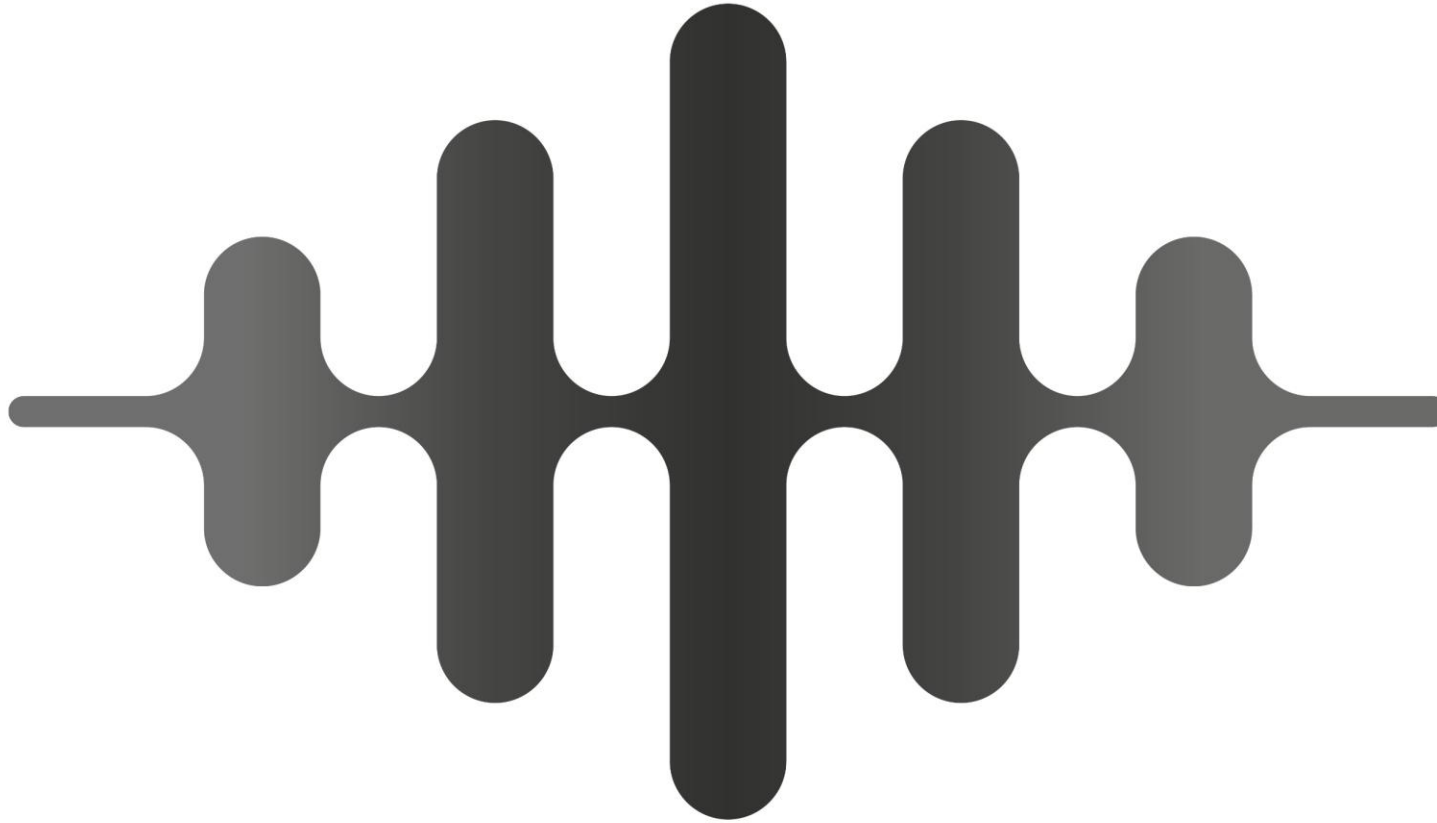
32ND ITU WORLD
RADIOCOMMUNICATION SEMINAR

ITUWRS GENEVA2026

7–11 December 2026
Geneva, Switzerland

itu.int/go/ITU-R/WRS-26
#ITUWRS



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ITU

ITU World Radiocommunication Seminar

HF Broadcasting (HFBC)

7-11 December 2026, Geneva, Switzerland

HFBC Notification procedure RR Article 12 and software tools

[11.12.2026]
[10:40 – 12:00]

Hakim Ebdelli
Senior Radiocommunication Engineer

HFBC Notification procedure

RR Article 12 and software tools

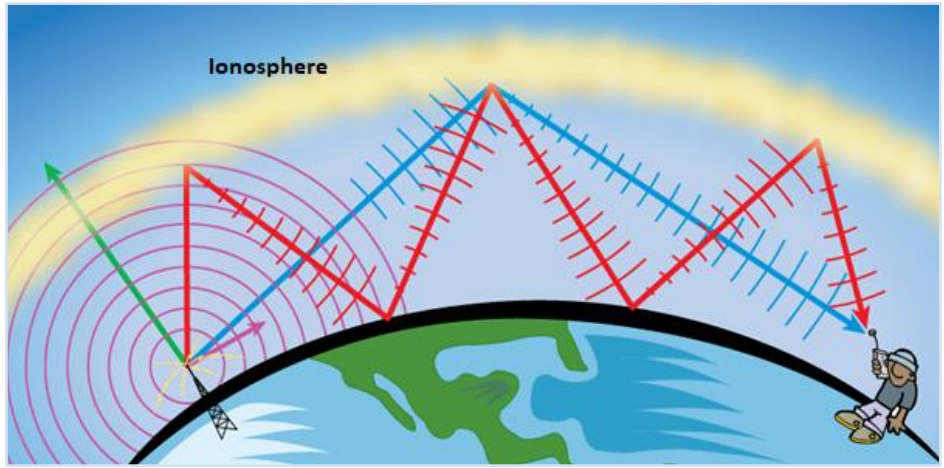


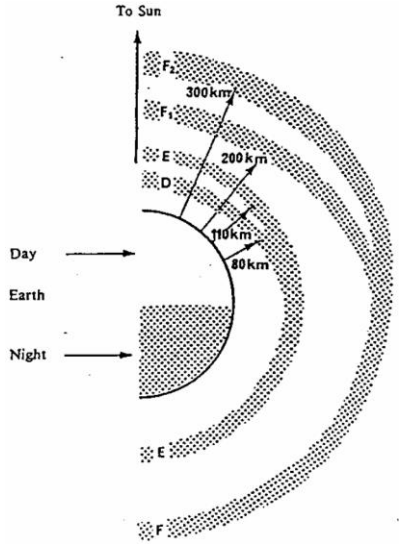
Outline

1. HFBC particularities
2. RR Article 12 and Resolution 535
3. Seasons, schedules and frequency bands
4. Notifying the requirements
5. Coordination and publications
6. eHFBC tools and case studies

Propagation through the ionosphere

- **HF: 3 – 30 MHz.** The HFBC bands lie between 5 900 and 26 100 kHz
- **Skywave propagation:** reflected by the ionosphere, the waves travel beyond the horizon: long-distance, international coverage
- Propagation varies between **summer and winter**, **day and night**, and with the **solar activity** (sunspot number)
- Hence **seasonal schedules**, examined with propagation predictions





ITU handbook: **Ionosphere and its Effects on Radiowave Propagation**

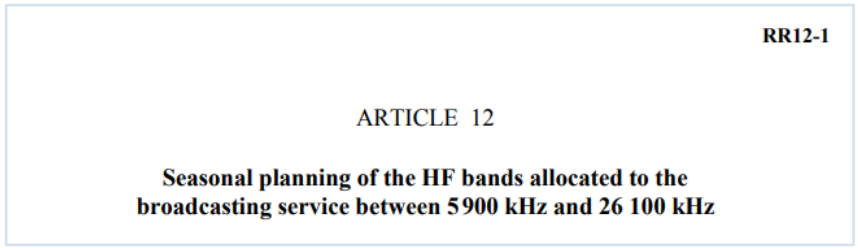
Broadcasting bands of RR Article 5

Band	Frequency range	Region	Plan / Agreement
LF	148.5 – 283.5 kHz	R1	GE75
MF	526.5 – 1 606.5 kHz 535 – 1 705 kHz	R1, R3 R2	GE75 RJ81, RJ88
HF	**5 900 – 26 100 kHz**	**R1, R2, R3**	**HFBC planning procedure (RR Article 12)**
VHF	47 – 254 MHz	R1, ...	ST61, GE84, GE89, GE06
UHF	470 – 862 MHz	R1, ...	GE06, GE89

HF broadcasting
No a priori plan
seasonal planning, worldwide

The schedules of the administrations are coordinated, notified and published twice a year: **Article 12**

Article 12 at a glance



RR12-1

ARTICLE 12

Seasonal planning of the HF bands allocated to the broadcasting service between 5900 kHz and 26 100 kHz

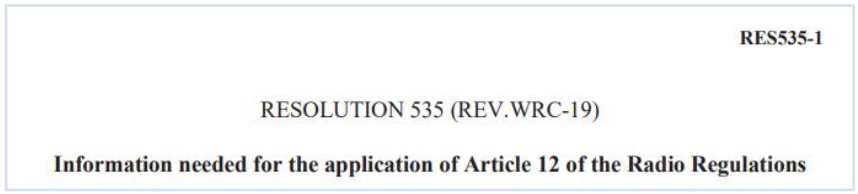
Article 12 covers

- The procedure
- The frequency range
- Seasons and schedules
- Who notifies, when and what
- The publications by the BR

Main principles (12.2 – 12.14)

1. Equal access to the HF bands
2. Equitable treatment of national and international requirements
3. Efficient use of the spectrum
4. Minimize incompatibility
5. Flexibility
6. Only requirements expected to be active during the schedule period

Resolution 535



RES535-1

RESOLUTION 535 (REV.WRC-19)

Information needed for the application of Article 12 of the Radio Regulations

Information needed for the application of Article 12 of the Radio Regulations

Resolution 535 is the technical companion of Article 12: the same rules for the administrations and for the BR software

Input data	The file format of the requirements
Methodology	ITU-R P.533: wanted / unwanted field strength · P.842: reliability · BS.705: antenna patterns
Data	References for the signal-to-noise ratio, RF protection ratios...
Time sequence	Detailed time sequence of the procedure
BR software	Data capture and validation of the requirements, data query, propagation and compatibility analysis

The HFBC procedure

1 Initial planning

Requirements of the administrations and broadcasters

2 Coordination

Bilateral, multilateral, regional coordination groups

3 Notice file

The seasonal schedule in the common file format

4 Notification

Submitted to the BR via WISFAT

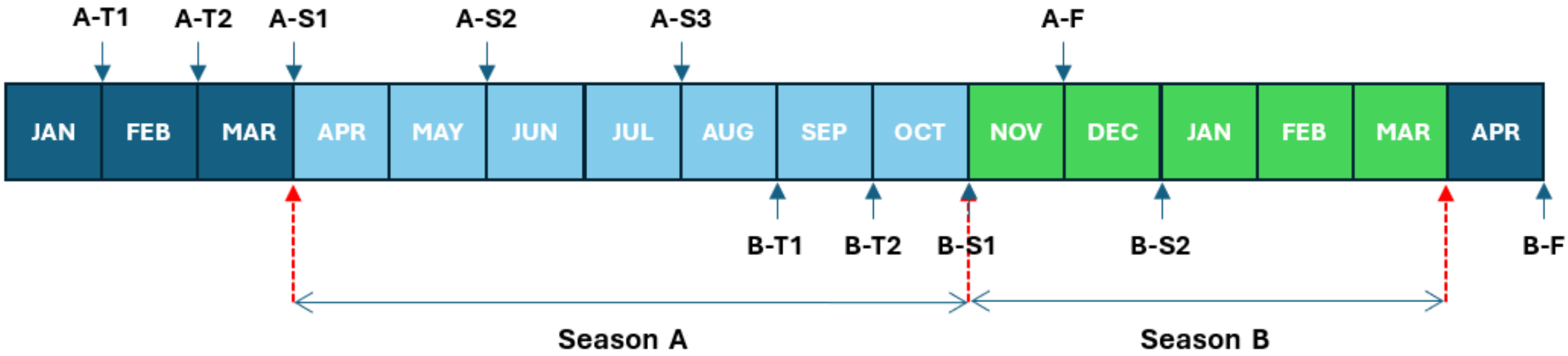
5 Publication

The BR validates, analyses the compatibility and publishes

- Notifications to the ITU are made via **WISFAT** (Web Interface for Submission of Frequency Assignments/allotments for Terrestrial services): www.itu.int/ITU-R/go/wisfat
- Access restricted to **registered notifiers**, with a **TIES** account: www.itu.int/ties

Upon receipt of the schedules, the Bureau **validates** the data, performs a **compatibility analysis** and **publishes** the results

Two seasons, eleven publications a year



Season A (summer)

Last Sunday of March → last Sunday of October (7 months)

Season B (winter)

Last Sunday of October → last Sunday of March (5 months)

11 publications (schedules)

Before: T1, T2 · During: S1, S2 (S3) · After: F

If no schedule is submitted

RR 12.26

"...where an administration does not indicate its requirements for a new seasonal schedule, the Bureau shall use the assignments from the previous **corresponding** seasonal schedule for this administration... The Bureau shall follow this practice for **two consecutive schedule periods**."

Schedule	Submission?	Action of the BR (12.26)
A26	Yes	Normal submission
A27	No	Carry A26 → A27 (1st consecutive A)
A28	No	Carry A26 → A28 (2nd consecutive A)
A29	**No**	**No carry-forward of A26 → A29**

RR 12.27 ...the Bureau shall notify the administration concerned that the schedule will not include their broadcasting requirements unless the administration advises otherwise.

Example: the deadlines of season B26

#	Schedule	Publication	Deadline for submissions
1	B26 Tentative 1 (B26T1)	End of August 2026	16 August 2026
2	B26 Tentative 2 (B26T2)	End of September 2026	20 September 2026
3	B26 Schedule 1 (B26S1)	End of October 2026	18 October 2026
4	**B26 Schedule 2 (B26S2)**	**End of December 2026**	**20 December 2026**
5	B26 Final (B26F)	End of April 2027	18 April 2027

Next deadline

B26S2: 20 December 2026

The deadlines for submissions are published by the BR in a Circular Letter. A26/B26: **CR-525**

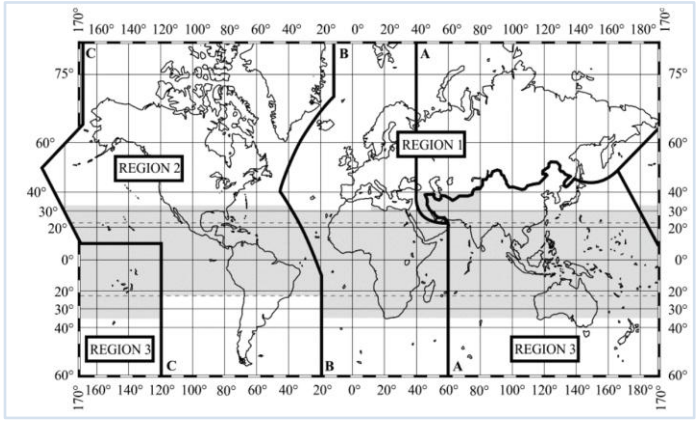
HFBC frequency bands

Band	Range (kHz)	Width (kHz)	Channels
6	5 900 – 6 200	300	59
7	7 200 – 7 450 *	250	49
9	9 400 – 9 900	500	99
11	11 600 – 12 100	500	99
13	13 570 – 13 870	300	59
15	15 100 – 15 800	700	139
17	17 480 – 17 900	420	83
18	18 900 – 19 020	120	23
21	21 450 – 21 850	400	79
25	25 670 – 26 100	430	85

* 7 200 – 7 300 and 7 400 – 7 450 kHz: Regions 1 and 3 only

5 kHz
channel raster

10 bands
774 channels



The three ITU Regions (RR Article 5)

IRDR – International Radio for Disaster Relief

- **Recommendation ITU-R BS.2107-1** (December 2022)
- Use of International Radio for Disaster Relief frequencies for emergency broadcasts in the HF bands
- **One frequency within each HF band** is reserved for emergency broadcasting



Keep the IRDR frequencies in mind when preparing the schedule: they are reserved for emergency broadcasting

Who, when and what to notify

Who

- Administrations
- Organizations authorized by them: other administrations, broadcasters, frequency management organizations (FMO)...

When

- **RR 12.16:** twice yearly, the projected seasonal schedules in the relevant bands
- By the deadlines published by the BR

What

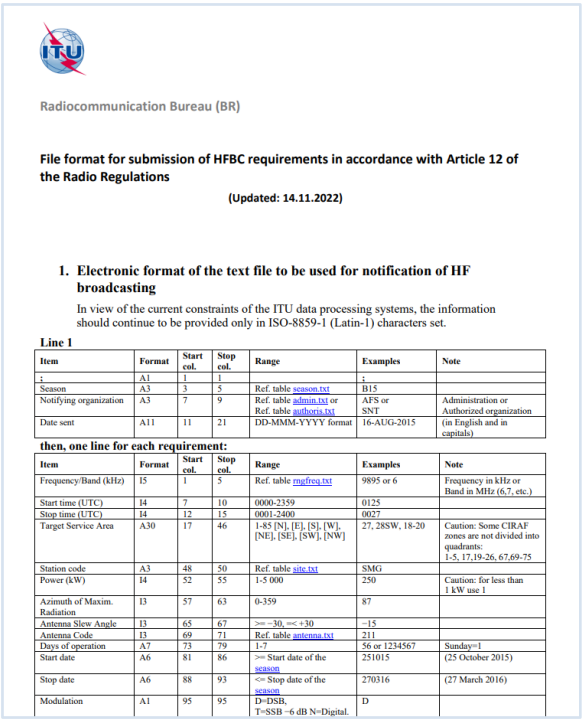
- The **whole schedule**, not just the modifications
- In the **common file format** (Resolution 535)
- Only requirements expected to be active during the schedule period

Submitted via **WISFAT** by the registered notifiers

The requirement file

```
; A23 ITU 19-Jan-2023
;
; With the exception of the first line (containing season, notifying org., date)
; Lines starting with ; (semicolon) are ignored by the software.
; Total number of requirement: 2458
;
; This is a combined schedule A23T1
;
;
; created by ITU HFBC    - 1/19/2023 3:09:16 PM
;
;----+----+----+------------------------------+---+----+-------+---+---+-------+------+------+-+-----+----------+---+---+---+-----+-+-----+-----+-----+-------
;FREQ STRT STOP CIRAF ZONES                    LOC POWR AZIMUTH SLW ANT DAYS    FDATE  TDATE MOD AFRQ LANGUAGE   ADM BRC ORG REQ# OLD ALT1 ALT2  ALT3  NOTES
;----+----+----+------------------------------+---+----+-------+---+---+-------+------+------+-+-----+----------+---+---+---+-----+-+-----+-----+-----+-------
;
 5905 0000 2400 28,27,29,30,39,40              SOF 50   306     0   885 1234567 260323 291023 D 5000  Mul        BUL NEW SPC  1    N                   BUL     SPC
 5905 0600 0630 18,27,28                       PIN 10   0       0   975 1234567 260323 291023 D 5905  Deu        D   DWD FNA  2                             D
 5905 1200 1230 18,27,28                       PIN 10   0       0   975 1234567 260323 291023 D 5905  Deu        D   DWD FNA  3                             D
 5905 1600 1630 18,27,28                       PIN 10   0       0   975 1234567 260323 291023 D 5905  Deu        D   DWD FNA  4                             D
 5905 2000 2030 18,27,28                       PIN 10   0       0   975 1234567 260323 291023 D 6040  Deu        D   DWD FNA  5                             D
 5910 0000 1800 44,45                          PYO 100  0       0   925 1234567 260323 291023 D                  KRE KCB KCB  6    O                   KRE
 5920 0300 2400 18,27,28,37                    WNM 10   145     0   300 1234567 260323 291023 D 5920  Mul        D   HCJ FNA  7                             D
 5920 1300 1500 43N,44                         YAM 300  290     0   146 1234567 260323 291023 D       Mul        J   JIC MIC  8                             J
 5920 1600 1700 43N,44                         YAM 300  290     0   146 1234567 260323 291023 D       Mul        J   JIC MIC  9                             J
 5925 0300 0400 46,47,52,53,57                 BOT 100  10      0   156 1234567 260323 281023 D 8500  English    BOT AGM AGM  10                            BOT
 5925 0300 0600 49                             CK2 50   0       0   975 1234567 260323 291023 D 5925  Vie        VTN VOV VOV  11   N                        VTN
 5925 0400 0500 46,47,52,53,57                 BOT 100  350     0   156 1234567 260323 281023 D 8500  English    BOT AGM AGM  12                            BOT
 5925 1000 1705 44S                            BEI 100  163     0   206 1234567 260323 291023 D 7700  Zho        CHN CNR RTC  13   N                        CHN
 5925 1100 1500 49                             CK2 50   0       0   975 1234567 260323 291023 D 5925  Vie        VTN VOV VOV  14   N                        VTN
 5925 2055 2400 44S                            BEI 100  163     0   206 1234567 260323 291023 D 7700  Zho        CHN CNR RTC  15   N                        CHN
 5925 2145 0100 49                             CK2 50   0       0   975 1234567 260323 291023 D 5925  Vie        VTN VOV VOV  16   N                        VTN
 5935 1300 1400 27E,28NW                       NAU 125  233     0   146 1234567 260323 281023 D 9600  Mul        D   MBR MBR  17                  A.307    D
```

Example of requirement file: comment lines (;) at the top are optional



Radiocommunication Bureau (BR)

File format for submission of HFBC requirements in accordance with Article 12 of the Radio Regulations

(Updated: 14.11.2022)

1. Electronic format of the text file to be used for notification of HF broadcasting

In view of the current constraints of the ITU data processing systems, the information should continue to be provided only in ISO-8859-1 (Latin-1) characters set.

Line 1

Item	Format	Start col.	Stop col.	Range	Examples	Note
;	A1	1	1		;	
Season	A3	3	5	Ref. table season.txt	B15	
Notifying organization	A3	7	9	Ref. table admin.txt or Ref. table authoris.txt	AFS or SNT	Administration or Authorized organization
Date sent	A11	11	21	DD-MMM-YYYY format	16-AUG-2015	(in English and in capitals)

then, one line for each requirement:

Item	Format	Start col.	Stop col.	Range	Examples	Note
Frequency/Band (kHz)	I5	1	5	Ref. table rngfreq.txt	9895 or 6	Frequency in kHz or Band in MHz (6,7, etc.)
Start time (UTC)	I4	7	10	0000-2359	0125	
Stop time (UTC)	I4	12	15	0001-2400	0027	
Target Service Area	A30	17	46	1-85 [N], [E], [S], [W], [NE], [SE], [SW], [NW]	27, 28SW, 18-20	Caution: Some CIRAF zones are not divided into quadrants: 1-5, 17,19-26, 67,69-75
Station code	A3	48	50	Ref. table site.txt	SMG	
Power (kW)	I4	52	55	1-5 000	250	Caution: for less than 1 kW use 1
Azimuth of Maxim. Radiation	I3	57	63	0-359	87	
Antenna Slew Angle	I3	65	67	>= −30, =< +30	−15	
Antenna Code	I3	69	71	Ref. table antenna.txt	211	
Days of operation	A7	73	79	1-7	56 or 1234567	Sunday=1
Start date	A6	81	86	>= Start date of the season	251015	(25 October 2015)
Stop date	A6	88	93	<= Stop date of the season	270316	(27 March 2016)
Modulation	A1	95	95	D=DSB, T=SSB −6 dB N=Digital.	D	

A **common text format**: File format for submission of HFBC requirements · defined in RR Resolution 535 · example of requirement file (eHFBC web site)

Fields of a requirement

Header (line 1)

Field
Season
Date sent
Notifying organization

Mandatory fields of a requirement

Field
Adm
Site code
Antenna code
Antenna slew angle
Azimuth
Frequency (kHz)
Antenna design frequency (kHz)
Power (kW)
Modulation
Dates (start – stop)
Time UTC (start – stop)
Days of operation
Target service area (CIRAF)

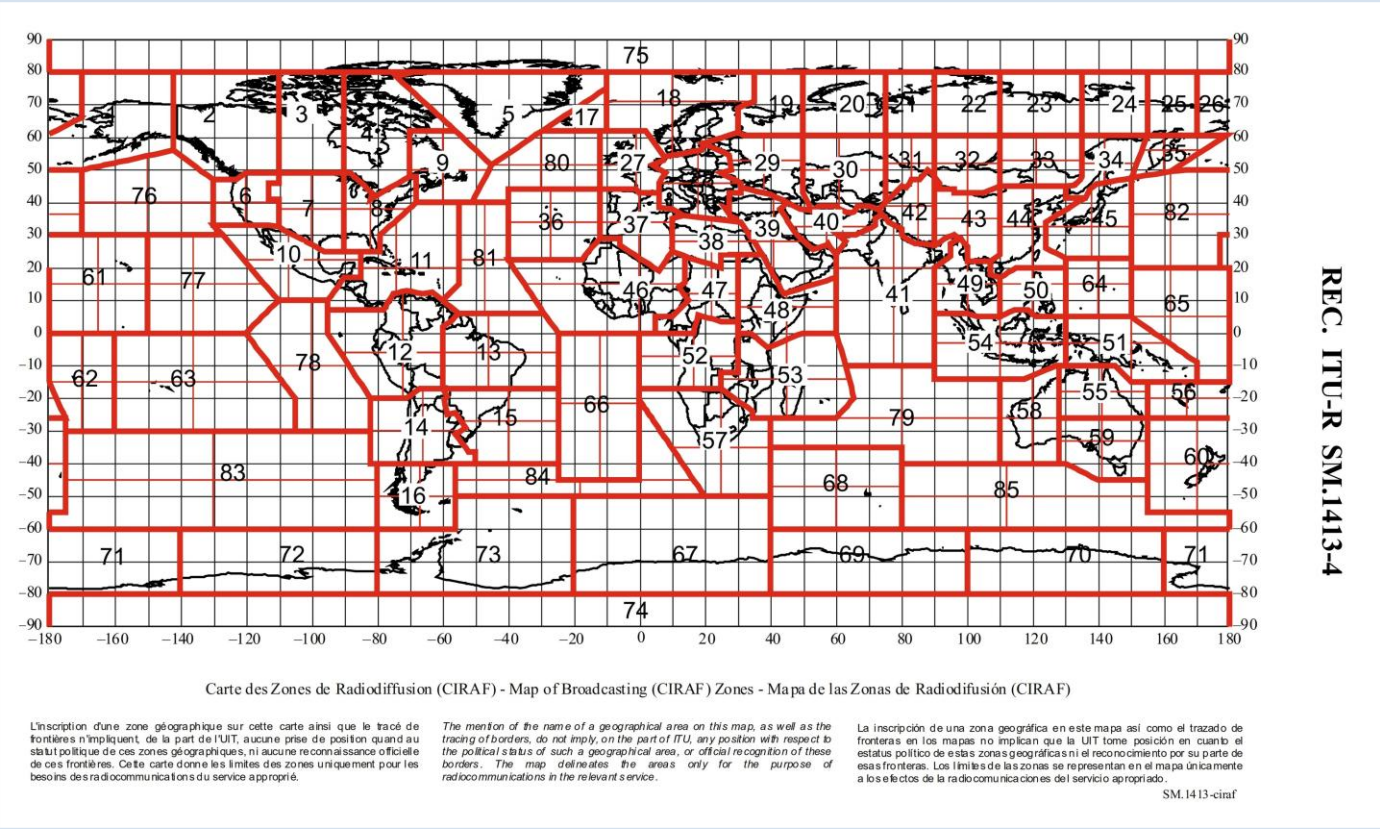
Optional / recommended

Field	
Broadcaster code	R
FMO code [1]	R
Language	O
Alternate frequency 1	O
Alternate frequency 2	O
Alternate frequency 3	O
Notes	O

R: recommended · O: optional

[1] Frequency Manager Organization; if blank, identical to the administration code

Target service area: CIRAF zones



- Zones **1 to 85**
- Divided into quadrants: N, E, S, W, NE, SE, SW, NW
- Not divided into quadrants: 1–5, 17, 19–26, 67, 69–75
- Map of the zones: Rec. ITU-R BS.1413

Example: target service area **46SE,47W**

Reference tables

Table	Content
Admin	Administrations
Organization	Authorized organizations
FMO	Frequency management organizations
Broadcaster	Broadcasters
Site	Transmitting sites
Language	Languages (ISO-3)
Antennas	Transmitting antennas
Season	Seasons
Ciraf	Test points and CIRAF zones
Frequency	Frequency bands
Sunspot	Sunspot numbers

- Established to **identify a requirement**
- **Maintained by the BR**
- Common use with the **HF regional coordination groups**
- Used to create the **requirement files**

11 reference tables on eHFBC

www.itu.int/ITU-R/eTerrestrial/eBroadcasting/eHFBC#/reftables/tables/RefTableOverview

Coordination

- Bilateral and multilateral
- Regional coordination groups
- Coordination on a **common technical base**

HFBC regional coordination groups

ASBU
Arab States Broadcasting Union

www.asbu.net

ABU-HFC
Asia-Pacific Broadcasting Union – High Frequency Conference

www.abu.org.my

HFCC
High Frequency Coordination Conference

new.hfcc.org

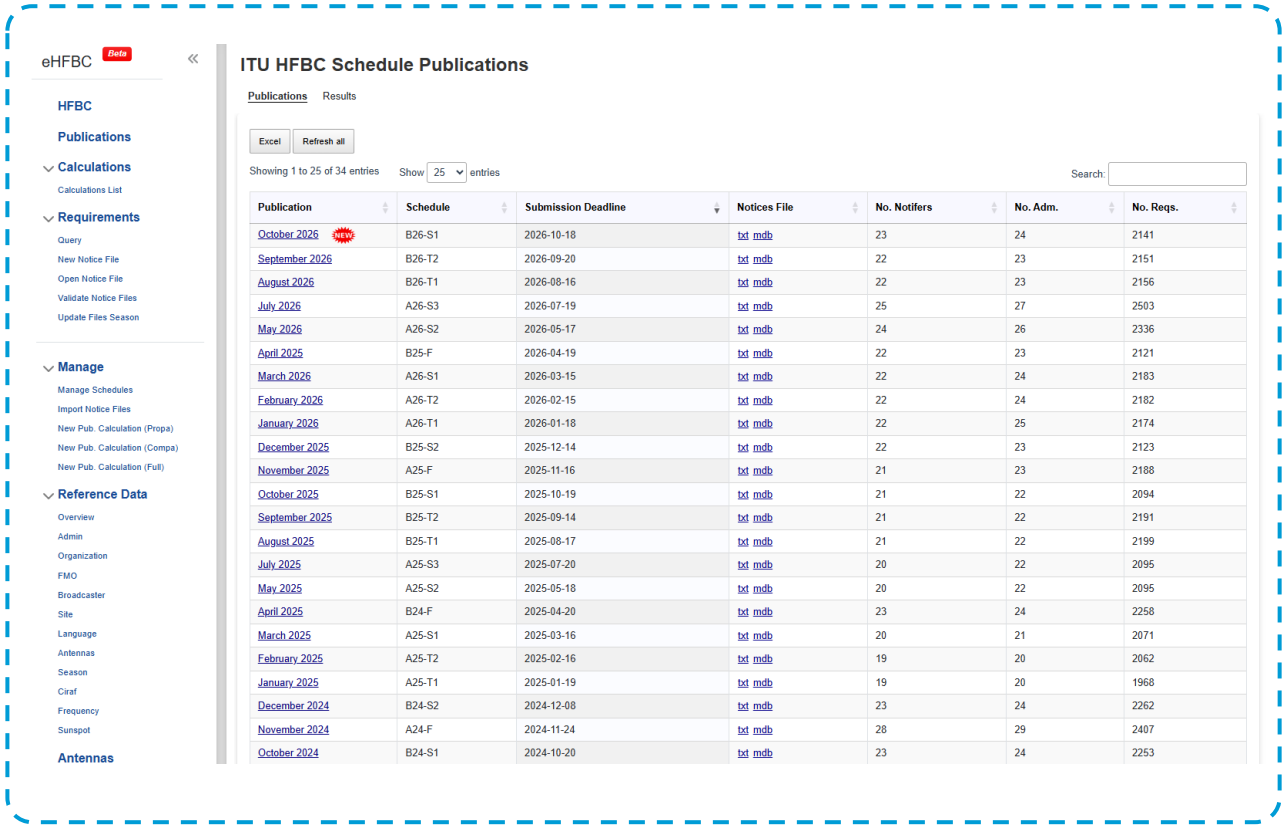
HFBC publications on eHFBC

www.itu.int/ITU-R/eTerrestrial/eBroadcasting/eHFBC

11 publications a year

Tentative schedules T1, T2 · schedules S1, S2 (S3) · final schedule F

- Monthly updated seasonal schedules
- Propagation and compatibility analysis results
- HFBC updates (deadlines...) and circular letters
- Regulations: Article 12, resolutions, ITU-R Rec.
- File format, example, reference tables, coordination groups
- HFBC tools



Publication	Schedule	Submission Deadline	Notices File	No. Notifers	No. Adm.	No. Reqs.
October 2026 NEW	B26-S1	2026-10-18	txt mdb	23	24	2141
September 2026	B26-T2	2026-09-20	txt mdb	22	23	2151
August 2026	B26-T1	2026-08-16	txt mdb	22	23	2156
July 2026	A26-S3	2026-07-19	txt mdb	25	27	2503
May 2026	A26-S2	2026-05-17	txt mdb	24	26	2336
April 2025	B25-F	2026-04-19	txt mdb	22	23	2121
March 2026	A26-S1	2026-03-15	txt mdb	22	24	2183
February 2026	A26-T2	2026-02-15	txt mdb	22	24	2182
January 2026	A26-T1	2026-01-18	txt mdb	22	25	2174
December 2025	B25-S2	2025-12-14	txt mdb	22	23	2123
November 2025	A25-F	2025-11-16	txt mdb	21	23	2188
October 2025	B25-S1	2025-10-19	txt mdb	21	22	2094
September 2025	B25-T2	2025-09-14	txt mdb	21	22	2191
August 2025	B25-T1	2025-08-17	txt mdb	21	22	2199
July 2025	A25-S3	2025-07-20	txt mdb	20	22	2095
May 2025	A25-S2	2025-05-18	txt mdb	20	22	2095
April 2025	B24-F	2025-04-20	txt mdb	23	24	2258
March 2025	A25-S1	2025-03-16	txt mdb	20	21	2071
February 2025	A25-T2	2025-02-16	txt mdb	19	20	2062
January 2025	A25-T1	2025-01-19	txt mdb	19	20	1968
December 2024	B24-S2	2024-12-08	txt mdb	23	24	2262
November 2024	A24-F	2024-11-24	txt mdb	28	29	2407
October 2024	B24-S1	2024-10-20	txt mdb	23	24	2253

Online tools for HF broadcasting

1 Notices

- Create a new notice file
- Open / edit an existing notice file
- Validate notice file(s)

2 Coverage analysis

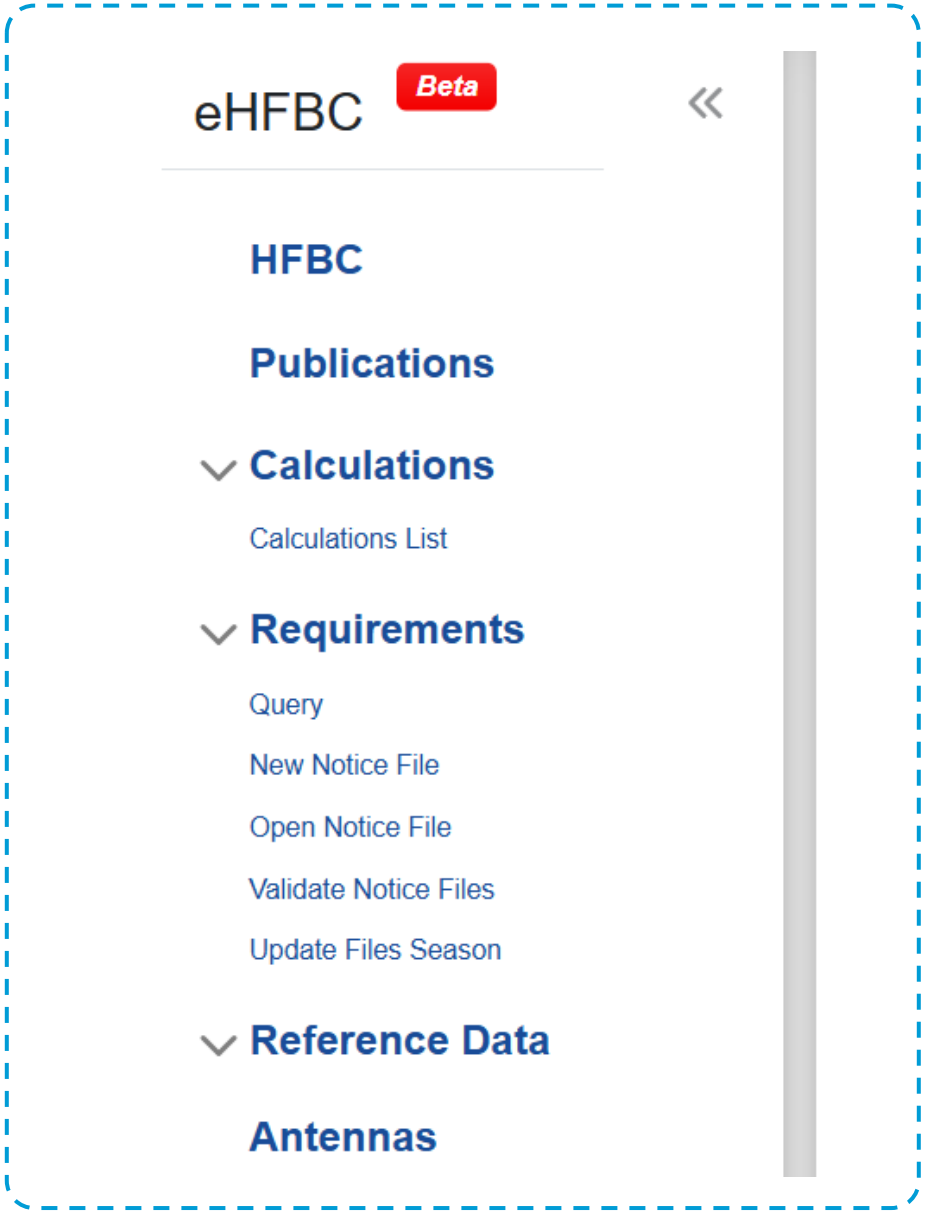
Basic circuit reliability (BCR) of a requirement, hour by hour, on a map

3 Interference analysis

The interferers of a requirement at a given hour, and the interference

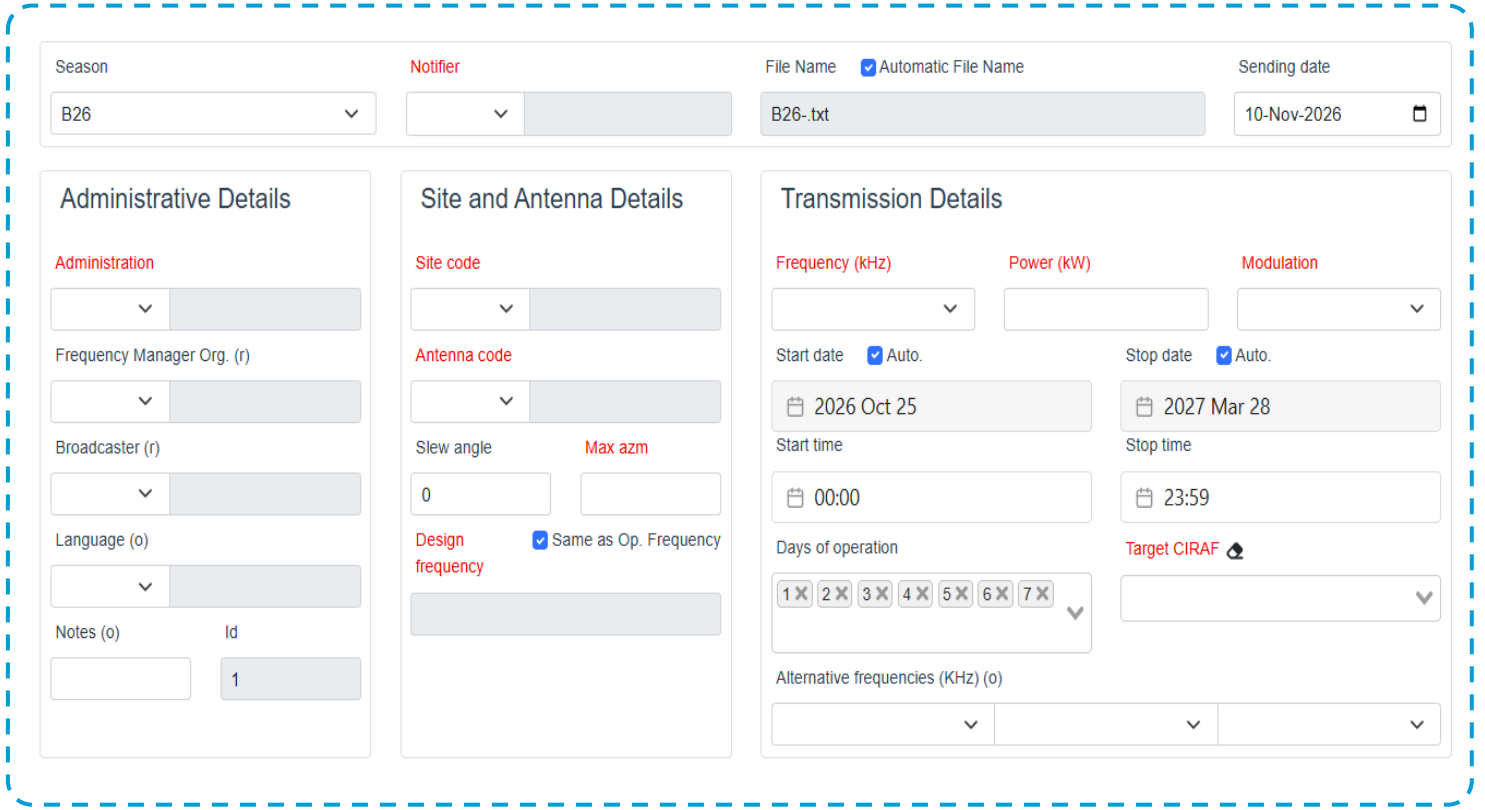
4 What-if studies

Change a parameter (azimuth, frequency...) and recompute on the fly



Case study 1 – New notice file for season A27

Mandatory field	Value
Season	A27
Date sent	Automatic
Notifying organization	AUT
Adm	AUT
Site code	MOS
Antenna code	217 (AHR(S)4/4/0.8)
Antenna slew angle	-10
Azimuth	140
Frequency (kHz)	11955
Antenna design frequency (kHz)	16700
Power (kW)	100
Modulation	D
Dates (start – stop)	2027 Mar 28 – 2027 Oct 31
Time UTC (start – stop)	17:00 – 19:00
Days of operation	1, 2, 3, 7
Target service area (CIRAF)	46SE,47W



Also fill in the recommended **broadcaster** and **FMO** codes; language, alternate frequencies and notes are optional

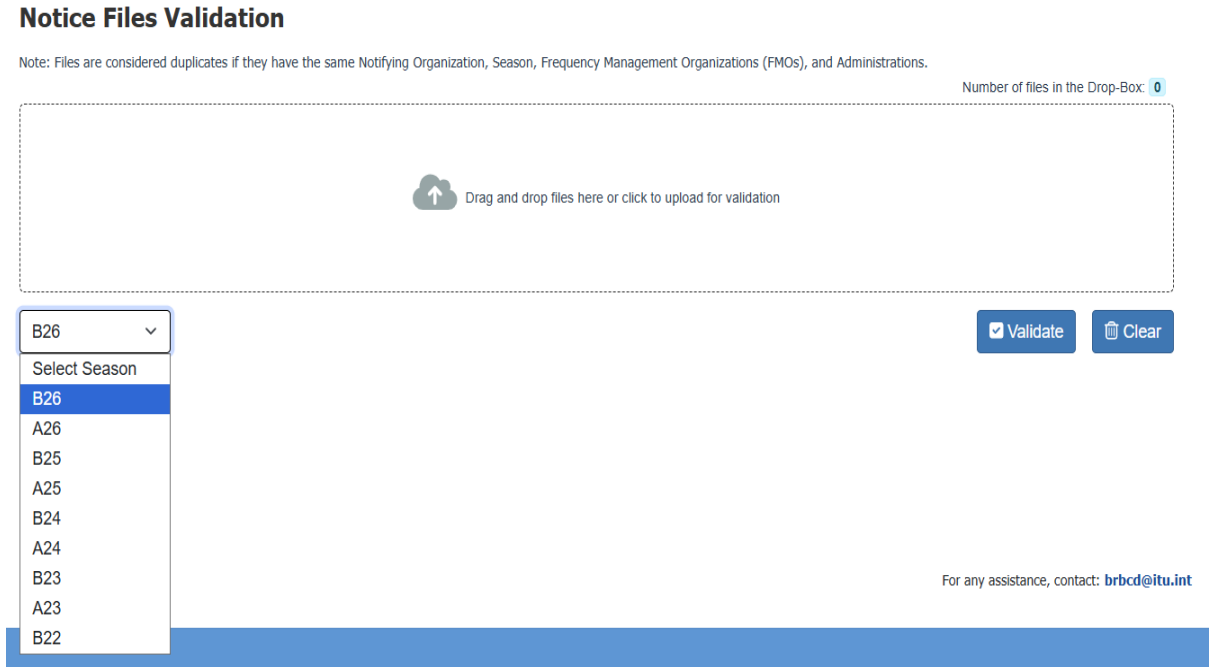
Case study 2 – Modify and validate the file

Modify the requirement of case study 1

Field	Before	After
Frequency (kHz)	11955	11880
Time UTC	17:00 – 19:00	19:00 – 23:00

Validate

1. **Example 1:** validate the file created in case study 1
2. **Example 2:** validate a file with errors, correct it and save the file



Case study 3 – Coverage analysis

1 Publication

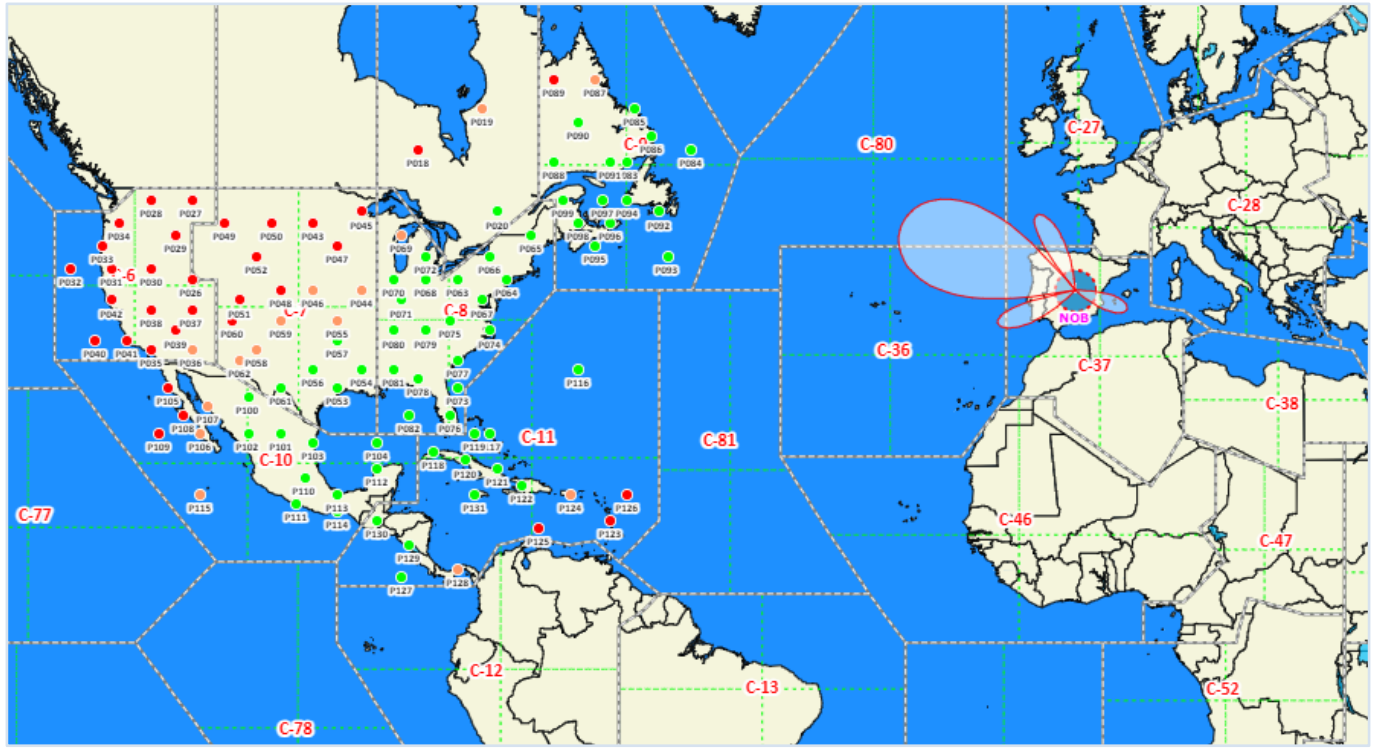
Schedule	**B24T1**
Month	**March 2025**

2 Requirement

Notifying org.	**E**
BR Id	**68219**
Time	**15:00 – 24:00**

3 Task

Analyse the coverage with the BCR at hour 23



BCR at hour 23

Case study 4 – Interference / compatibility analysis

1 Publication

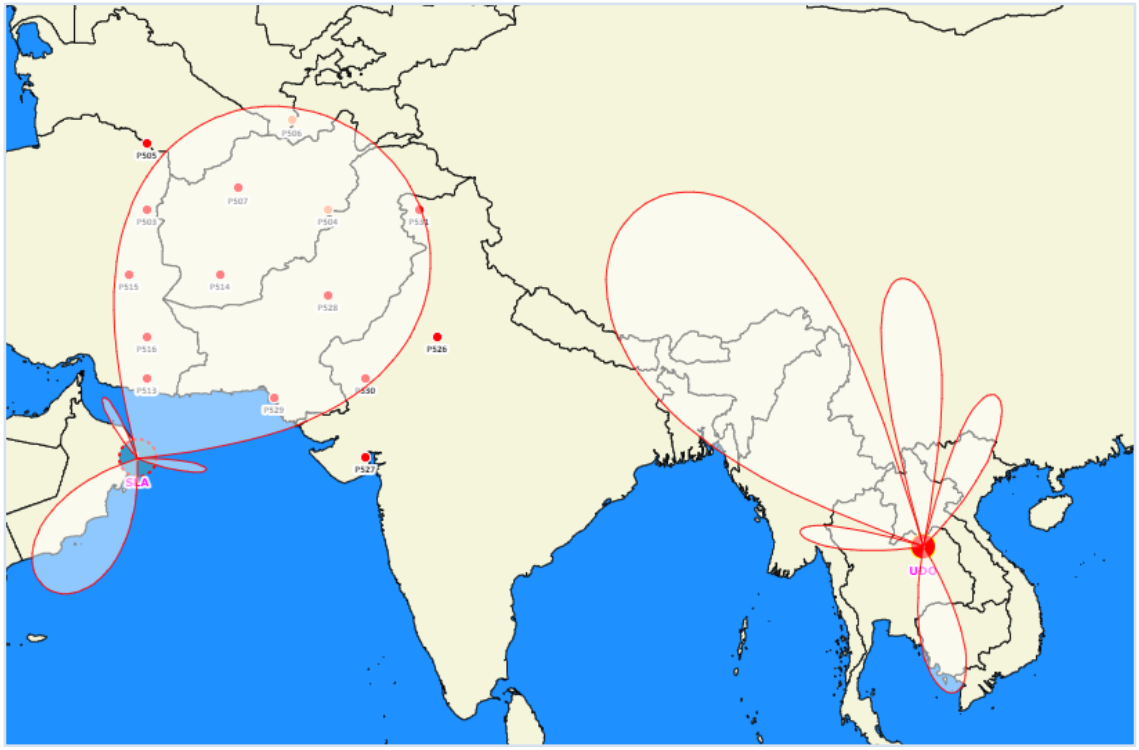
Schedule	**B24T1**
Month	**March 2025**

2 Requirement

Notifying org.	**OMA**
BR Id	**67905**
Time	**16:00 – 16:30**

3 Task

Analyse the interference at hour 16



The interferer and the interference at hour 16

Case study 5 – What-if: change the azimuth

1 Publication

Schedule	**B24T1**
Month	**March 2025**

2 Requirement

Notifying org.	**BOT**
BR Id	**68453**
Time	**21:30 – 22:00**

3 Task

Change the azimuth from 350° to 320°: BCR at hour 21



Azimuth 350°



Azimuth 320°

Case study 6 – What-if: 24-hour study

1 Publication

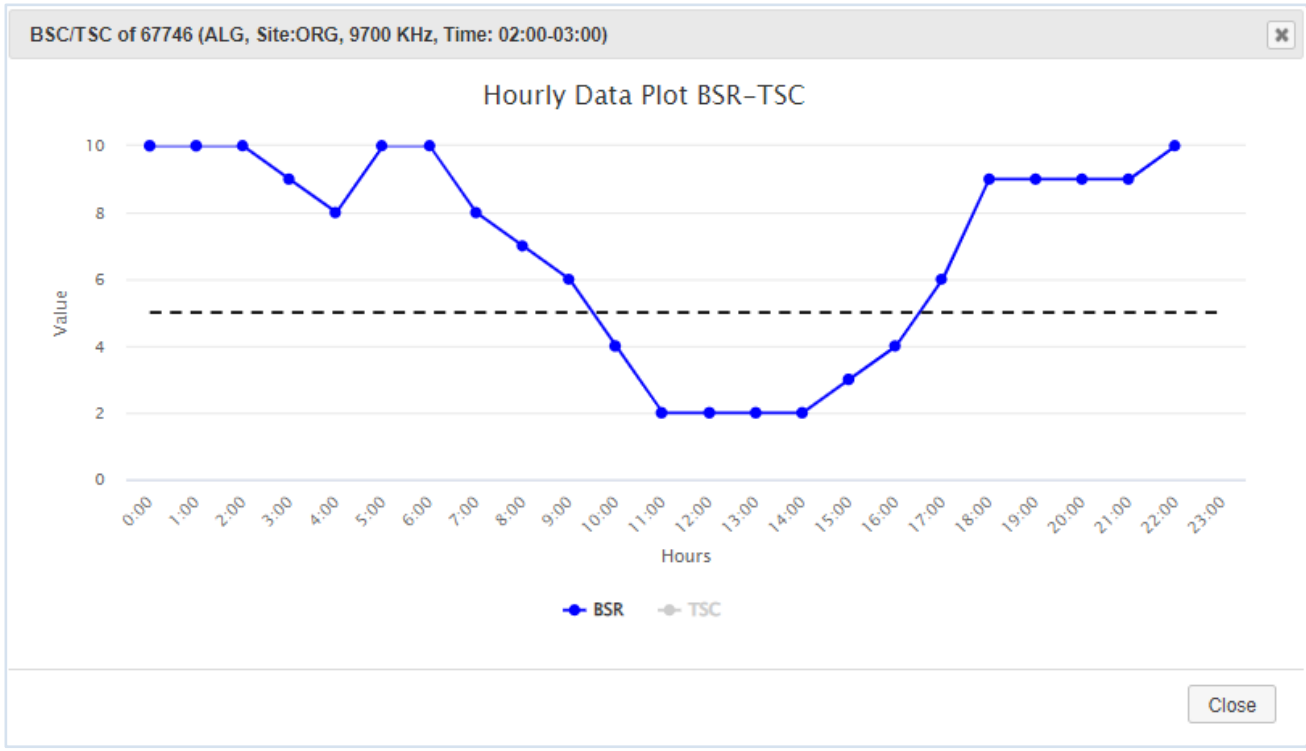
Schedule	**B24T1**
Month	**March 2025**

2 Requirement

Notifying org.	**ALG**
BR Id	**67746**
Frequency	**9700 kHz**

3 Task

Study the BCR over 24 hours



Hourly plot of the requirement over 24 hours

Recap

Article 12 — Seasonal planning of the HF bands 5 900 – 26 100 kHz, with Resolution 535

Seasons — A and B, 11 publications a year; deadlines in the BR Circular Letters

Notify — The whole schedule, in the common file format, via WISFAT

eHFBC — Notices, coverage, interference and what-if studies on the published schedules

Thank you



Questions

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