





# Workshop ITU HFBC software

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# Introduction to the ITU HFBC software package

- General principles:
  - Consistent with Article 12 and Resolution 535 of WRC-97.
  - Developed in consultation with administrations, broadcasters, and coordination groups.
  - Takes into account the availability of suitable computer hardware by administrations to run the software.

# Key features of the software modules

-  **HFBC REQ** - Data Capture software
-  **ITU HFBC** - Calculation software
-  **HFBC VAL** - Data validation software
-  **HFBC ANT** - Antenna calculation software

# HFBC REQ

## Data capture software

- Capture HF requirements.
- Create and modify requirement files.

# HFBC REQ

ITU RR12 submission - M:\BRTSD\BCD\HFBC\B10\B10S1ReadyForPublication\B10T2-15918-CZE.txt - HFBCREQ

File Display Tools Preferences Help Français Español

Season: **B10**

Source: **CZE**

No of requirements: **26**

Enter/Change data as required.

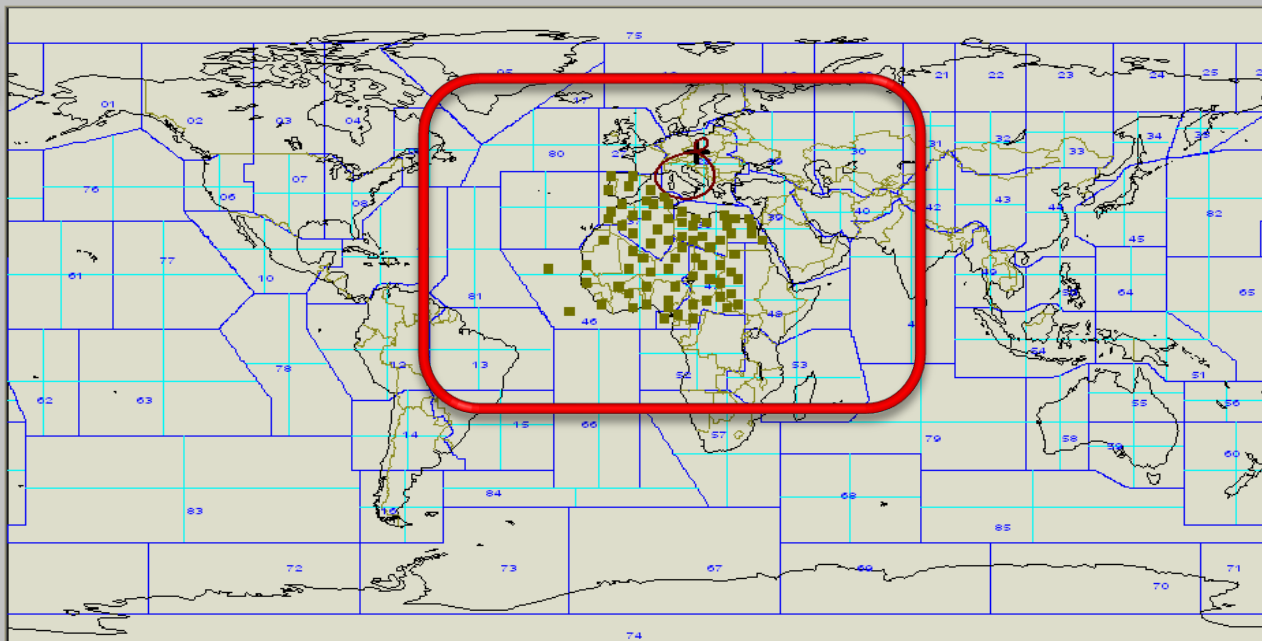
Freq/Band	Start time	Stop time	Start Date	Stop Date	Days Operation	Alt Freq 1	
7355	22 30	23 00	10/31/2010	3/27/2011	1234567		
Site	Site name	Target Cirafs	Alt Freq 2				
LIT	Litomysl, CZE	37,38,46,47					
Ant Code	Antenna designation	Pwr kW	Slew	Max Azm	Mod	Design Freq	Alt Freq 3
146	AHR(S)2/2/0.5	100	0	199	D		
Adm	Ntf	Brc	FMD	Language	Remarks	Data type	
CZE	CZE	RPR	TCH	Eng			

All requirements

Click below to select requirement

- 5930 0700-0800 LIT (1)
- 5930 1600-1630 LIT (2)
- 5930 1700-1730 LIT (3)
- 5930 1730-1800 LIT (4)
- 5930 1800-1830 LIT (5)
- 5930 1900-2000 LIT (6)
- 5930 2000-2100 LIT (7)
- 5930 2100-2130 LIT (8)
- 5930 2130-2230 LIT (9)
- 5930 2300-2400 LIT (10)
- 5980 0500-0530 LIT (11)
- 5995 1830-1900 LIT (12)
- 6055 1230-1300 LIT (13)
- 6055 1300-1400 LIT (14)
- 7280 1630-1700 LIT (15)
- 7345 0300-0330 LIT (16)
- 7345 0330-0430 LIT (17)
- 7345 0800-0830 LIT (18)
- 7345 1100-1130 LIT (19)
- 7355 2230-2300 LIT (20)**
- 7410 0100-0300 LIT (21)
- 7420 1530-1600 LIT (22)
- 9855 0430-0500 LIT (24)
- 9880 1130-1230 LIT (25)
- 21745 1000-1100 LIT (26)

Save changes    Add as a NEW requirement    Delete requirement    Clear all fields



# ITU HFBC

## Calculation software

- The main HF module, linked with the data capture module.
- Propagation prediction: calculates propagation data; results in tabular form or on maps.
- Compatibility analysis: calculates interference from other requirements; identifies interference sources; results are shown on maps.

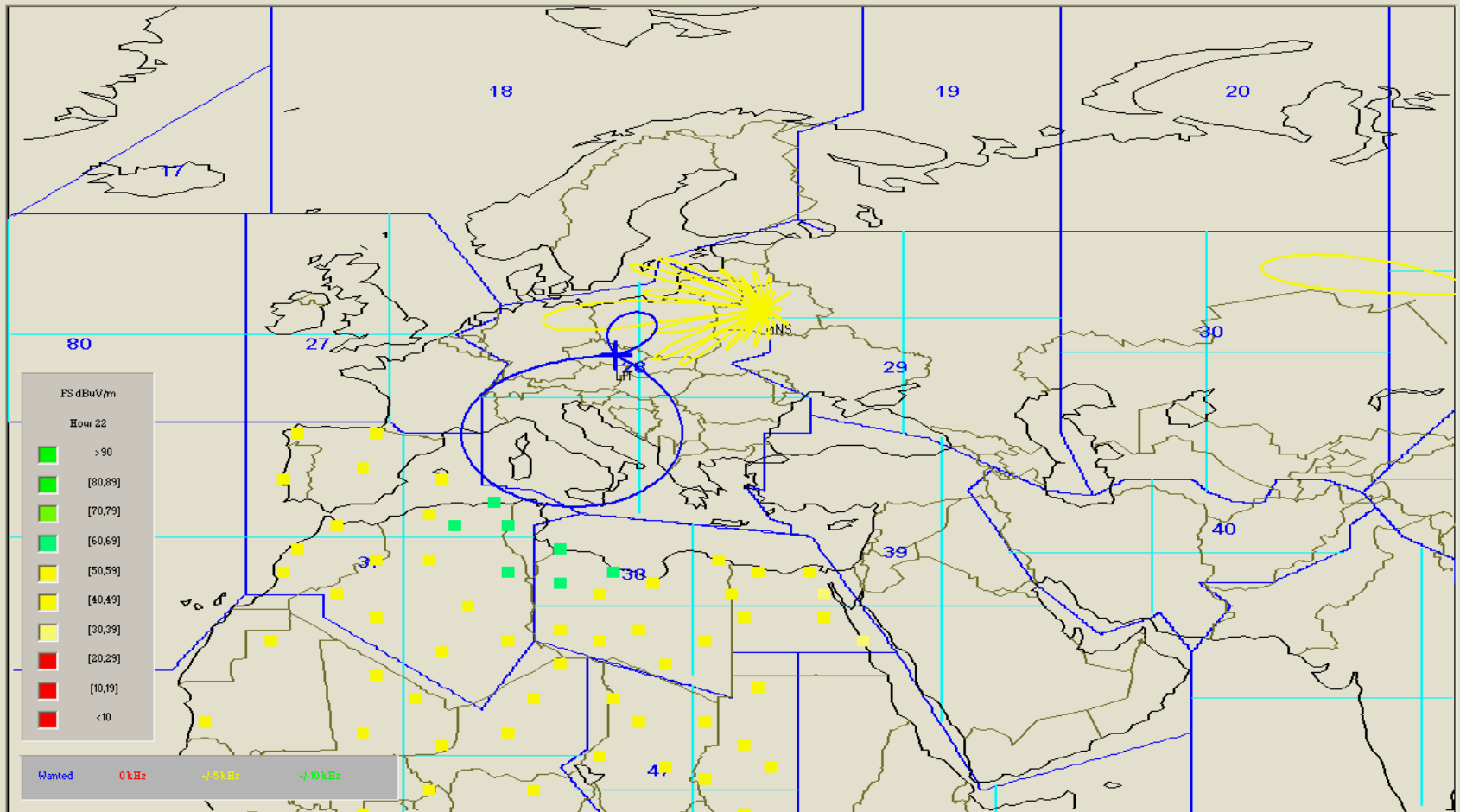
# ITU HFBC

GO TO COMPATIBILITY ANALYSIS MODE - B1051 on ITU HFBC CD-ROM - ITU HFBC 5.2

Schedule Tools Preferences Help Français Español

Move cursor on test points and Left-Click to display results. Right-Click with cursor elsewhere to show Menu

Field strength in dBuV/m for Hour 22



Wanted: (4378) 7355 D 2230-2300 CZE TCH LIT 37.38 46.47  
Unwanted: (68) 7355 D 2200-0400 USA FCC RND 3-5.9-11.17.27  
Unwanted: (1179) 7360 D 2155-2400 CHN RTC BJI 42SE,435W  
Unwanted: (2838) 7360 D 1200-2400 BLR SDT MNS 27.28  
Unwanted: (3437) 7350 D 2200-2300 RUS GFC NVS 43.44



# HFBC VAL

## Data validation software

- Designed to assist administrations to validate quickly their HFBC requirement files:
  - For Article 12 HF bands.
  - For Regional coordination groups bands.
- Remove requirements with frequencies out of the Article 12 bands.



# HFBC VAL

HFBC VAL 2.0 - M:\BRTSD\BCD\HFBC\B10\B10S1ReadyForPublication\B10T2-15918-CZE.txt

File Edit Validate Tools Help Français Español

4 error(s); Total number of requirements = 26

; B10 CZE 30-AUG-2010 TCH

FREQ	STRT	STOP	CIRAF	ZONES	LOC	POWR	AZIMUTH	SLW	ANT	DAYS	FDATE	TDATE	MOD	AFRQ	LANGUAGE	ADM	BRC	FMO	REQ#	OLD	ALT1	ALT2	ALT3	NOTES			
5930	0700	0800	07,08,09		LIT	100	260	0	101	1234567	311010	270311	D		FraDeu	CZE	RPR	TCH	8086								
3333	1600	1630	27,28		LIT	100	260	0	101	1234567	311010	270311	D		Deu	CZE	RPR	TCH	8087								
5930	1700	1730	99		LIT	100	290	0	206	1234567	311010	270311	D		Eng	CZE	RPR	TCH	8089								
		1800	27,28		LIT	100	260	0	206	1234567	311010	270311	D		Fra	CZE	RPR	TCH	8090								
5930	1800	1830	27,28		LIT	100	290	0	206	1234567	311010	270311	D		Eng	CZE	RPR	TCH	8091								
5930	1900	2000	27,28,36,37		LIT	100	245	0	894	1234567	311010	270311	D		SpaFra	CZE	RPR	TCH	8094								
5930	2000	2100	27,28,36,37		LIT	100	245	0	894	1234567	311010	270311	D		SpaCes	CZE	RPR	TCH	8093								
5930	2100	2130	27,28		LIT	100	290	0	206	1234567	311010	270311	D		Eng	CZE	RPR	TCH	6346								
5930	2130	2230	13,14,37		LIT	100	365	0	894	1234567	311010	270311	D		SpaCes	CZE	RPR	TCH	14123								
5930	2300	2400	3-10		LIT	100	310	0	146	1234567	311010	270311	D		FraEng	CZE	RPR	TCH	8084								
5980	0500	0530	28-30		LIT	100	60	0	206	1234567	311010	270311	D		Rus	CZE	RPR	TCH	8096								
5995	1830	1900	28-31		LIT	100	60	0	206	1234567	311010	270311	D		Rus	CZE	RPR	TCH	12238								
6055	1230	1300	28-31		LIT	100	60	0	206	1234567	311010	270311	D		Rus	CZE	RPR	TCH	8097								
6055	1300	1400	18,27,28		LIT	100	0	0	927	1234567	311010	270311	D		DeuCes	CZE	RPR	TCH	6351								
7280	1630	1700	38-40		LIT	100	125	0	891	1234567	311010	270311	D		Ces	CZE	RPR	TCH	14122								
7345	0300	0330	12-16		LIT	100	245	0	894	1234567	311010	270311	D		Spa	CZE	RPR	TCH	15132								
7345	0330	0430	7-10		LIT	200	310	0	146	1234567	311010	270311	D		CesEng	CZE	RPR	TCH	15131								
7345	0800	0830	27		LIT	100	290	0	206	1234567	311010	270311	D		Eng	CZE	RPR	TCH	6360								
7345	1100	1130	27-29		LIT	200	0	0	926	1234567	311010	270311	D		Deu	CZE	RPR	TCH	6358								
7355	2230	2300	37,38,46,47		LIT	100	199	0	146	1234567	311010	270311	D		Eng	CZE	RPR	TCH	6392								
7410	0100	0300	7-10		LIT	100	310	0	146	1234567	311010	270311	D		EngSpaCes	CZE	RPR	TCH	14074								
7420	1530	1600	29-32		LIT	100	60	0	206	1234567	311010	270311	D		Rus	CZE	RPR	TCH	14143								
9790	0000	0100	12-16		LIT	100	245	0	878	1234567	311010	270311	D		SpaCes	CZE	RPR	TCH	8085								
9855	0430	0500	38,39,48		LIT	100	144	0	892	1234567	311010	270311	D		Eng	CZE	RPR	TCH	6369								
9880	1130	1230	18,28		LIT	100	356	0	878	1234567	311010	270311	D		EngCes	CZE	RPR	TCH	8101								
21745	1000	1100	37,46		LIT	100	210	0	878	1234567	311010	270311	D		EngCes	CZE	RPR	TCH	6387								

# HFBC ANT

## Antenna calculation program

- Theoretical approach based on Recommendation ITU-R BS.705
- Calculates the radiation patterns and gain of the most common used HF antennas.
- Provide quick reference for administrations and broadcasters in identifying antennas.

# HFBC ANT



English  
Español  
Français

## HFBC Antennas

Please enter Antenna Code or select from list below  
If required, make changes to parameters and click Refresh

### Antenna Type

- AHR (100-299)
- CHR (300-499)
- EHR (500-699)
- CH (700-750)
- CT (750-799)
- LPH (800-849)
- LPV (850-874)
- RH (875-924)
- HQ (925-949)
- HX (950-974)
- VM (975-990)
- Old Codes (1-75)

### Tools

- Refresh
- Print

Exit

Antenna Code

Antenna Type

Horizontal log-periodic

Antenna designation

LPH18/35/30/30/3/26/89

Ground dielectric constant (3 - 80)

Shortest to longest element distance (m)

Ground conductivity (.00003 - 5.0 S/m)

Height of the shortest element (m)

Operating frequency (2 - 30 MHz)

Height of the longest element (m)

Number of elements (20 max)

Feeder impedance (999 ohm max)

Half-length of the shortest element (m)

Half-length of the longest element (m)

Azimuth at Gain max (degrees)

Directivity Gain (dBi)

11.8

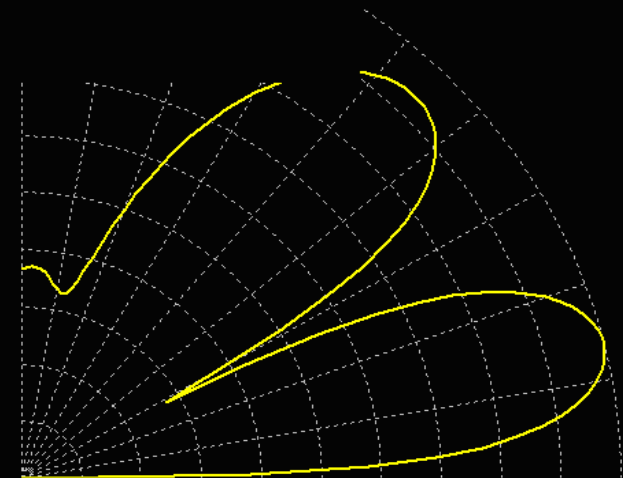
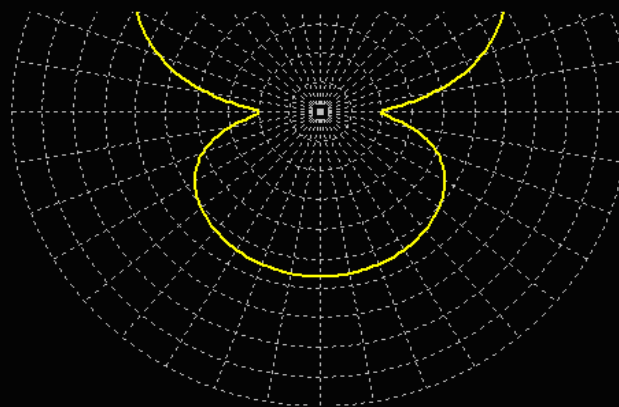
Elevation at Gain max (degrees)

Floor/Step value (dB)

-30/3

Horizontal pattern at 14° elevation

Vertical pattern at 0° azimuth



# Thank you for your attention

## Questions



# HFBC Exercises

## ITU Regional Radiocommunication Seminar for Asia-Pacific 2013 (RRS-13 Asia-Pacific)



### Exercise 1 – HFBC REQ 1.3 - Data Capture

#### Purpose and objectives:

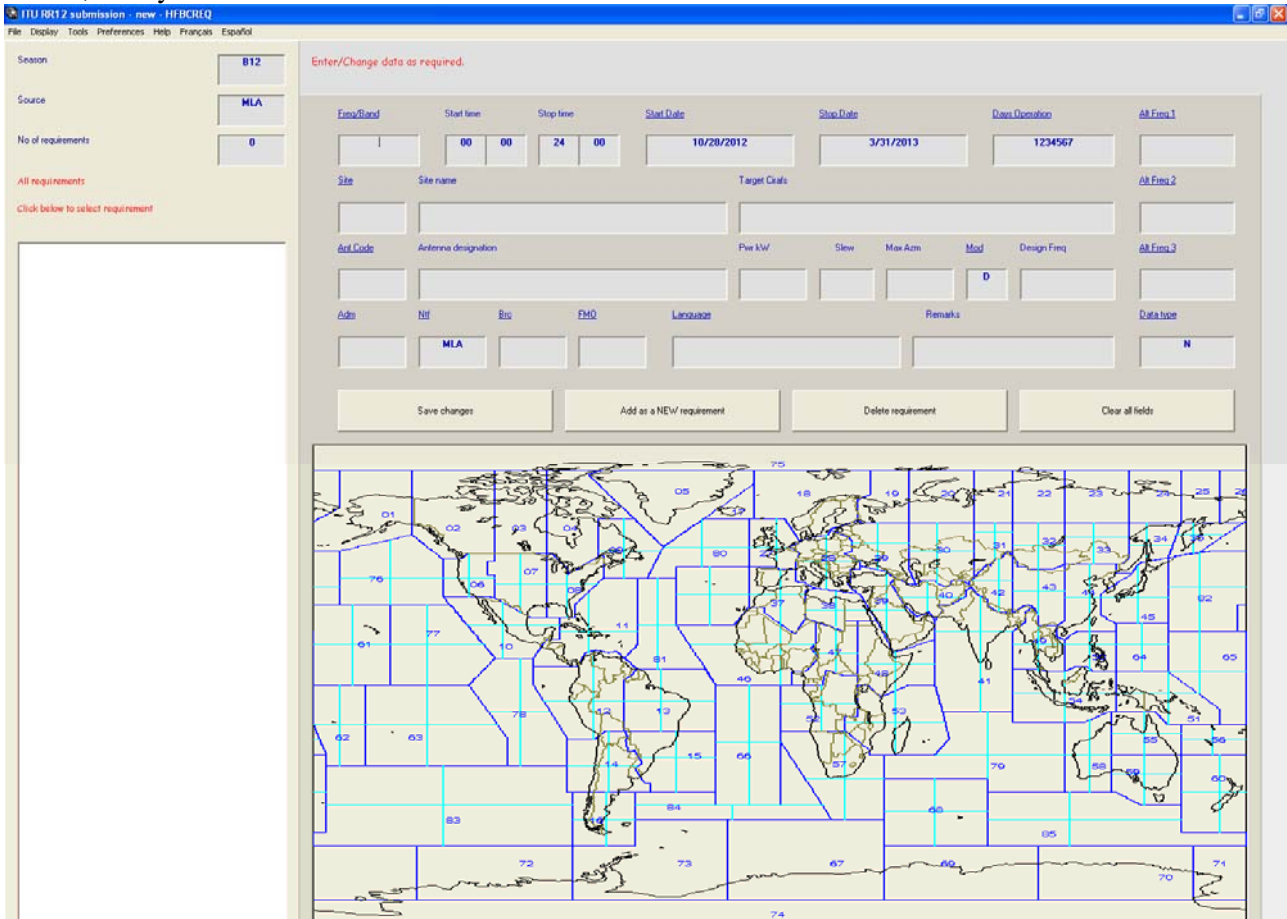
A simple requirement file for notification to the ITU has to be created and saved using the Data Capture software HFBC REQ 1.3.

#### Input data:

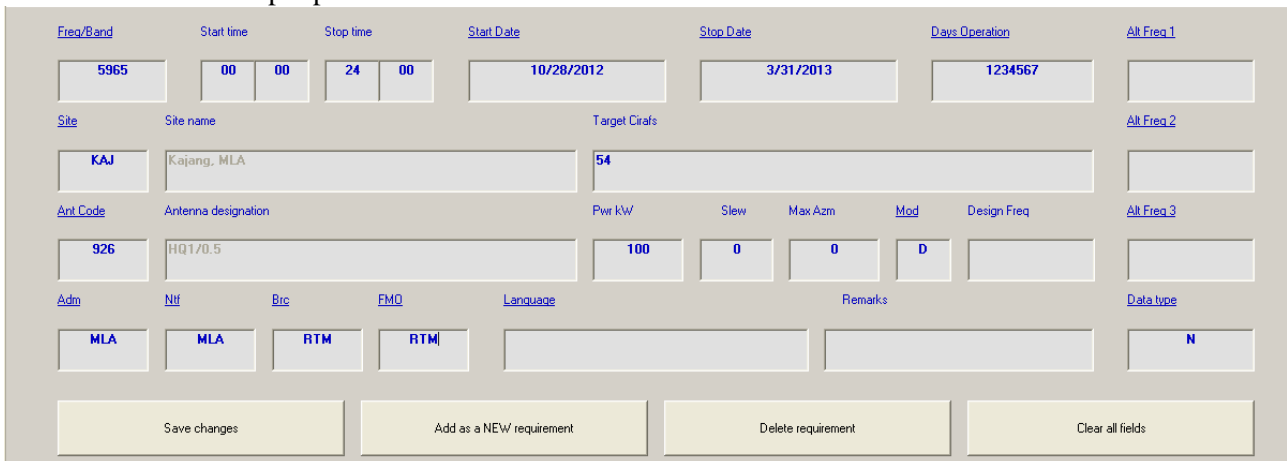
- Requirement file should cover the season B12 (October 2012 – March 2013)
- Administration responsible: Malaysia
- One requirement to be included in the requirement file:
  - *Frequency: 5965 [MHz]*
  - *Transmission time slot: 00:00-24:00 [UTC]*
  - *Start Time: code: 00 00*
  - *Stop time: code: 24 00*
  - *Coverage area: Malaysia, Indonesia, 54 [CIRAF zones]*
  - *Transmitter site location: Kajang, code: KAJ*
  - *Transmitting power: 100 [kW]*
  - *Azimuth of the maximum radiation: 0 [Degrees]*
  - *Antenna slew angle: 0 [Degrees]*
  - *Antenna type: Quadrant antenna HQ1/0.5, antenna code: 926*
  - *Days of operation: From Monday to Friday, code: 1234567*
  - *Period of operation: From 28-Oct-2012 to 31-Mar-2013*
  - *Start Date: 28/10/2012*
  - *Stop date: 31/03/2013*
  - *Modulation: Double-side, code: D*
  - *Language used for the transmission: Malay, language code: May*
  - *Broadcaster: Radio Television Malaysia, code: RTM*
  - *Frequency manager organization: Radio Television Malaysia, code: RTM*
  - *Alternative frequency: None*
  - *Data type: new requirement, code N*

**Solution - Steps to be followed:**

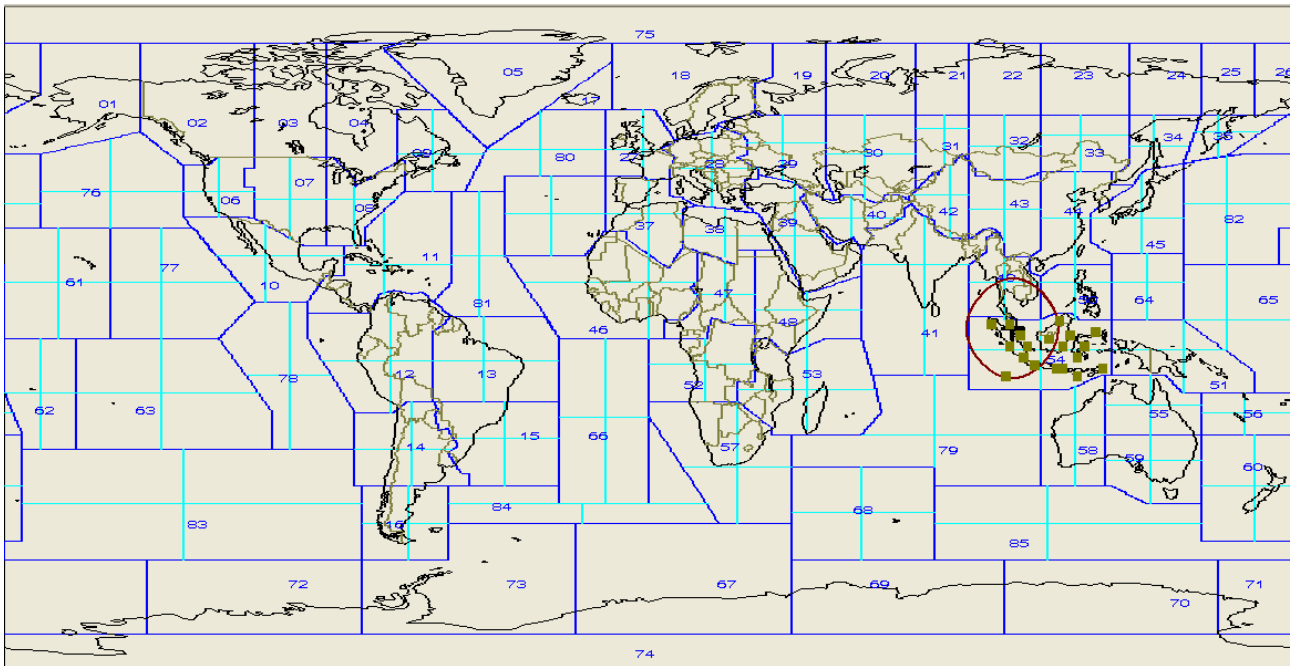
1. Run the HFBC REQ 1.3 software.
2. Configure the “Open” dialog box:  
“Requirement file to ITU”; Open a new requirement file, “B12 season”.
3. Configure the “Authorised Notifying Organisations” dialog box.  
“MLA, Malaysia”.



4. Type in or select from the item titles the appropriate input data for the requirement.
5. Check data in the input part of the screen. It should be:



6. The graphical part of the screen should display the antenna diagram of the selected antenna system and the requested target service area:



7. To save the requirement, click on “Add as a NEW requirement” button, then OK.

8. Please note that this first added requirement appears in left blank box which contains a short list of all requirements included in the notification file.

Enter/Change data as required.

Freq/Start	Start time	Stop time	Start Date	Stop Date	Days Operation	Alt Freq 1
5955	00 00	24 00	10/28/2012	3/31/2013	1234567	

Site	Site name	Target Code	Alt Freq 2
KAJ	Cajiang, MLA	54	

Ant Code	Antenna designation	Pwr kW	Slew	Max Azm	Mod	Design Freq	Alt Freq 3
926	HQ170 S	100	0	0	D		

Ant	Ref	Res	FMD	Language	Remarks	Data type
MLA	MLA	RTM	RTM			N

Click below to select requirement

- 5955-0000-2400 KAJ (L)

Buttons: Save changes, Add as a NEW requirement, Delete requirement, Clear all fields



9. From the main “File” menu, select “Save”. A dialog box appears requesting you to select the code of the organization authorized to submit requirements on behalf of your administration. Select the code MLA.

10. Select a folder on your computer to save the file. Please note that automatically, the proposed name of your requirement file is set to: *[Season][Notifying organization].txt* (*B12MLA.txt*)

11. Your file is saved as a simple text file format and ready to be sent to the Bureau.

12. Close the application.



```
HFBC VAL 2.0 - M:\VRTSD\BCDV\HFBC\docs\Seminars\2012\B11-MLI.txt
File Edit Validate Tools Help Français Español

Select Validate to check file... or Select other available options

P B12 MLI 13-Nov-2012
generated from previous submitted requirement file B11-MLI.txt
;
; pour notification à l'U.I.
; No totale des besoins 30
;
; à l'exception de la première ligne (contenant saison. org notificatrice, date)
; Lignes commençant avec virgule (;) sont ignorées par le programme
;
; crée par HFBCREQ 1.3 on 19/07/2011 12:16:45
;
-----
;FREQ DEBU FIN ZONES CIRAF LOC PUIS AZINUTE PIV AMT JOURS DDATE FDATE MOD AFRQ LANGUE ADM RPF ORG REQ# VIE ALT1 ALT2 ALT3 NOTES
-----
;
5995 0600 0800 46 BKO 100 0 0 925 1234567 281012 310313 D 5995 MLI NTR 1 Y MLI
5995 1800 2400 46 BKO 100 0 0 925 1234567 281012 310313 D MLI NTR 2 Y MLI
7295 0800 0900 46 BKO 100 0 0 925 1234567 281012 310313 D 7295 MLI CRI 3 Y MLI
7295 2300 0000 46 BKO 100 0 0 925 1234567 281012 310313 D 7295 MLI CRI 4 Y MLI
6635 0800 1800 46 BKO 100 45 0 215 1234567 281012 310313 D 6635 MLI MTR 5 Y MLI
```

5. Save the file as **B12MLIfromB11.txt**

6. Close the application.

## **Exercise 3 – ITU HFBC 5.2 – Propagation and compatibility analysis**

### **Purpose and objectives:**

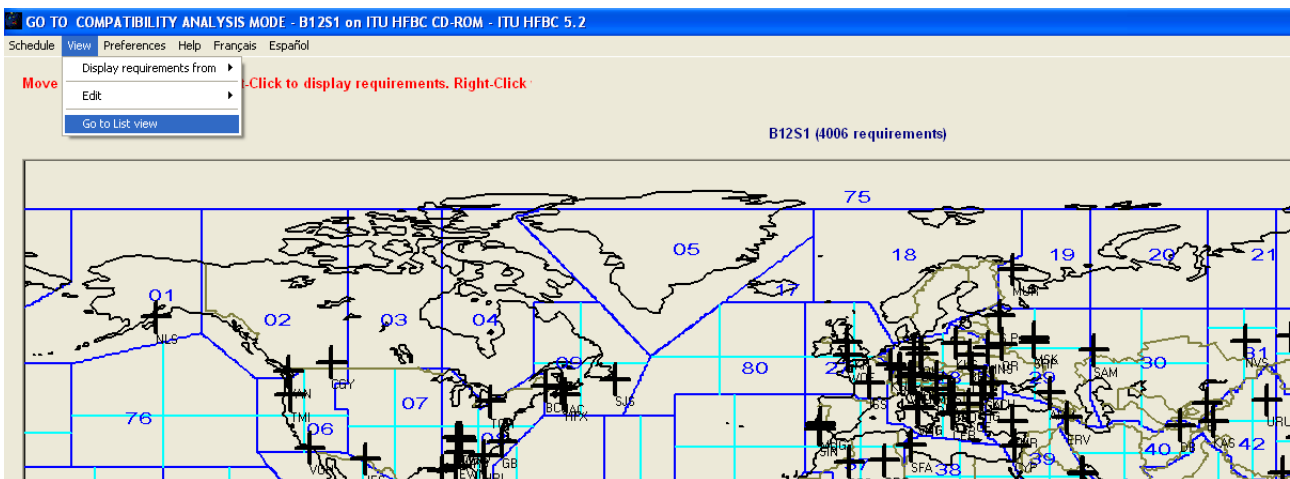
Analyze the Basic Service Reliability (**BSR**) and Time Service Circuit (**TSC**) for specific group of requirements published in ITU HFBC schedule (**in the list view mode**).

### **Input data:**

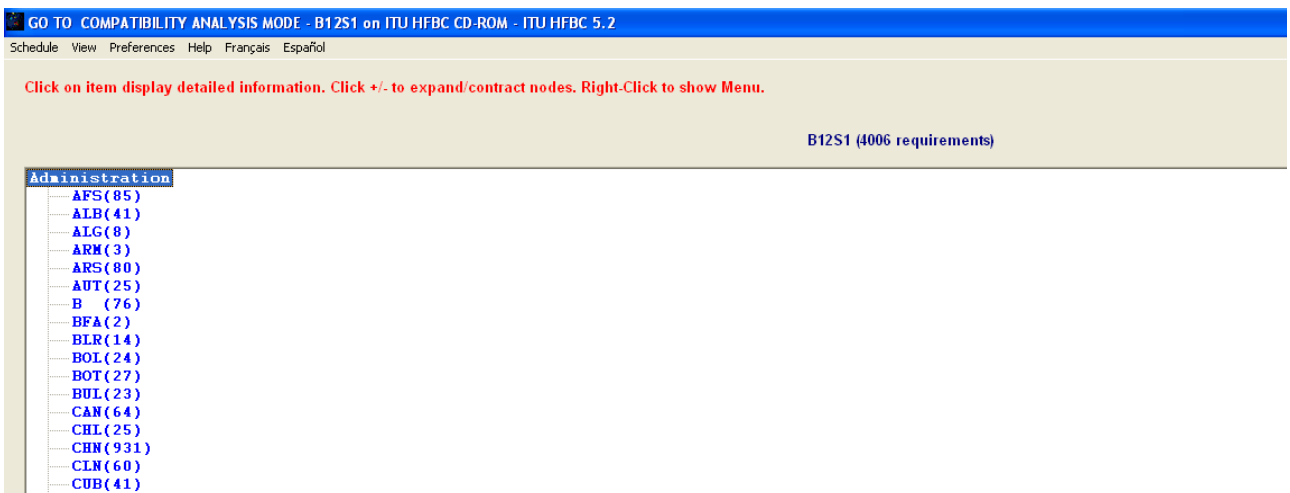
- (CD-ROM) HFBC Schedule B12S1.

### **Solution - Steps to be followed:**

1. Execute ITUHFBC 5.2 software.
2. Open schedule: B12S1
3. Select “List view”



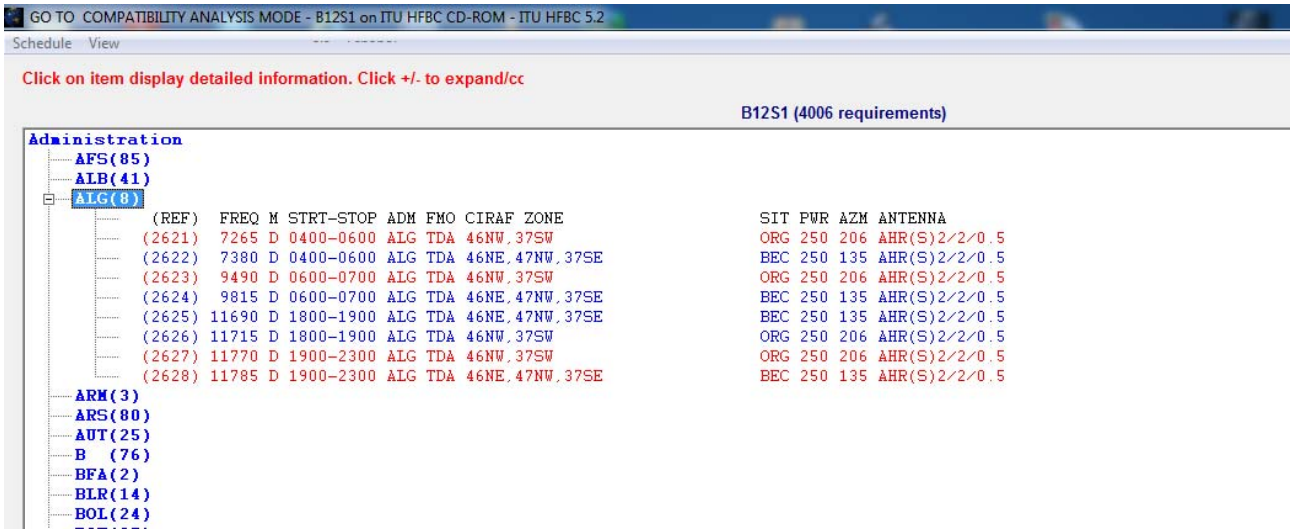
4. The list view is displayed:



5. Display requirements from an administration:

From “View” menu, select “Display Requirements from”, then select “Administration: **ALG** (Algeria)”.

6. Click on the ALG (8) to expand the requirements from Algeria.



7. Note the some requirements are displayed in red and some in blue.

8. Note the status bar at the bottom:



Requirements in RED color have BSR or TSC less than 50%.

Requirements in BLUE color have BSR or TCS more than 50%.

9. Analyze data for the requirements:

BSR and TSC values are presented as numbers from 0 to 9 (from 0% to 90%) for each transmitting hour (from Hour 4 to Hour 6 or 0400-0600...) and for each seasonal period:

November –beginning of the season;

January –middle of the season;

March –end of the season.

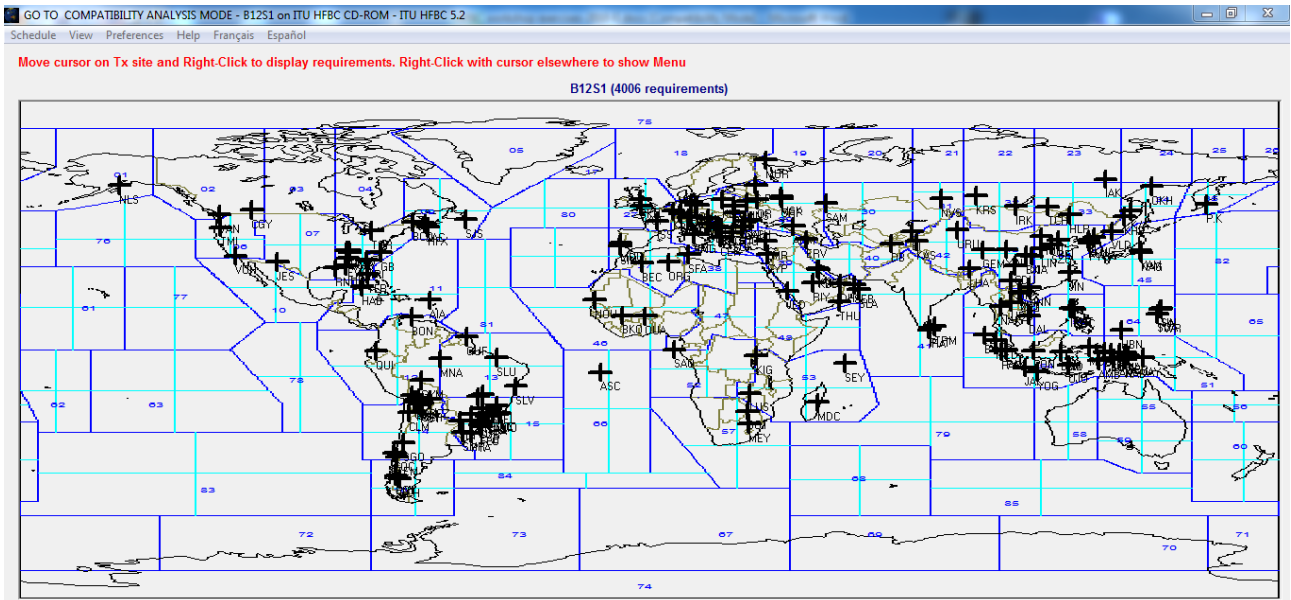
10. Click on a requirement to display detailed results:

(REF)	FREQ	M	STRT-STOP	ADM	FMO	CIRAF	ZONE	SIT	PWR	AZM	ANTENNA	
(2621)	7265	D	0400-0600	ALG	TDA	46NW,37SW			ORG	250	206	AHR(S)2/2/0.5
BSR H0405												
Nov	7	3										
Jan	6	1										
Mar	7	6										
TSC H0405 Interfered Cirafs (Wanted/Unwanted FS)												
Nov	2	9										
X	-	37SW,46NW(22/41-50/39dBu)										
X	-	37SW(21/18-32/18dBu)										
X	X	37SW(20/7-20/7dBu)										
Jan	2	9										
X	-	37SW,46NW(19/41-48/37dBu)										
X	-	37SW(13/21-31/16dBu)										
Mar	2	9										
X	-	37SW,46NW(30/41-50/39dBu)										
X	-	37SW(25/25-40/25dBu)										
(2622)	7380	D	0400-0600	ALG	TDA	46NE,47NW,37SE			BEC	250	135	AHR(S)2/2/0.5
(2623)	9490	D	0600-0700	ALG	TDA	46NW,37SW			ORG	250	206	AHR(S)2/2/0.5
(2624)	9815	D	0600-0700	ALG	TDA	46NE,47NW,37SE			BEC	250	135	AHR(S)2/2/0.5
(2625)	11690	D	1800-1900	ALG	TDA	46NE,47NW,37SE			BEC	250	135	AHR(S)2/2/0.5
(2626)	11715	D	1800-1900	ALG	TDA	46NW,37SW			ORG	250	206	AHR(S)2/2/0.5
(2627)	11770	D	1900-2300	ALG	TDA	46NW,37SW			ORG	250	206	AHR(S)2/2/0.5
(2628)	11785	D	1900-2300	ALG	TDA	46NE,47NW,37SE			BEC	250	135	AHR(S)2/2/0.5

(REF)	FREQ	M	STRT-STOP	ADM	FMO	SIT	CIRAF	ZONES
(3466)	7265	D	0400-0430	G	RCI	WOF	38E,39SW	
(1766)	7265	D	0500-1700	D	FNA	GOH	18,19,27,28,29,37N	
(813)	7260	D	0257-1205	CHN	RTC	URU	42N	
(3466)	7265	D	0400-0430	G	RCI	WOF	38E,39SW	
(1766)	7265	D	0500-1700	D	FNA	GOH	18,19,27,28,29,37N	
(3466)	7265	D	0400-0430	G	RCI	WOF	38E,39SW	
(1766)	7265	D	0500-1700	D	FNA	GOH	18,19,27,28,29,37N	

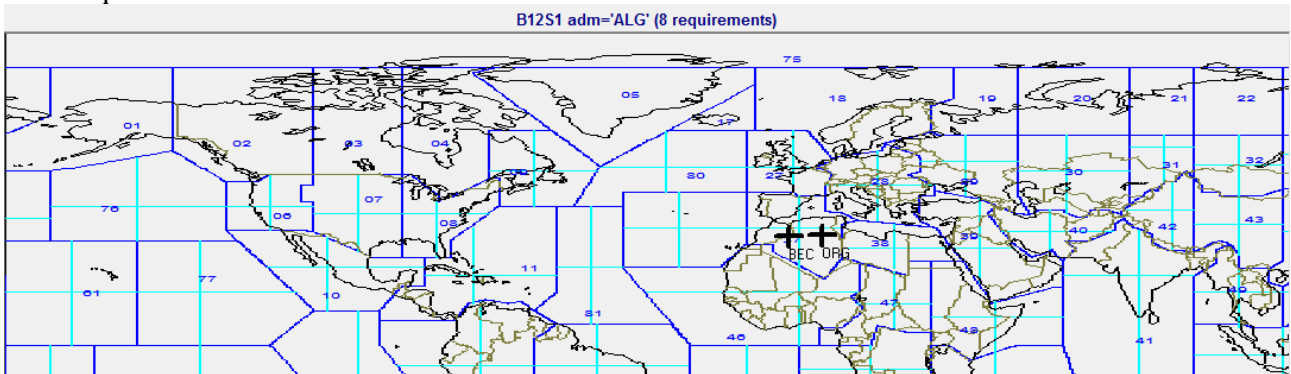
11. From "View" menu, select "Go to Map view"



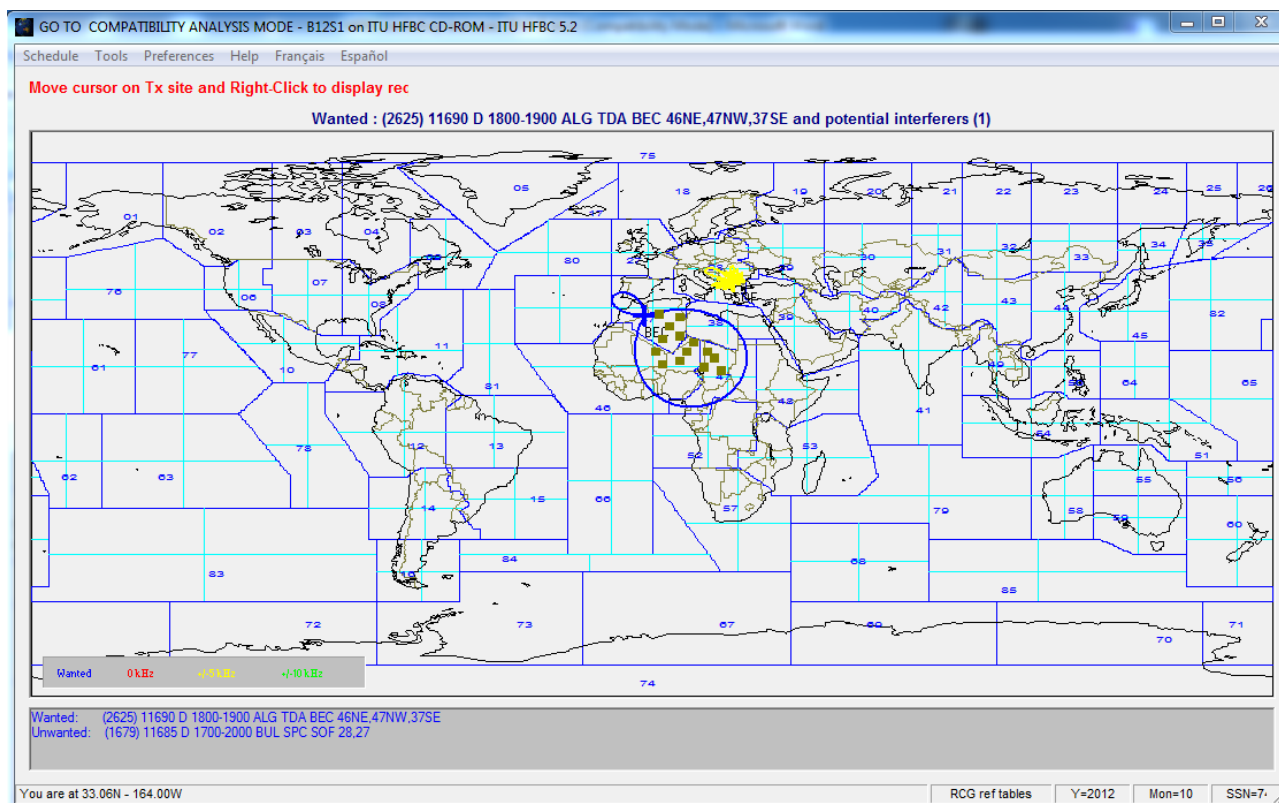
12. Display all requirements from an administration: ALG (Algeria)

Note that the location of the transmitter sites is marked on the map.

13. Right click the transmitter site cross BEC and select the requirement REF. (2625) from the list of the ALG requirements.



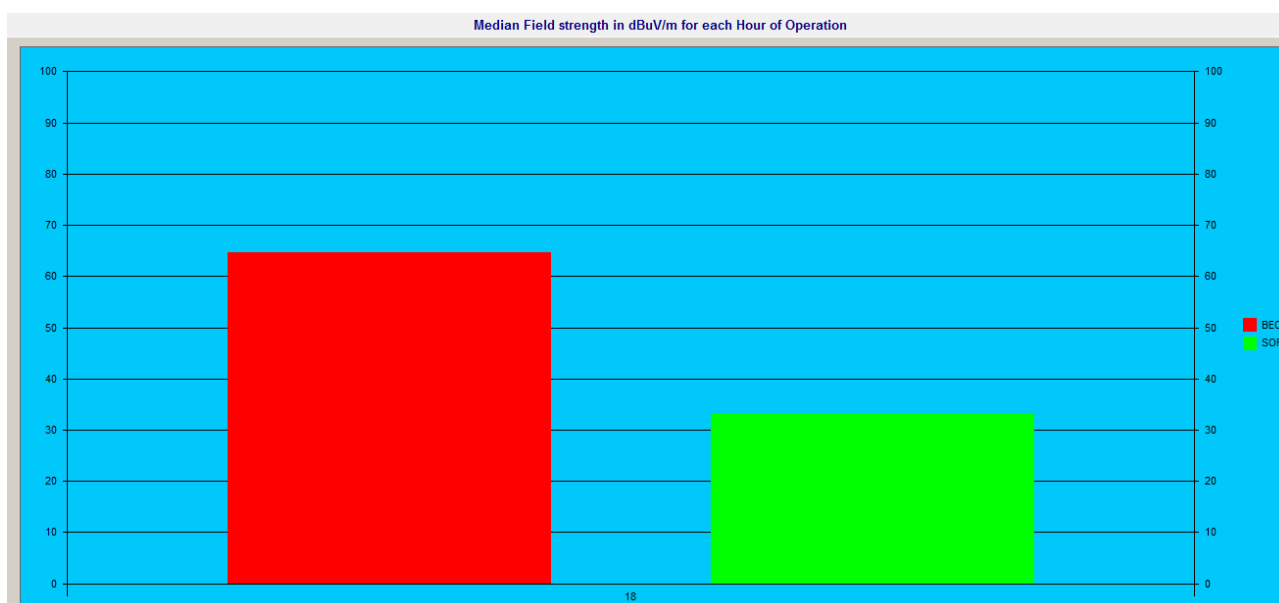
The antenna pattern of the selected requirement (2625) is displayed on the map in blue. The requirement appears in the list as Wanted. Other “Unwanted” requirements are indicated as potential interferers. Potential interfering requirements on the same channel are displayed in red, those on the adjusting channels +/- 5 kHz in yellow, and those in on +/- 10 kHz channels in green.



14. From “Tools” menu, select “Calculate”, then “Run compatibility analysis”.

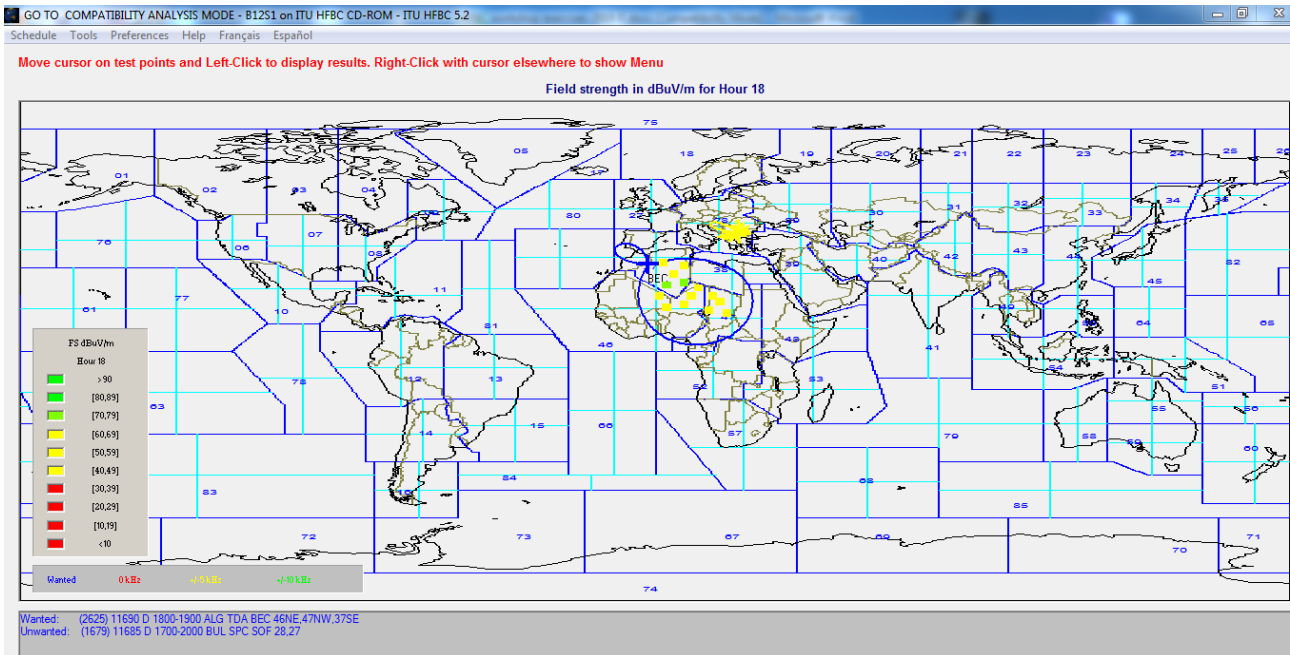
The software calculates...

15. A chart of the median Field Strength for each hour of operation is displayed:





16. Display the compatibility analysis on the map:  
From “Tool”, select “Show Map”.



17. Display the other parameters: Field Strength, Power received, Basic circuit reliability, Signal to Interference, Overall circuit reliability.

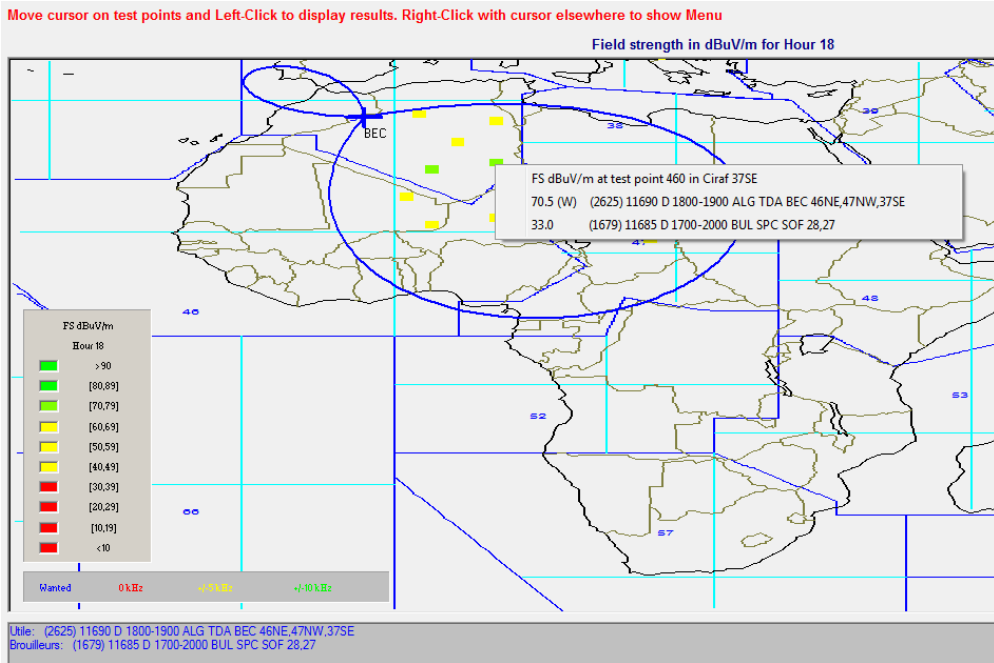
From “Tools”, select “Select Values”, then:

- “FS” – Field Strength
- “PWR” – Power received
- “BCR” – Basic circuit reliability
- “StoI” – Signal to Interference
- “OCR” – Overall circuit reliability

18. Switch between the different types values: Minimum, Median, and Maximum of the currently displayed parameter.

From “Tools” menu, select “Select Values Types”, then “Minimum”/“Median”/“Maximum”.

19. Zoom the map: click inside a continent, in this case, Africa:



## Exercise 4 – HFBC ANT 1.0 – HF transmitting antennas

### Purpose and objectives:

Display horizontal and vertical patterns of an antenna.

### Input data:

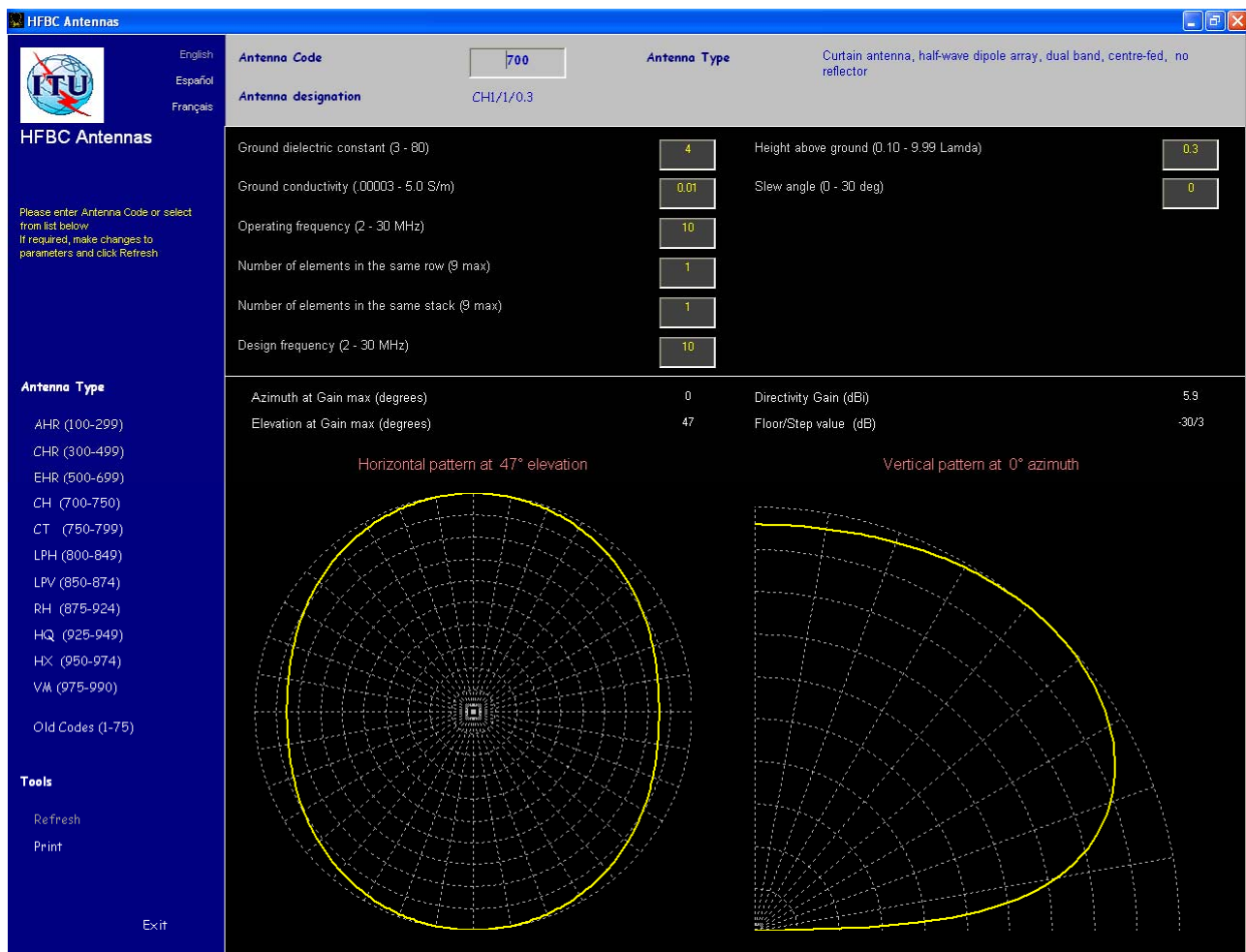
- Curtain antenna, half-wave dipole array, dual band, centre-fed, no reflector. Antenna type: CH1/1/0.3, antenna code: 700

This software is often used to determine the code, the description, and the parameters of the commonly used HF transmission antennas.

### Solution - Steps to be followed:

1. Execute the HFBC ANT 1.0 software.
2. Select the type of the antenna:

From the left menu “Antenna type”, select “CH (700-750)”, then from the list select “700 CH1/1/0.3”.



The selected antenna and its characteristics are displayed.

3. Select an antenna by specifying its code:  
Type the code in the “Antenna code box”:



4. Print the antenna parameters:  
From the left menu, click on "Print".
5. Close the application.