✓ Validation of notice(s):

- Initial - by TerRaNotices: *File -> Validate and save file*
- Deep – by Online validation tool at:

- <https://www.itu.int/ITU-R/terrestrial/OnlineValidation/Login.aspx> or

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

The notice file shall not contain errors.

✓ Submission of the notices to eBroadcasting:

- Go to web-portal - eTools: <https://www.itu.int/ITU-R/eTerrestrial/ECalculations>
- Select:
 - **GE84** calculation type
 - **GE84 Optimization** option
- Click on **New calculation**
- Change configuration information if needed. More information and description of results can be found in *eTools Documentations -> GE84 Optimization*
- Browse and **Upload** the notice file together with the notice file(s) of neighboring country(-ies) to eBCD web-portal
- Label your job and click on **Submit**



Getting compatibility calculation results

- ✓ Click on **Back to calculation history**
- ✓ Wait for results (either email message received or by clicking time-to-time on **Refresh** until job status becomes **Success**)
- ✓ Click on the job Id **number** to see the results
- ✓ Select desired modes for considering interference and Set Acceptable NFS value (for example **54 dB(μ V/m)**)
- ✓ Select **Evaluate Statistics** option
- ✓ Select an Administration
- ✓ Click on **Evaluate Statistics**
- ✓ Select the desired requirement for analysis
- ✓ Analyze compatibility calculation results



Outcome of compatibility analysis

Fixing of a selected frequency

- 1) For flex requirements please note frequency(-ies) on which calculated NFSs in both directions (received and generated) **do not exceed** the acceptable NFS value, i.e. frequency (-ies) assignable to this site (**highlighted in green**).
- 2) To assign a specific frequency (to fix a frequency) from the list of assignable ones, it is necessary to modify the initial flex requirement (notice) containing **87.7 MHz** and **FLEX** by changing 87.7 MHz to a selected one and **remove FLEX**.
- 3) While fixing of a selected frequency, please bear in mind that **adjacent frequencies in the range ± 300 kHz from the selected one are further considered as non-assignable for this site.**



Outcome of compatibility analysis

General recommendations

If no assignable frequency has been found, it is advisable to apply for a selected frequency the following:

- Detailed calculations involving a digital terrain map (for example based on Rec. ITU-R P.1812).
- Coordination with neighbors concerned. In case of successful coordination insert this information in the COORD section of the notice.
- Change of technical characteristics of the requirement in question. Please keep in mind that the calculated NFSs might be changed by modifying:
 - Polarization, location;
 - Antenna height, Effective Radiated Power (for generated NFS only).
- Removal of excessive requirements.
- Combination of above.
- Select another frequency and repeat measures above.



Outcome of compatibility analysis

Another chance: Best practices approach

If still no assignable frequency has been found, by using this approach it is also possible to assign frequencies with 400 kHz difference between co-sited transmitters as shown on example rounded in green below:



Transmitter Location	CT	Freq. MHz	Station	Coverage area	Pol	ERP in dBW	Mode	Longitude	Latitude	Coord X	Coord Y	ASL
AARAU OBERHOLZ	AG	97.7	Radio 32	Aarau, Erlinsbach, Kölliken	V	20	S	8° 2' 28" E	47° 22' 38" N	2645490	1247555	486
AARBURG FESTUNG	AG	91.3	SRF 3	K103 Umfahrung Aarburg			S	7° 54' 11" E	47° 19' 34" N	2635110	1241795	406
	AG	94.0	Radio Argovia				S	7° 54' 11" E	47° 19' 34" N	2635110	1241795	406
	AG	96.0	SRF 1				S	7° 54' 11" E	47° 19' 34" N	2635110	1241795	406
	AG	97.3	Radio 32				S	7° 54' 11" E	47° 19' 34" N	2635110	1241795	406
AARBURG PARADISLI	AG	91.3	SRF 3	K103 Umfahrung Aarburg			S	7° 54' 22" E	47° 19' 13" N	2635340	1241155	408
	AG	94.0	Radio Argovia				S	7° 54' 22" E	47° 19' 13" N	2635340	1241155	408
	AG	96.0	SRF 1				S	7° 54' 22" E	47° 19' 13" N	2635340	1241155	408
	AG	97.3	Radio 32				S	7° 54' 22" E	47° 19' 13" N	2635340	1241155	408
ABBAYE PONT AGOUILLONS	VD	87.6	Espace 2	Vallée de Joux	V	30	S	6° 20' 2" E	46° 40' 14" N	2515461	1169417	1145
	VD	99.5	La Première		V	30	S	6° 20' 2" E	46° 40' 14" N	2515461	1169417	1145
	VD	101.4	Couleur 3		V	30	S	6° 20' 2" E	46° 40' 14" N	2515461	1169417	1145
ADELBODEN WINTERTAL	BE	88.1	SRF 1	Adelboden	V	13	S	7° 33' 5" E	46° 28' 52" N	2608648	1147773	1449
	BE	90.2	SRF 2 Kultur		V	13	S	7° 33' 5" E	46° 28' 52" N	2608648	1147773	1449
	BE	104.9	SRF 3		V	13	S	7° 33' 5" E	46° 28' 52" N	2608648	1147773	1449
AESCH HAUPTSTRASSE	BL	96.7	SRF 1	Dornach, Gempen	V	19	S	7° 35' 48" E	47° 28' 12" N	2611911	1257717	314
AESCH ZUERICH UETLIBERG	ZH	88.0		A4			S	8° 30' 54" E	47° 20' 39" N	2681348	1244255	429
	ZH	93.6	Radio 1				S	8° 30' 54" E	47° 20' 39" N	2681348	1244255	429
	ZH	94.6	SRF 1				S	8° 30' 54" E	47° 20' 39" N	2681348	1244255	429
	ZH	99.2	Radio Central				S	8° 30' 54" E	47° 20' 39" N	2681348	1244255	429
	ZH	99.6	SRF 2 Kultur				S	8° 30' 54" E	47° 20' 39" N	2681348	1244255	429
	ZH	100.9					S	8° 30' 54" E	47° 20' 39" N	2681348	1244255	429
	ZH	102.8	Radio 24				S	8° 30' 54" E	47° 20' 39" N	2681348	1244255	429
	ZH	105.8	SRF 3				S	8° 30' 54" E	47° 20' 39" N	2681348	1244255	429
	ZH	106.7	Radio Zürisee				S	8° 30' 54" E	47° 20' 39" N	2681348	1244255	429

Source: Swiss Federal Office of Communications (OFCOM) <https://www.bakom.admin.ch/bakom/en/homepage/frequencies-and-antennas/broadcasting.html>

Important! The procedure is not automatic. Due attention should be paid to other interferers/affected



Some useful links

- <https://www.itu.int/en/ITU-R/terrestrial/broadcast/africa/Pages/default.aspx>
- <https://www.itu.int/en/ITU-R/terrestrial/broadcast/Pages/FMTV.aspx>
- <https://www.itu.int/en/ITU-R/terrestrial/tpr/Pages/FMTVNotices.aspx#FMTVNotices>
- https://www.itu.int/en/ITU-R/terrestrial/broadcast/africa/Documents/1stMeteeng/info_docs/INFO_GE84_Opt-1-E_final.pdf



Thank you for your attention!

Questions?

brbcd@itu.int