

Content of the presentation

- History of SMS4DC
- Main Functions of SMS4DC
 - Administrative Functions
 - Engineering Functions
 - Geographic Map Display functions
- Samples for the different functions
- How to obtain SMS4DC
- Future developments



History

- ITU-R and ITU-D cooperation
- 1995 BASMS (FoxPro)
- 1997 WinBASMS
- WTDC March 2002: further developments
- 2002 ITU-R SG1: Rec. ITU-R SM.1604
- Consolidated technical specification: 2004
- 2007 first quarter: Version 1
- 2008 first quarter: Version 2
- 2009 third quarter: Version 3



Main Functions of SMS4DC/1

Administrative Functions

- Relational database management
- Recording frequency application, frequency assignment, licensing, coordination data, import data from BRIFIC & SRS
- Producing electronic notices, print license, invoice & spectrum fee
- Security features: Multi level access enables system administrator to define users and groups with different access levels



Main Functions of SMS4DC/2

Engineering Analysis Functions

- Enhanced analysis tools for frequency arrangement, assignment, coordination and interference calculation
- Propagation models based on ITU-R latest recommendations available at the time of development
- Coverage area, field strength, field strength contour, microwave link calculations, network coverage and best server calculation
- Azimuth, elevation and horizon elevation for earth stations
- Link to monitoring software



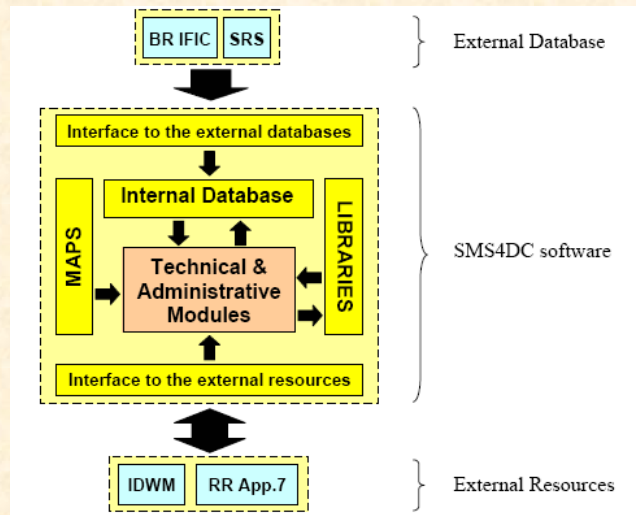
Main Functions of SMS4DC/3

Geographic Map Display Function

- User friendly interface, displaying of DTM, capability of importing standard mapping formats including Globe map, displaying of other higher resolution maps and export to Google Earth
- Online latitude, longitude and altitude presentation, overlaying, Scrolling and Zooming functionality capability of handling vectors,
- Providing multiple entry functions, menu items, assigning new stations on map and searching and displaying a station or group of stations on map.



STRUCTURE OF SMS4DC



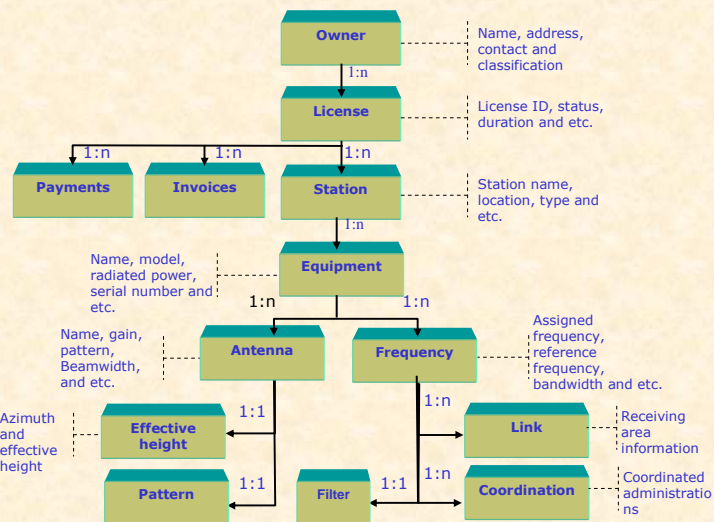
Ex1

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DATABASE STRUCTURE (terrestrial)

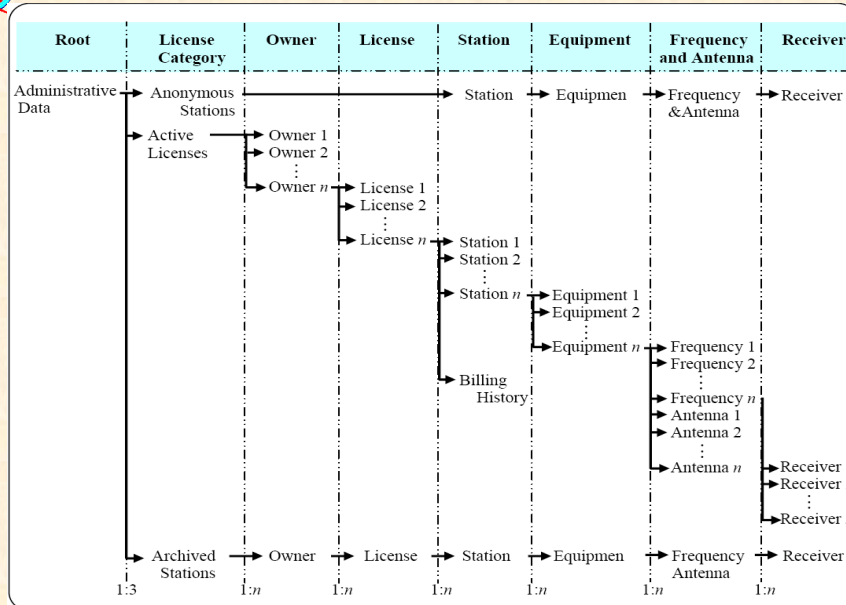


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Flow of Data Entry



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SMS4DC's Administrative Functions

Supervisory tasks

- User access →
- Backup/Restore
- Audit control

Audit trail

User Name: All Action: All Table: All

User	Date/Time	Action	Record no.	Table
Sanan	2005-10-11 05:24:18	Update equipment	1	Equipment
Sanan	2005-10-11 07:29:26	Update frequency	30	Frequency
Sanan	2005-12-11 21:50:39	Update frequency	43	Frequency
Sanan	2005-12-11 21:51:13	Update frequency	44	Frequency
Sanan	2005-12-11 21:52:39	Update frequency	43	Frequency
Sanan	2005-12-11 21:52:58	Update frequency	44	Frequency
admin	2005-11-13 09:57:54	Delete fixed/base station	42	Station
SMS4DC	2005-11-14 04:47:13	Update antenna	6	Antenna
SMS4DC	2005-11-14 10:48:16	Add payment	6	Payment
SMS4DC	2005-11-14 14:06:54	Delete license	3	License
SMS4DC	2005-11-15 11:48:42	Update frequency	51	Frequency
SMS4DC	2005-11-15 11:48:55	Update frequency	51	Frequency
SMS4DC	2005-11-15 11:49:30	Update frequency	52	Frequency
Somebody	2005-11-21 08:31:46	Update broadcasting station	9	BCStation
Somebody	2005-11-21 08:52:22	Update broadcasting station	2	BCStation
Somebody	2005-11-21 10:06:49	Update broadcasting station	2	BCStation
Somebody	2005-11-21 10:07:22	Add equipment	82	Equipment
Somebody	2005-11-21 10:08:54	Add equipment	83	Equipment
Somebody	2005-11-21 10:10:03	Add antenna	53	Antenna

Access levels

New

User Name:

User Password:

Modify

User Name: SMS4DC

User Password:

Access Level: 4 - Supervisor

Enabled

Delete Save Cancel

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SMS4DC's Administrative Functions

Data capture screens

Owner information

Field	Value
Owner Name	Admin2
Owner Address	Engheleb Ave.
City	Tehran
Country	IRN
Telephone	3243541
Telex	
Fax	5123451
Email	x@c.com
Remarks	
Security Category	Y
Address Code	A
Code of Operating Agency	001
Billing	
Billing Name	Admin2
Billing Address	Tehran

Owner information

Field	Value
Nom du propriétaire	Admin2
Adresse du propriétaire	Engheleb Ave.
Ville	Tehran
Pays	IRN
Téléphone	3243541
Télex	
Fax	5123451
Email	x@c.com
Remarques	
Niveau de sécurité	Y
Code d'adresse	A
Code de la compagnie exploitante	001
Billing	
Facturation au nom de	Admin2
Adresse de facturation	Tehran



SMS4DC's Administrative Functions

Broadcasting Station Information Data Entry Table

The screenshot shows the SMS4DC software interface with a tree view on the left and a data entry table on the right. The tree view is expanded to 'Broadcasting Stations' and then to a specific station entry.

Field	Value	Unit
Admin Ref. ID	DZDS10453	
Site ID		
Station Name	ADRAR	
Class of Station	BC	
Station Type	Fixed	
Location		
ITU Region		1
Latitude	+275300.00	DDMMSS SS
Longitude	+0001680.00	DDMMSS SS
Country	ALG	
Radius of Service		km
Height ASL	260	m
Plan		
Provision	Geneva 2006D	
Plan		
Target Latitude		DDMMSS SS
Target Longitude		DDMMSS SS
Service ID		
Plan Entry Code		1
Assignment Code	S	
Assoc. Alet. ID		
Assoc. Alet. SFN ID		
SFN ID		
Conditions Met	No	
Signed Commitment	No	
Notice Type	DS1	



SMS4DC's Administrative Functions

Dialog box for importing data from BRIFIC (Terrestrial)

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SMS4DC's Administrative Functions

Electronic notices to BR

Fixed, Land mobile, Broadcasting

Earth station

```

S:\IAD\2006-03-11.txt - Notepad
File Edit Format View Help
<HEAD>
t_adm=IRN
t_d_sent=2006-03-11
</HEAD>
<NOTICE>
t_fragment=NTFD_RR
t_notice_type=T13
t_prov=RR119
t_action=ADD
t_is_resub=FALSE
t_freq_assgn=150.000000
t_freq_carr=150.000000
t_d_inuse=2004-11-15
t_call_sign=Hello
t_site_name=Mobile1
t_emi_cls=F3E-
t_bdwth_cde=8K50
t_long=+0500000
t_lat=+300000
t_stn_cls=ML
t_nat_svs=CR
t_op_hh_fr=00.00
t_op_hh_to=24.00
t_addr_code=A
t_op_agcy=001
t_ctry=IRN
<ANTENNA>
t_pwr_xyz=X
t_pwr_ant=10.000000
t_pwr_dbw=10.000000
t_pwr_bvml
</ANTENNA>
</NOTICE>
<TAIL>
t_num_notices=1
</TAIL>

```

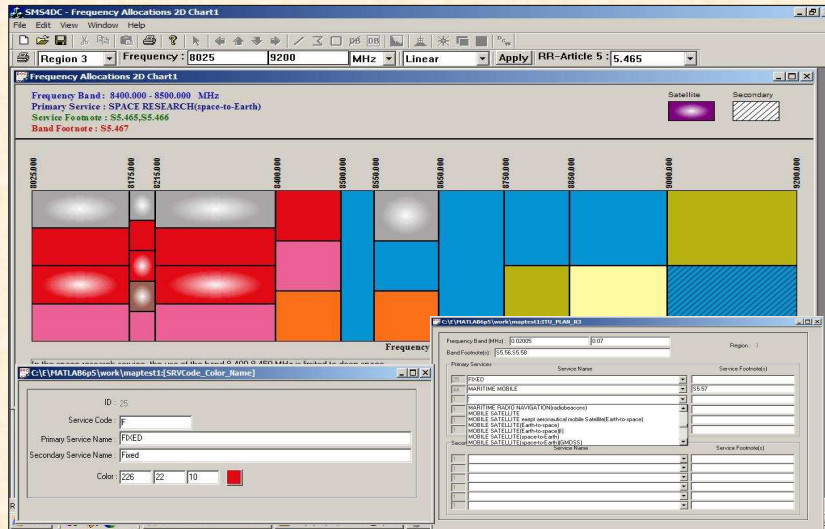
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SMS4DC's Engineering Functions

International & National frequency allocations table (chart)



Ex3

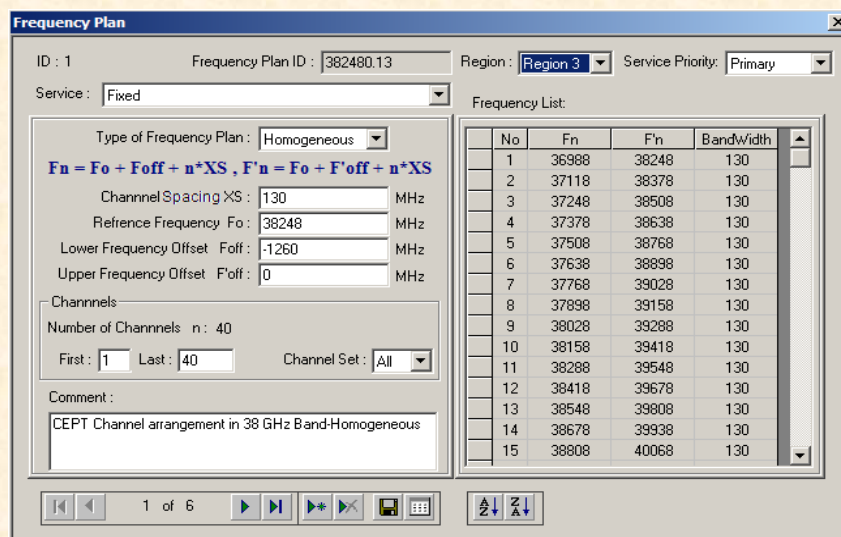
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SMS4DC's Engineering Functions

Frequency arrangement (Homogeneous)



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SMS4DC's Engineering Functions

Frequency assignment parameters & EMC analysis results

(a) Frequency assignment parameters

(b) EMC analysis result for assigning available planned frequencies to a concerned station

No	F _n	F _h	BandWidth	Num of Stations	PlanID	Srv Priority
1	148.0125	150.0125	0.0125	0	1490.0000125	Primary
2	148.025	150.025	0.0125	0	1490.0000125	Primary
3	148.0375	150.0375	0.0125	1	1490.0000125	Primary
4	148.05	150.05	0.0125	2	1490.0000125	Primary
5	148.0625	150.0625	0.0125	3	1490.0000125	Primary
6	148.075	150.075	0.0125	2	1490.0000125	Primary
7	148.0875	150.0875	0.0125	2	1490.0000125	Primary
8	148.1	150.1	0.0125	2	1490.0000125	Primary
9	148.1125	150.1125	0.0125	2	1490.0000125	Primary
10	148.125	150.125	0.0125	1	1490.0000125	Primary

No	ID	Name(2)	Service	Frequency	Coordinates	Dist_km	E1_2	E2_1	HE1_2
1	55	LM2	Land Mobile	148.050000	049E.2630 36N5030	17.4	8.07	11.08	-11.93
2	59	LM5	Land Mobile	148.062500	048E.5900 36N4400	30.5	52.07	52.07	32.07
3	60	FX1	Fixed	148.075000	049E.2610 36N2730	30.3	3.23	6.24	-16.77

Ex4

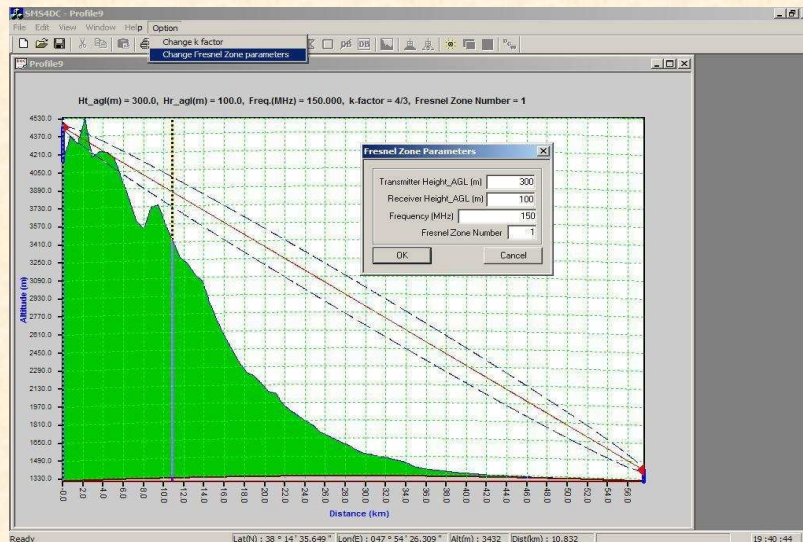
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SMS4DC's Engineering Functions

Path profile with Fresnel Zone



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SMS4DC's Engineering Functions

Link Calculation Dialog box using different propagation models

The screenshot displays the 'Link Calculation (P.530)' dialog box with a 3D terrain profile. The 'Reflection Points' table lists 13 points with their coordinates, distances, and heights. The 'P.530 - Availability' dialog box shows rain and multipath availability data.

No.	Coordinates	Distance(m): d1	Distance(m): d2	Height_ASL(m)	H_min(m)	Grazing Angle(deg)
1	151E011 39N544	1.097	35.882	1133.407	0.000	0.675
2	151E031 39N545	1.522	35.317	1132.541	0.000	0.554
3	151E044 39N546	1.928	35.041	1133.077	0.000	0.451
4	151E053 39N500	3.083	33.886	1133.160	0.000	0.438
5	151E053 39N500	3.122	33.847	1133.355	0.000	0.419
6	151E053 39N500	3.905	33.063	1133.964	0.000	0.414
7	151E105 39N523	5.473	31.496	1147.856	0.000	0.315
8	151E204 39N400	33.525	3.044	1371.425	0.016	2.155
9	151E251 39N404.2	35.130	1.905	1497.260	0.014	3.508
10	151E300 39N404.5	35.331	1.575	1503.716	0.014	3.921
11	151E322 39N404.0	35.370	0.999	1505.576	0.013	4.633
12	151E323 39N404.2	35.142	0.517	1505.252	0.012	5.428
13	151E325 39N404.8	35.522	0.077	1720.341	0.024	9.758

(e) Using ITU-R P.530, reflection points, availability calculation and text file profile data

Ex5

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SMS4DC's Engineering Functions

Spreadsheet of stations and h_{eff} calculation

The screenshot shows the 'Station Table' spreadsheet with columns for Call, Class, Station, EIRP, Distance, Power, and Distance. It also displays the 'Effective Height' dialog box and a circular plot of the effective height calculation results.

Selected station

Effective height calculation

result

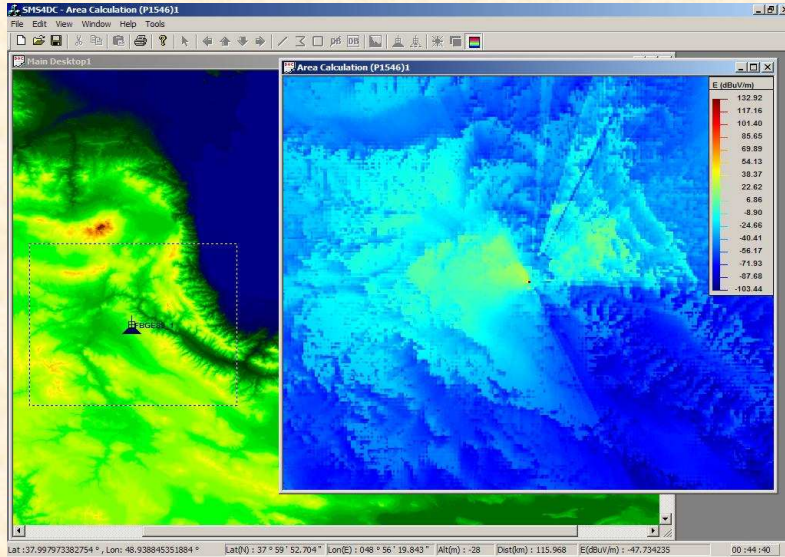
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SMS4DC's Engineering Functions

Area calculation using ITU-R P.1546 propagation model



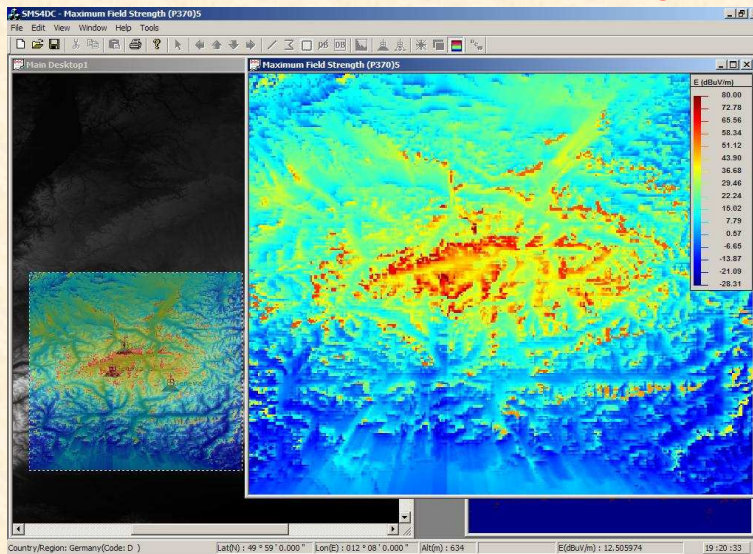
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SMS4DC's Engineering Functions

Network Processor : Maximum Field Strength



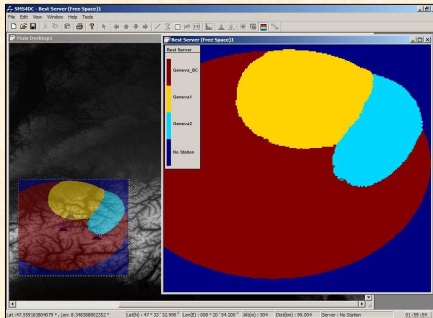
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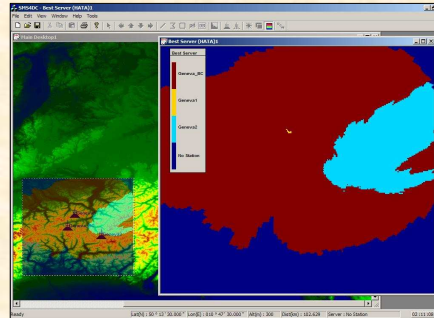


SMS4DC's Engineering Functions

Network Processor : Best Server



(a) Free-Space propagation model

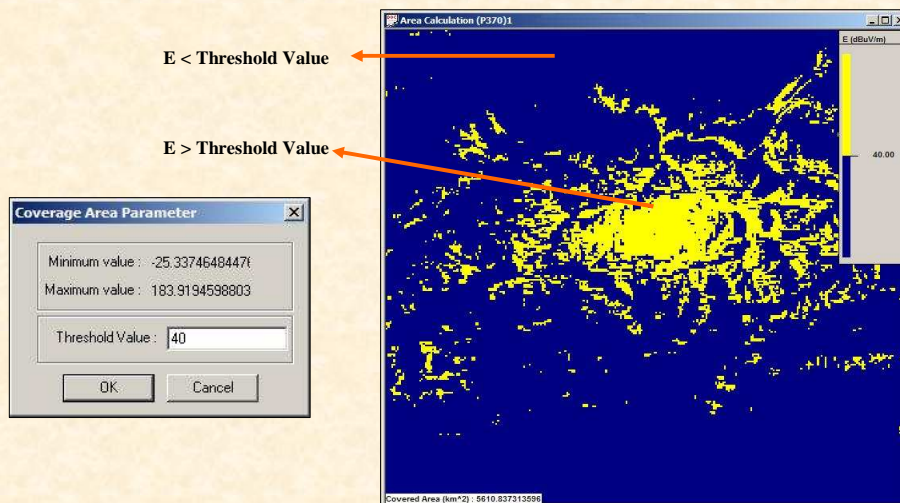


(b) Okumura-Hata propagation model



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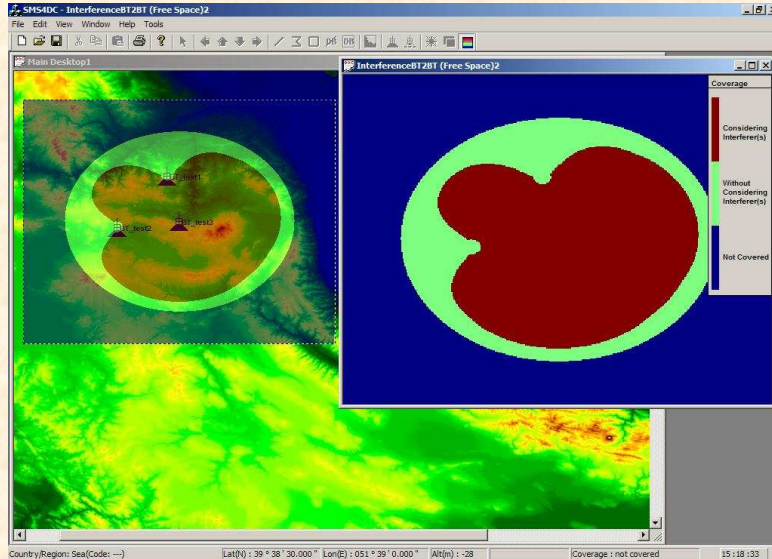
Coverage Area calculation





SMS4DC's Engineering Functions

Interference calculation BT to BT



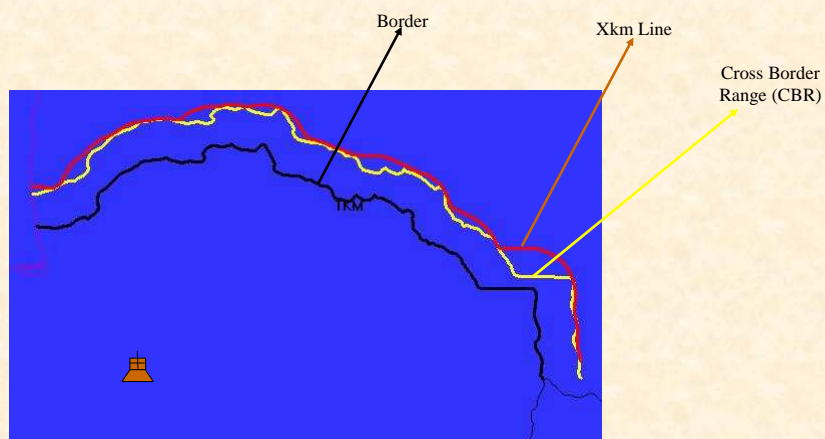
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SMS4DC's Engineering Functions

Borderline frequency coordination



Ex7

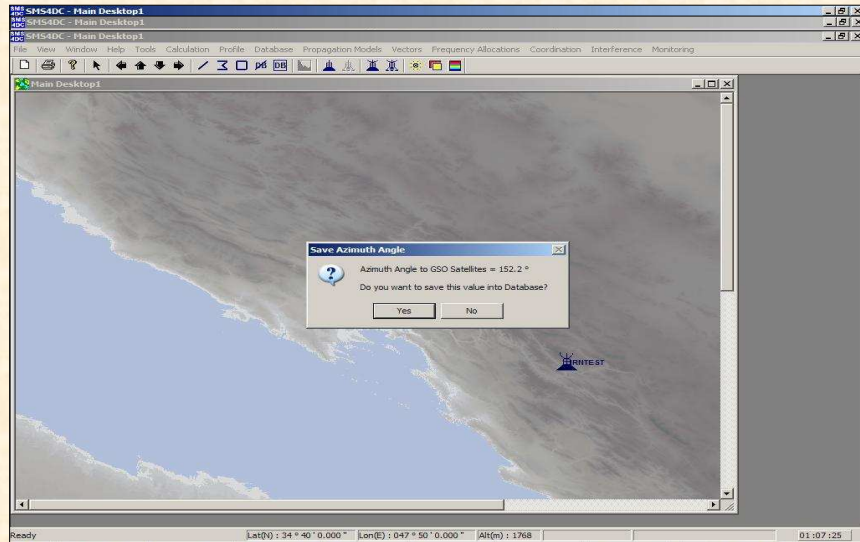
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SMS4DC's Engineering Functions

ES horizon elevation, azimuth, elevation



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SMS4DC's Engineering Functions

Calculations according to the Final Acts of the GE06 Plan

Coverage and service area calculation

- Stage 1 – Calculation of noise-limited coverage area
- Stage 2 – Identification of interferers
- Stage 3 – Calculation of the test points for the interference-limited coverage


Calculation of interference caused by Interferer Station/ Assignment/Allotment to Victim Stations/Assignments/ Allotments

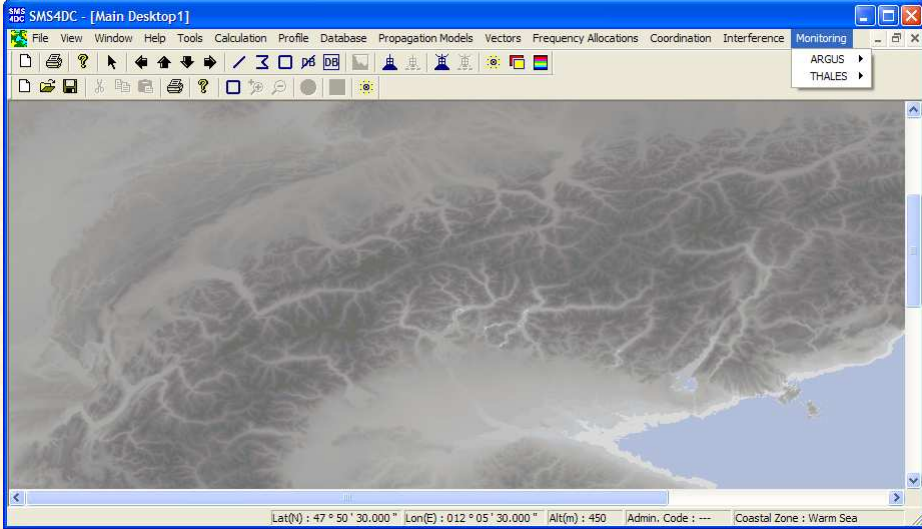
- BCBT to Digital BCBT or to Analogue BT;
- FXM to Digital BCBT or to Analogue BT;
- BCBT to FXM

Official results from the BR !

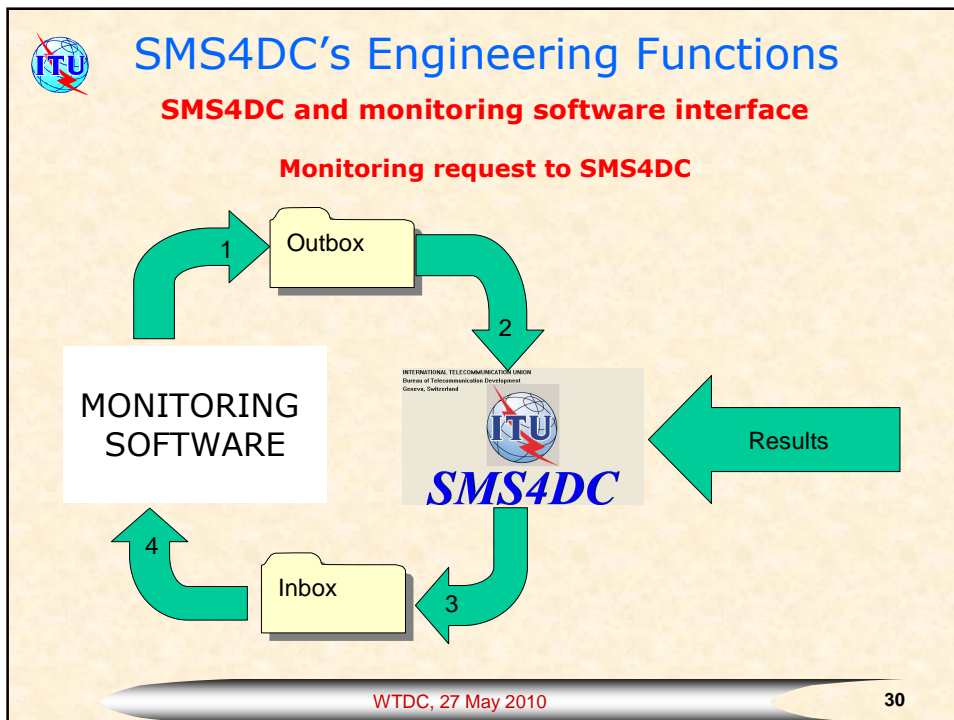
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 **SMS4DC's Engineering Functions**
SMS4DC and monitoring software interface



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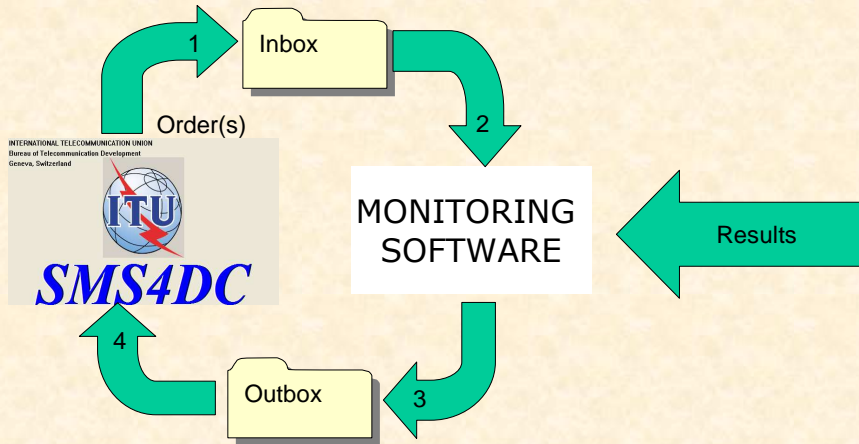




SMS4DC's Engineering Functions

SMS4DC and monitoring software interface

SMS4DC order to monitoring



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SMS4DC's Engineering Functions

SMS4DC and monitoring software interface

Output examples

See during the demonstrations

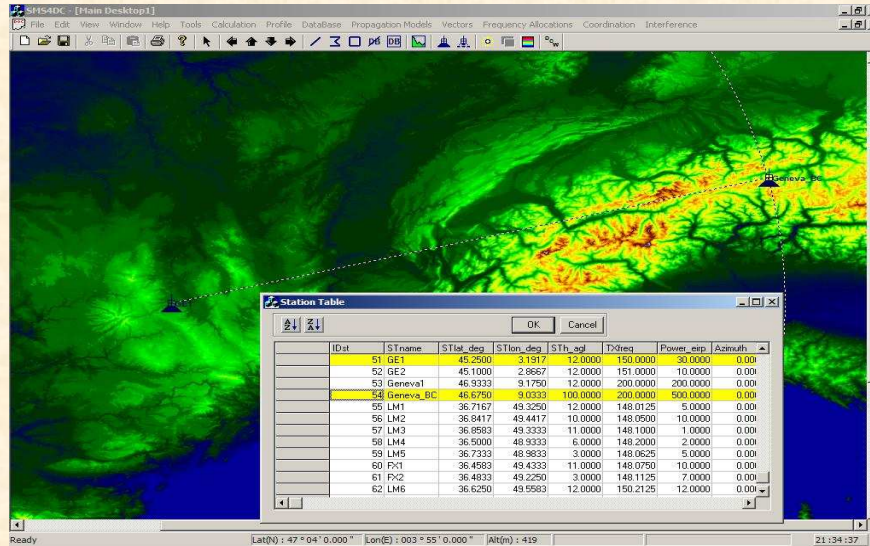
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Geographic Map Display functions

Drawing line from database



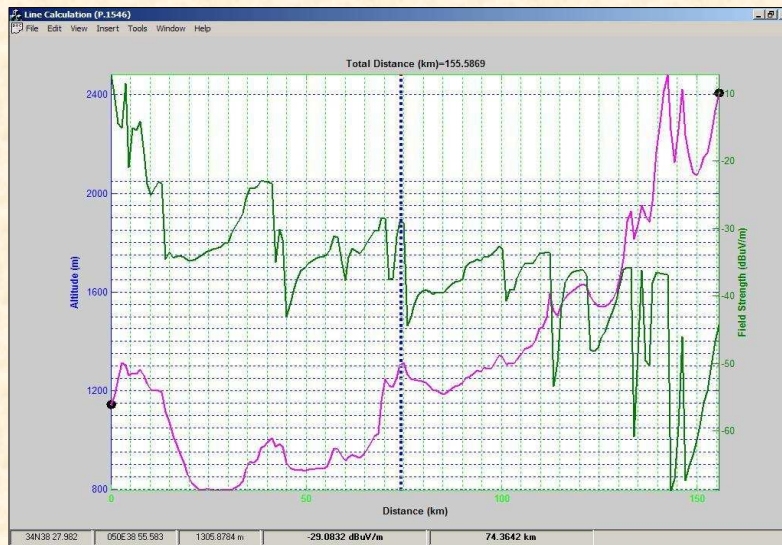
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Geographic Map Display functions

Field-strength along a line



Ex8

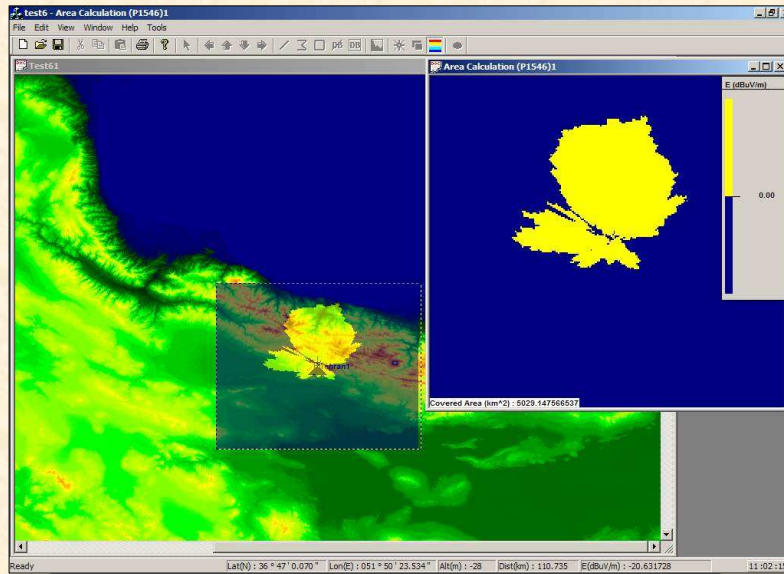
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Geographic Map Display functions

Overlay possibility



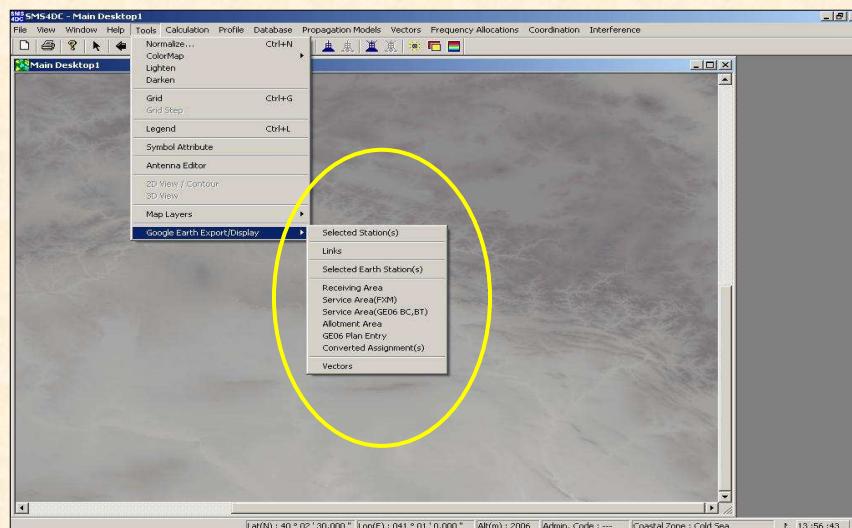
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Geographic Map Display functions

Google Earth export



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Geographic Map Display functions

Google Earth – results to export

- Selected Stations (Including Earth Stations)
- Selected Links
- Receiving Area
- Service Area
- Allotment Area
- GE06 Plan Entry
- GE06 Converted Assignments
- Vectors
- Area Propagation Calculation
- Maximum Field Strength Calculation,
- Best Server Calculation
- Field Strength Contour

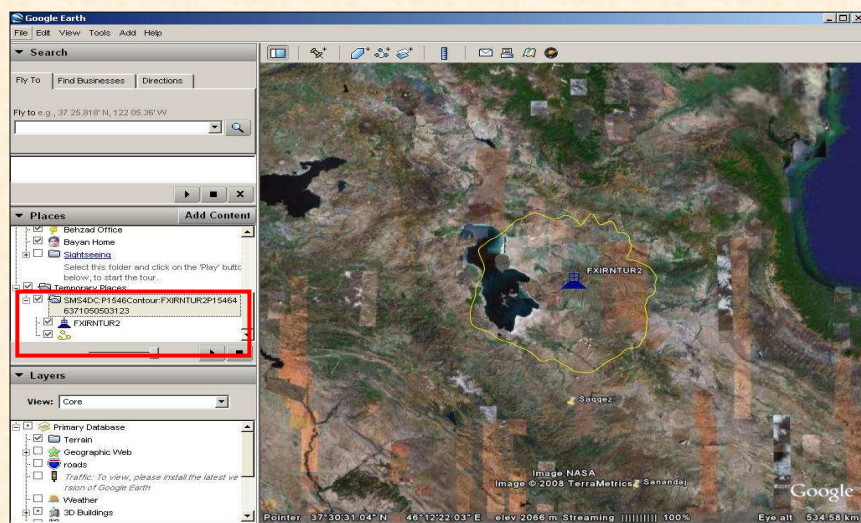
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Geographic Map Display functions

Google Earth Display - Field Strength Contour (P.1546)



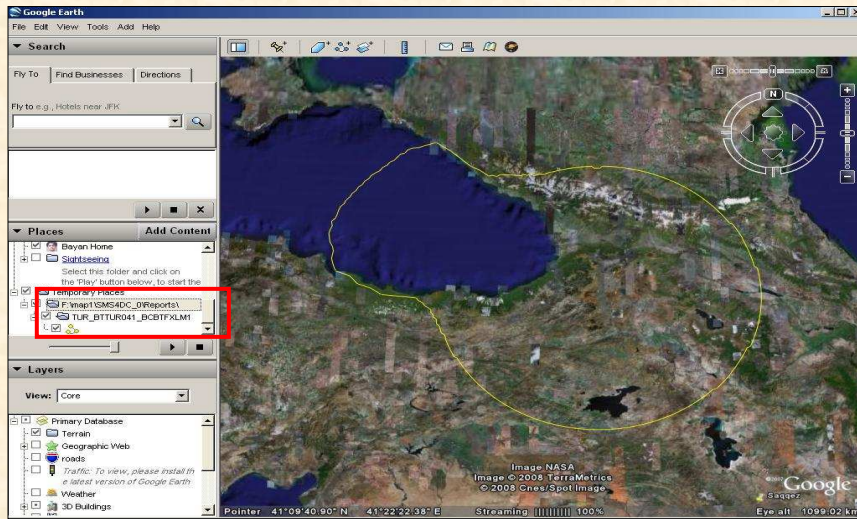
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Geographic Map Display functions

Google Earth Display - GE06 (BCBT2FXLM)



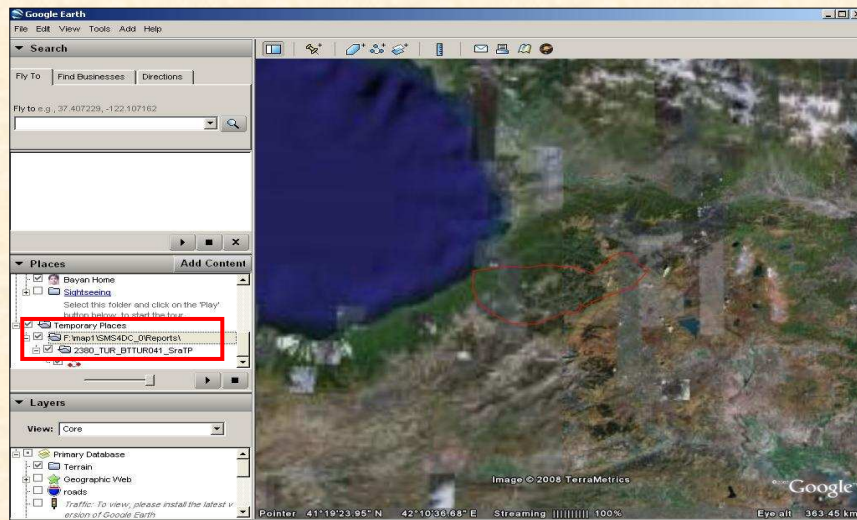
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Geographic Map Display functions

Google Earth Display - GE06 Service area



Ex9

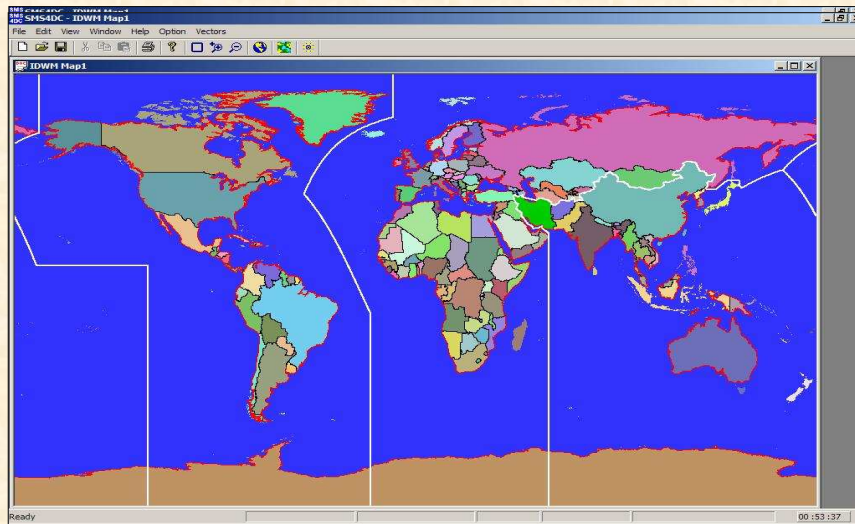
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Geographic Map Display functions

Fill countries



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How to order SMS4DC

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E-Strategies
Resources
FAQ

Spectrum Management System for Developing Countries (SMS4DC) - Version 3.0
Edition: 2009

The Telecommunication Development Bureau (BDT) of the International Telecommunication Union (ITU) has released the third version of a harmonized, efficient, automated technical and administrative tool for spectrum management in developing countries under the brand name SMS4DC (Spectrum Management System for Developing Countries). The version 3.0 contains an upgrade to display results on Google Earth; provide links between SMS4DC and the ARGUS monitoring software of Rohde & Schwarz; the frequency allocation table approved by WRC-07 and additional enhancements to the Version 2 of the software.

SMS4DC is sold as an integrated software package on CD-ROM containing the Software, a user manual and Digital Terrain Map of the world. SMS4DC software is available in English, with the user manual in English.

No facilities of services regarding data migration or specific software support or training are included in this Publication. It may be necessary for some users to obtain assistance in order to take full advantage of SMS4DC. ITU invites users having special needs to contact BDT (bdmail@itu.int) to discuss specific assistance possibilities.

Availability: now available

[Table of contents](#)

	ITEM DETAIL	ARTICLE	PRICE	CART
ENGLISH	Programme Installation Guide - Free of charge		Free of charge	DOWNLOAD
	CD	34309	4860 CHF	ADD
	Part.1 User's Guide - Free of charge		Free of charge	DOWNLOAD

[Publication Notice with Order Form](#)

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How to order SMS4DC

Annual licensing fee

Annual licensing fee in Swiss francs	Catalogue Price (software) annual licensing fee: CHF 4 860.– (for a single workstation)
	Member State Administrations and Sector Members: –15%
	Administrations of the least developed countries: – 80%
	Libraries of educational institutions: – 80%

Price for software installed on one single or multiple workstation(s)

Number of workstations	1	2-3	4-5	6-10
Annual licensing fee (in Swiss francs)	4 860.–	7 290.–	8 260.–	9 720.–



Future developments

- French version
- Addition of new services (e.g. radionavigation, maritime mobile)
- SMS4DC web-site
- Purchase follow-up
- On-line training material



Thank you!

istvan.bozsoki@itu.int

<http://www.itu.int/ITU-D/tech/spectrum-management/SMS4DC.html>

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