



Spectrum Management System for Developing Countries (SMS4DC)

Training on SMS4DC

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Livingstone, ZAMBIA

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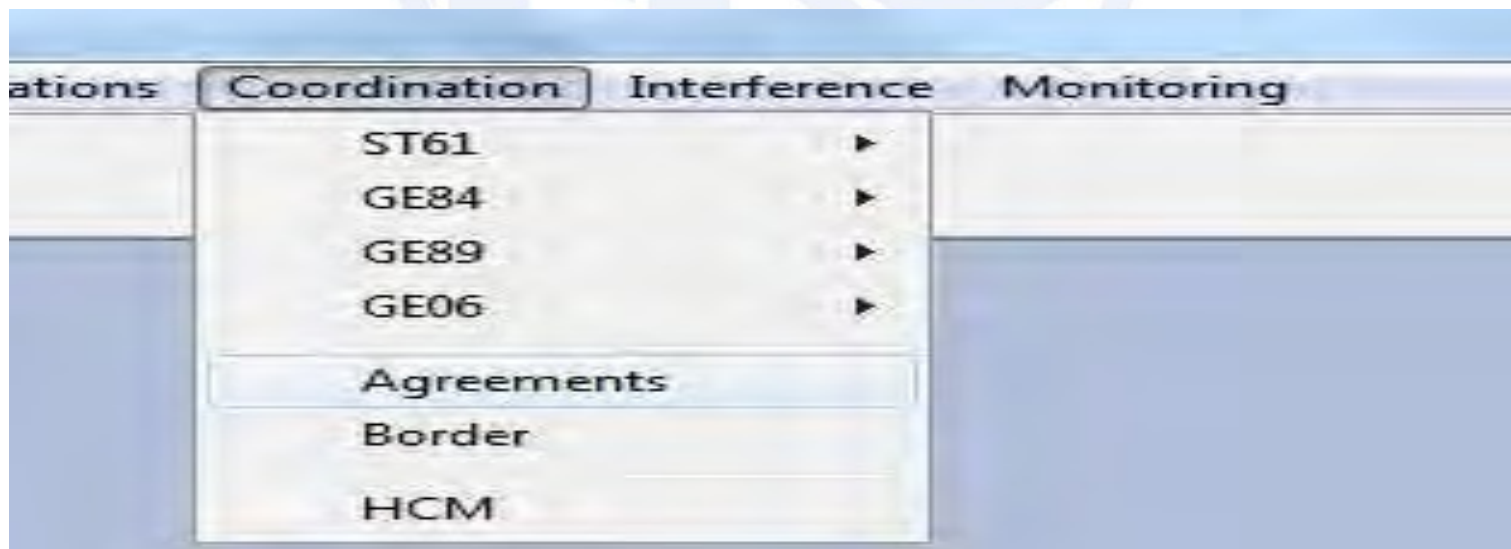
BORDER COORDINATION-USER DEFINED AGREEMENTS



WHY BORDER COORDINATION

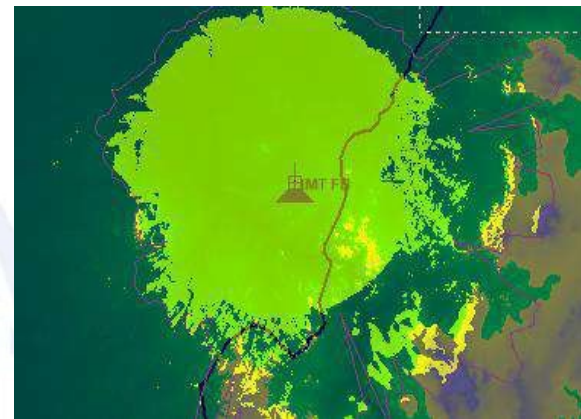
AGREEMENT

- DEVELOPING EFFECTIVE BILATERAL OR MULTILATERAL AGREEMENTS ON FREQUENCY USE IN BORDER AREAS WILL AID LONG-TERM STRATEGIC PLANNING, PROMOTE EFFICIENT SPECTRUM UTILISATION AND HELP AVOID INTERFERENCE
- THE ITEM “AGREEMENT” IN COORDINATION MENU ENABLES THE ENTRY OF USER-DEFINED AGREEMENTS WHICH MAY BE USED FOR BORDER COORDINATION THROUGH THE “BORDER” ITEM IN SAME MENU.
- EACH AGREEMENT CONSISTS OF TWO PARTS; HEADER AND TECHNICAL CHARACTERISTICS.



WHY BORDER COORDINATION

- RADIOWAVES DO NOT STOP AT THE BORDER OF THE COUNTRY.
- TO AVOID HARMFUL INTERFERENCE FROM THE STATIONS OF ONE COUNTRY INTO THE TERRITORY AND STATIONS OF NEIGHBOR COUNTRIES.
- BILATERAL OR MULTILATERAL AGREEMENTS ON FREQUENCY USE IN BORDER AREAS WILL AID LONG-TERM STRATEGIC PLANNING, PROMOTE EFFICIENT SPECTRUM UTILIZATION.
- AGREE ON ALLOWED INTERFERENCE RANGE AND DISTANCE
- COORDINATING FREQUENCIES AMONG ADMINISTRATIONS BEFORE ASSIGNING THEM.
- QUICK ASSESSMENT OF INTERFERENCE THROUGH AGREED CRITERIA.



SMS4DC BORDER AGREEMENTS

- THE ITEM “AGREEMENT” IN COORDINATION MENU ENABLES THE ENTRY OF USER-DEFINED AGREEMENTS WHICH MAY BE USED FOR BORDER COORDINATION THROUGH THE “BORDER” ITEM IN SAME MENU.
- EACH AGREEMENT CONSISTS OF TWO PARTS; HEADER AND TECHNICAL CHARACTERISTICS.

HEADER PART

- NAME OF AGREEMENT
- MEMBER COUNTRIES
- INCORPORATED RADIO COMMUNICATION SERVICES
- PROPAGATION MODELS USED IN THE AGREEMENTS (FREE SPACE AND P.1546)
- AGREEMENT CATEGORY

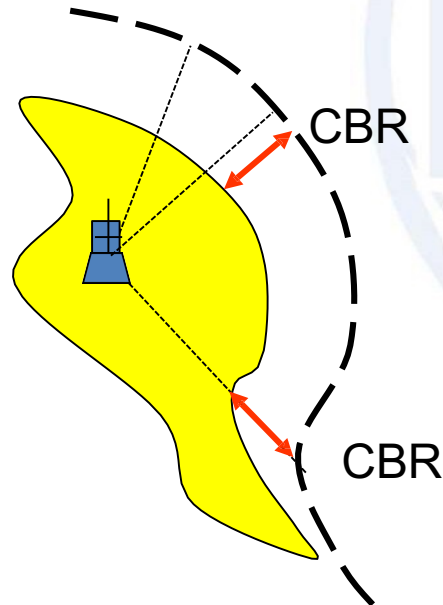
TECHNICAL PART

- FREQUENCY BANDS
- PREFERENTIAL COUNTRIES IN ANY FREQUENCY BAND
- CROSS BORDER RANGE (CBR), X-KM OR COORDINATION DISTANCE.
- EFFECTIVE RADIATED POWER AND PERMISSIBLE INTERFERENCE FIELD STRENGTH (PIFS)

CONTOUR CATEGORIES

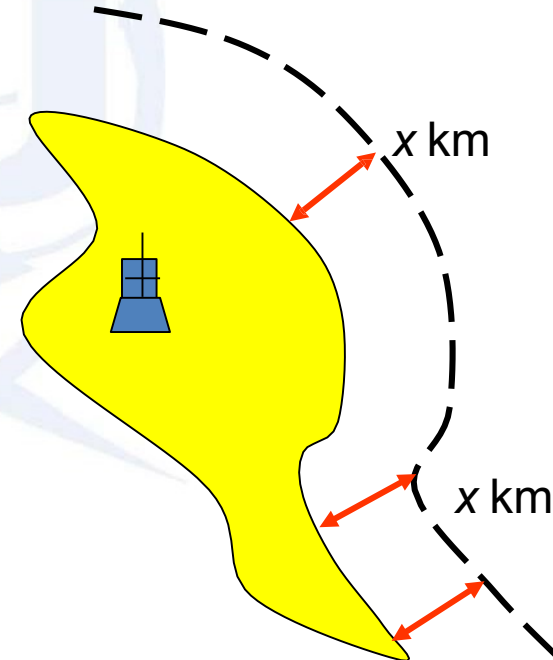
Cross Border Range(CBR)

- is the locus of points where their distances to the border, along the line connecting points to the concerned station, are identical

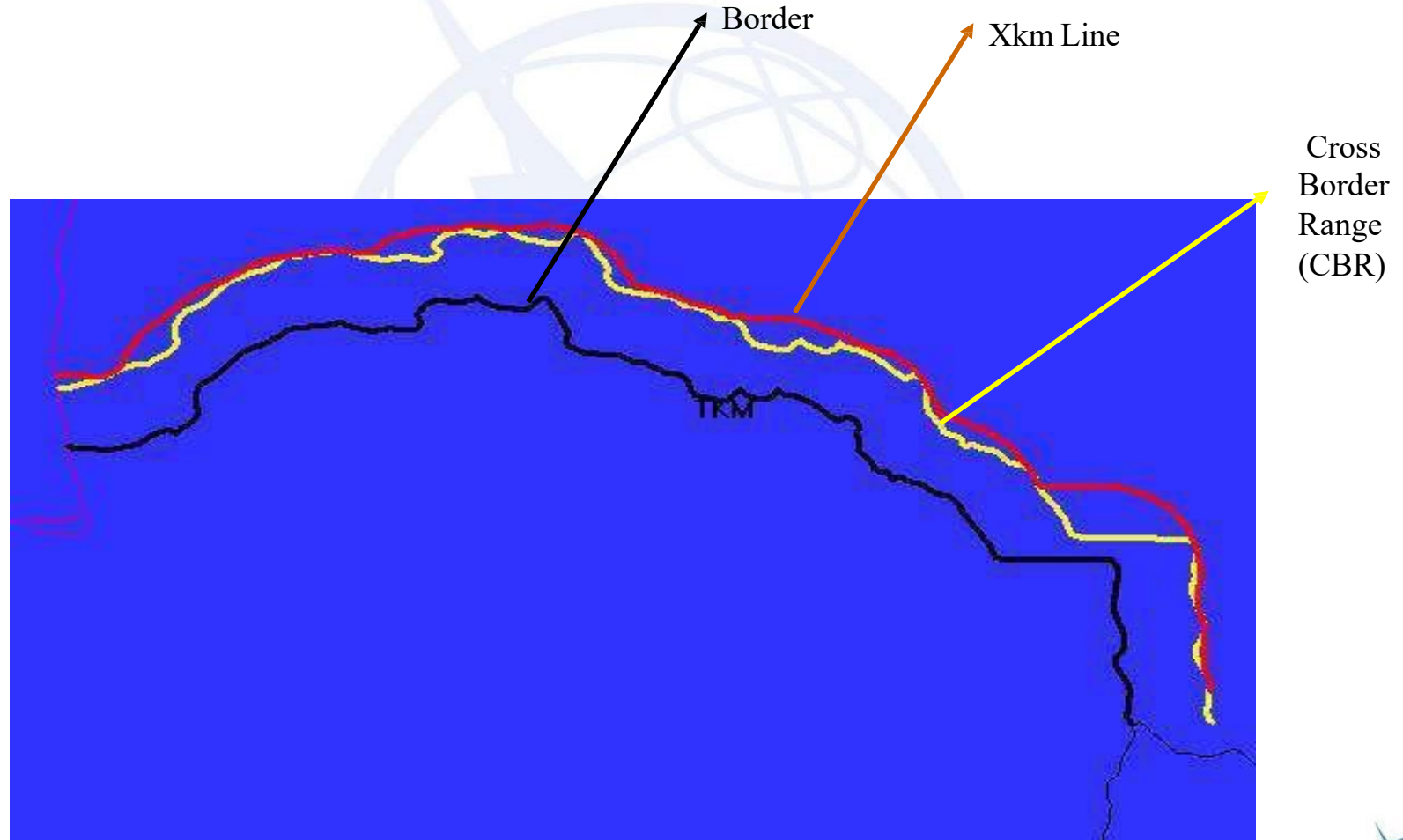


The x-km contour

- is the locus of points where their nearest distance to the border is set at an agreed value of x km.



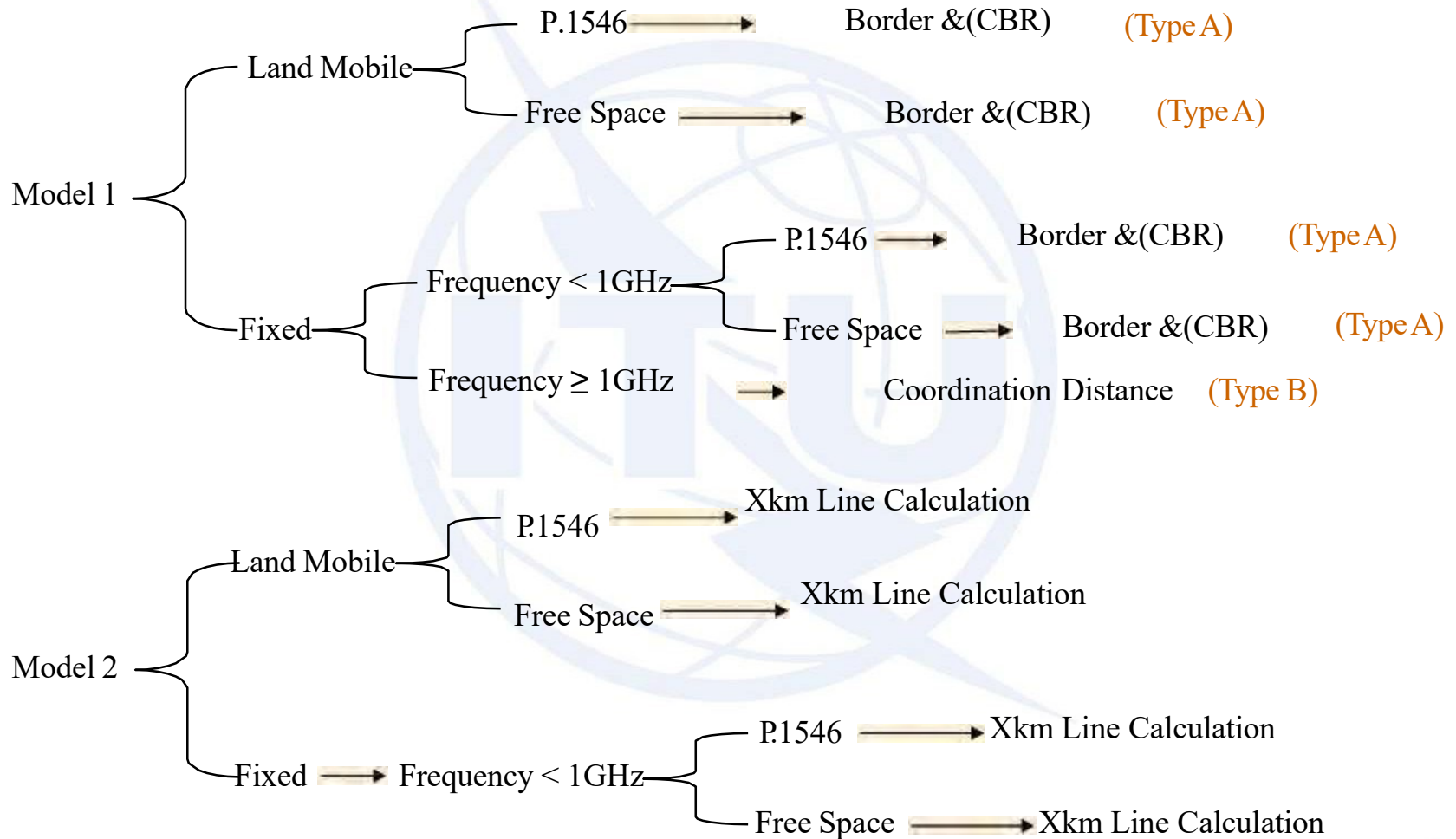
CONTOUR CATEGORIES



AGREEMENTS TYPES

- **Frequencies requiring co-ordination** :Frequencies which Administrations are required to co-ordinate with the other Administrations affected before a station is put into service.
 - Model 1 (Type A) Land Mobile service (all frequencies) & Fixed service(below 1 GHz) Coordination of selected station is required if field strength on border of concerned administrations exceeds permissible interference level. Also field strength on CBR shall not exceed permissible interference level.
 - Model 1 (Type B) Fixed service above 1 GHz Coordination of selected station is required if distance of the station to border is less than coordination distance
- **Preferential Frequencies** :Frequencies which the Administrations concerned may assign, without prior co-ordination, on the basis of bi- or multilateral agreements.
 - Model 2 : Land Mobile service (all frequencies) and fixed service below 1 GHz Prior co-ordination is not required if field strength of selected station on X-km is less than permissible interference level

AGREEMENTS TYPES



AGREEMENTS TYPES

Model 1 TypeA

Agreements

Name: Service:

Countries:

Model: 1 Type:

Propagation models:

Modify

Cancel

3 of 6

LoFreq (MHz)	HiFreq (MHz)	PIFS(dBW/m)	CBR(km)	ERP(dBW)	Emergency

AGREEMENTS TYPES

Model 1 Type B

Agreements

Name: Service:

Countries:

Model: Type:

Propagation models:

Modify

Cancel

3 of 6

LoFreq (MHz)	HiFreq (MHz)	CoordDist1(km)	CoordDist2(km)	Emergency

AGREEMENTS TYPES

Field name	Description	Category	
		Mode	Type
AgID	The ID number of an agreement in the database.	All	All
LoFreq,HiFreq	The lower and upper edge of the applicable frequency range (MHz).	All	All
PrefCountries	The list of preferential countries. If this cell in relevant row or the row is selected, the "Preferential Countries" push button can be used for choosing and inserting data in this cell.	2	---
PIFS	Permissible Interference Field Strength. This value (in dB μ V/m) is compared with the calculated field strength value to determine whether or not coordination is necessary.	All	A
CBR	The CBR (Cross Border Range), in km, is the distance beyond the national border used to establish a contour of points. The distance of any point on this contour to the border, along the line connecting to the concerned station, will be identical and equal to CBR (see Figure 3.175).	1	A
X-km	The X-km, in km, is the distance beyond national border used to establish a contour of points. The nearest distance of any point on this contour to the border will be identical and equal to X-km (see Figure 3.175).	2	
CoordDist1	The coordination distance used where the summation of station height, above sea level, and antenna height, above ground level, is less than 300 metres.	1	B
CoordDist2	The coordination distance used where the summation of station height, above sea level, and antenna height, above ground level, is over 300 metres.	1	B
ERP	The Effective Radiated Power (ERP), in dBW, of reference transmitter, used for field strength calculations (except in type B, mode 1).	All	A
Emergency	The code indicating the operation type for the frequency band, 1 for emergency and 0 for normal operation modes. This field is available for all categories of agreement.	All	All

AGREEMENTS FIELDS

Agreement name

Services considered

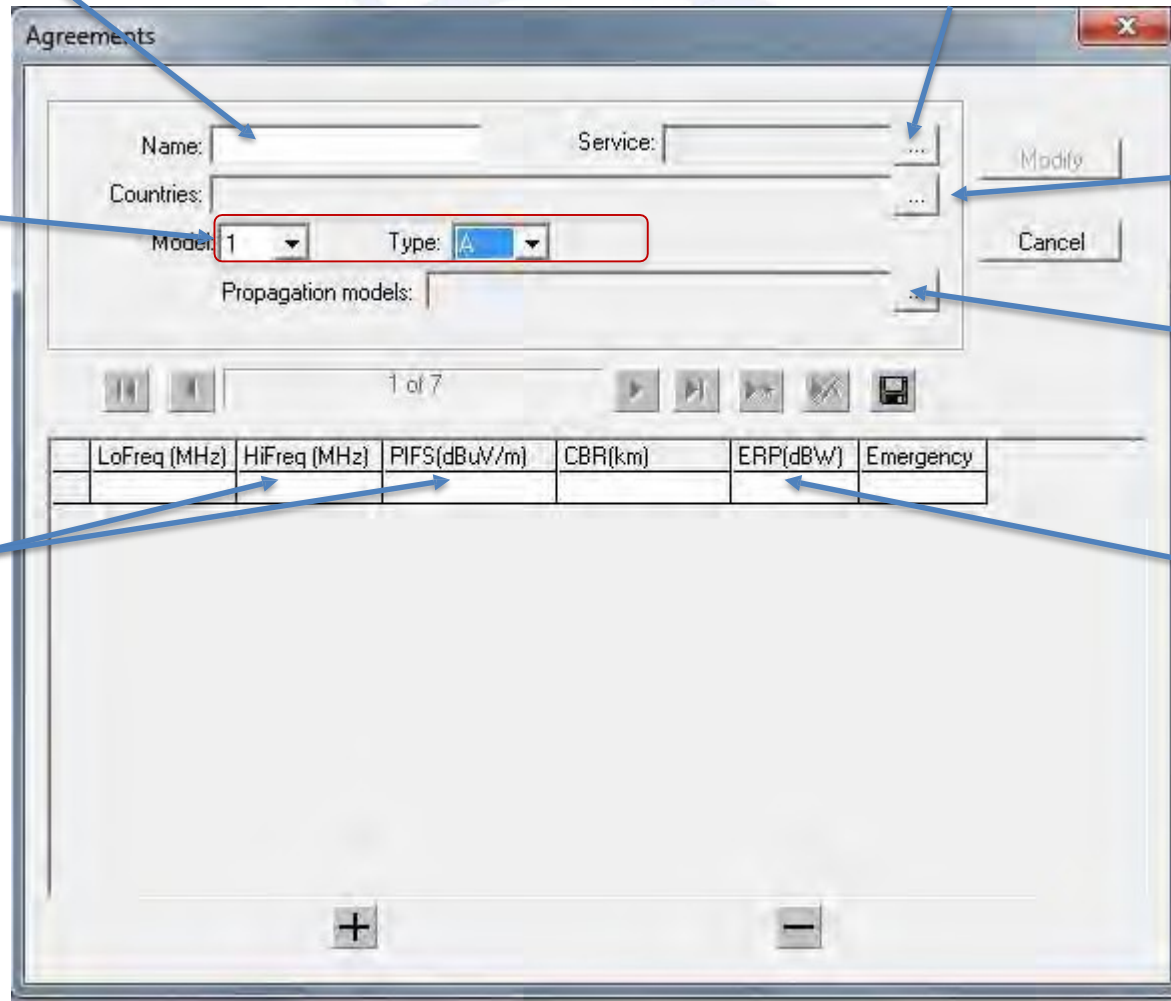
Category of agreements

Member countries

Propagation models used in the agreements

Frequency band definition

ERP of reference transmitter



The screenshot shows a software window titled "Agreements". It contains several input fields and buttons. Annotations with arrows point to specific fields:

- Agreement name:** Points to the "Name:" text box.
- Services considered:** Points to the "Service:" text box and its dropdown arrow.
- Category of agreements:** Points to the "Countries:" text box.
- Member countries:** Points to the dropdown arrow next to the "Countries:" text box.
- Propagation models used in the agreements:** Points to the "Propagation models:" text box and its dropdown arrow.
- Frequency band definition:** Points to the "LoFreq (MHz)" and "HiFreq (MHz)" columns of the table.
- ERP of reference transmitter:** Points to the "ERP(dBW)" column of the table.

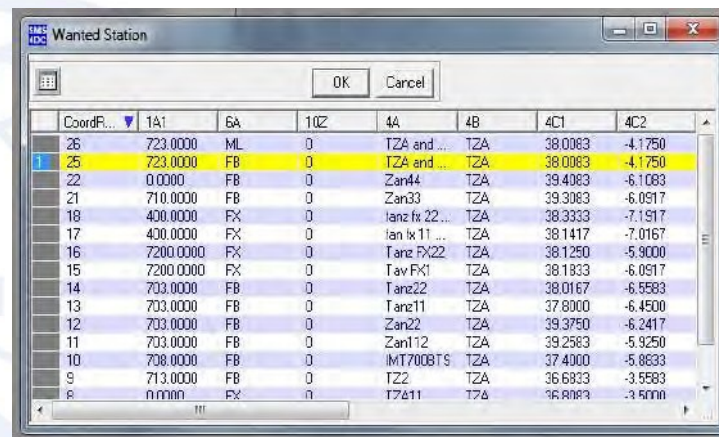
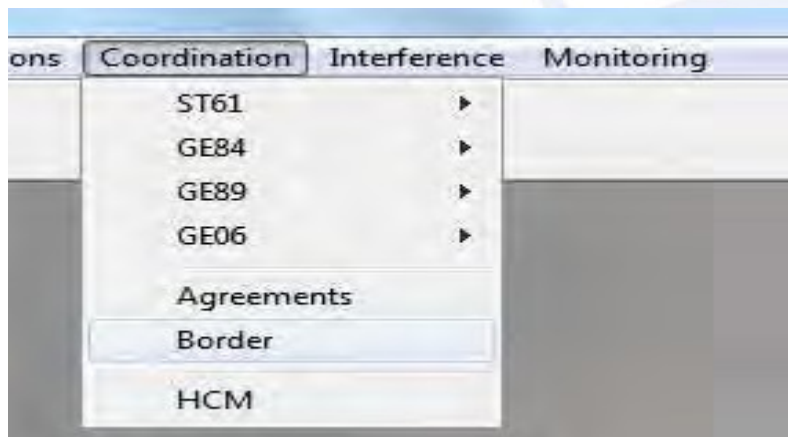
Other visible elements include a "Modify" button, a "Cancel" button, a "Type:" dropdown menu (highlighted with a red box), and a table with the following columns: LoFreq (MHz), HiFreq (MHz), PIFS(dBuV/m), CBR(km), ERP(dBW), and Emergency. The table currently shows one row of data.

BORDER COORDINATION CALCULATIONS

Select border under coordination menu

Choose wanted station

1



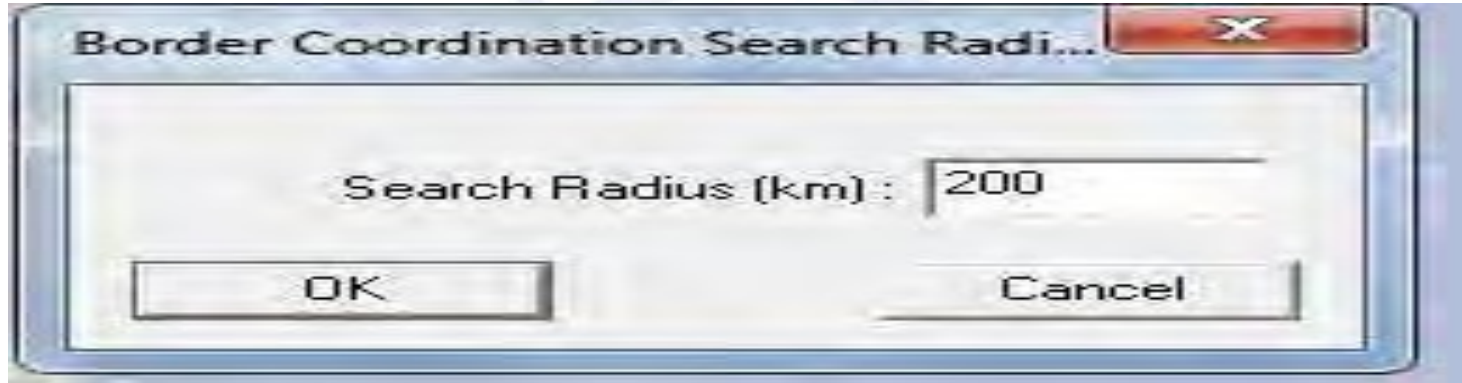
Applicable agreement (or agreements) will be displayed, The applicability of agreements will depend on the frequency, country and service type of the selected station.

2



BORDER COORDINATION CALCULATIONS

- 1 After choosing one of the presented applicable agreements, the search radius will be requested as additional criteria.



Border Coordination Search Radius...

Search Radius (km): 200

OK Cancel

Applicable agreement (or agreements) will be displayed, The applicability of agreements will depend on the frequency, country and service type of the selected station.

- 2



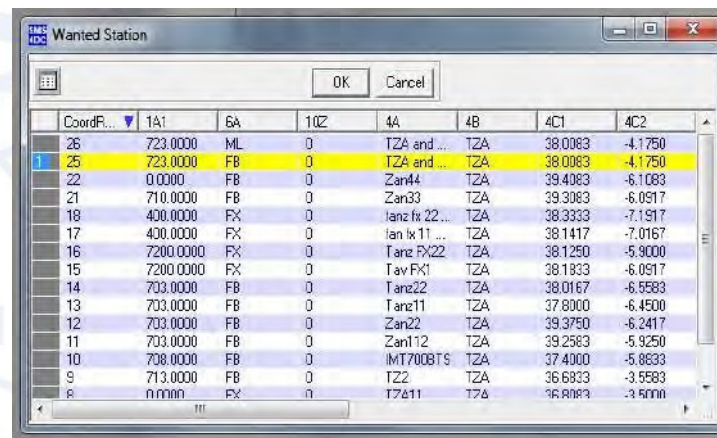
	AgID	AgName	Countries	Service	Model	Type	PropModels	LoFreq	Hi
1	7	TZA and ...	KEN_TZA	FX_LM	1	A		700.0000	80

BORDER COORDINATION CALCULATIONS

Select border under coordination menu

Choose wanted station

1



Applicable agreement (or agreements) will be displayed, The applicability of agreements will depend on the frequency, country and service type of the selected station.

2



CALCULATIONS RESULTS MODEL 1 TYPE A

Maximum field strength on border line

Maximum field strength on CBR

Border Coordination Result

Wanted Station :

No.	ID	Name	St_Class	Country	Location	AgName	Categories
1	25	TZA AND KE	FR	TZA	038E0030 0450130	TZA AND KEN A	Frequency requiring coordination

Border Calculations (Concerned Countries) :

No.	Frq(MHz)	Tx/Rx	Country	maxEb[dBuV/m]	Location	DistB(km)	maxEc[dBuV/m]	Location
1	723.0000	Tx	KEN	59.999	038E0601 03S5242	19	45.748	038E2857 03S16
2	733.0000	Rx	KEN	64.088	038E0601 03S5242	19	49.838	038E2857 03S16

Report

CALCULATIONS RESULTS MODEL 1 TYPE B

Minimum
distance to the
border

Coordination distance

Border Coordination Result

Wanted Station :

No.	ID	Name	St_Class	Country	Location	AgName	Categories
1	27	TZAFXAGR1	FX	TZA	038E1430 04S0830	TZAKENAGR2	Frequency requiring coordination

Border Calculations (Concerned Countries) :

No.	Frq(MHz)	Tx/Rx	Country	min DistB(km)	Location	Coord Dist(km)
1	7500.0000	TX	KEN	14.711	038E1826 04S0136	50.0
2	7500.0000	RX	KEN	14.711	038E1826 04S0136	50.0

Report

CALCULATIONS RESULTS MODEL 2

Maximum field strength on X-km contour

Border Coordination Result

Wanted Station :

No.	ID	Name	St_Class	Country	Location	AgName	Categories
1	28	TZAKENFBA	FB	TZA	038E2900 04S2000	TZAKENAGR2	Preferential Frequency

Border Calculations (Concerned Countries) :

No.	Frq(MHz)	Tx/Rx	Country	maxEb(dBuV/m)	Location	DistB(km)	maxEx(dBuV/m)	Location
1	2000.0000	Tx	KEN	61.324	038E3319 04S1215	16	24.883	038E5113 03S31
2	2000.0000	Rx	KEN	65.414	038E3319 04S1215	16	28.972	038E5113 03S31

Report

Report

BORDER COORDINATION RESULTS PARAMETERS

Field	Description	Type of Agreement		
		Frequency Requiring coordination		Preferential Frequency
		Type A: LM in all frequency and FX below 1GHz	Type B: FX above 1GHz	LM in all frequency and FX below 1GHz
Frequency	Frequency under investigation	X	X	X
TX or RX	Mode of frequency under investigation	X	X	X
Concerned countries	Countries likely to be affected by a station in another country	X	X	X
Max. Eb	Maximum field strength on border line	X		X
Max. Eb location	The location of maximum Eb	X		X
DistB	Distance of wanted station to the maximum Eb location	X		X
Max Ec	Maximum field strength on CBR (Figure 3.175)	X		
Max. Ec location	The location of maximum Ec	X		
DistC	Distance of wanted station to the maximum Ec location	X		
Max Ex	Maximum field strength on X-km contour (Figure 3.175)			X
Max. Ex location	The location of maximum Ex			X
DistX	Distance of wanted station to the maximum Ex location			X
PIFS	Permissible Interference Field Strength in accordance with agreement	X		X
CBR	Cross Border Range in accordance with agreement	X		
X-km	Contour of X km beyond wanted country border line			X
Min. DistB	Minimum distance of wanted station to the border line		X	
Min DistB location	The location of maximum Eb		X	
Coord. Dist.	Minimum permitted distance to the border (from agreement) for comparison with MinDistB		X	



Thank you!

