SWEDAC ACKREDITERING 1761 ISO/IEC 17025

Rapport utfärdad av ackrediterat provningslaboratorium
Test report issued by an Accredited Testing Laboratory

SAR Test Report: Dell Inspirion 1012 with the Ericsson F3607gw Mobile Broadband Module

Document number:	EAB-09:073321 Uen Rev B	**Date of report:**	2009-12-08
Testing laboratory:	Ericsson EMF Research Laboratory Ericsson AB SE-164 40 Stockholm Sweden	**Company/Client:**	Jonas Börlin (EAB/FJB/MIA) Ericsson AB SE-417 56 Göteborg Sweden
Tests performed by:	Björn Hansson Sonja Hiltunen	**Dates of SAR tests:**	2009-11-04 – 2009-11-07
Manufacturer and market name(s) of device(s):	Dell Inspirion 1012 (host device) Ericsson F3607gw (wireless module)		
Testing has been performed in accordance with:	IEC 62209-2 (CDV), EN 62311, FCC OET Bulletin 65 Supplement C, IC RSS-102		
Test results:	The tested device complies with the requirements in respect of all parameters subject to the test.		
Additional information:			
Signature:	Test engineer Björn Hansson Research Engineer bjorn.hansson@ericsson.com Tel: +46 10 714 2202	Quality manager Martin Siegbahn Senior Research Engineer martin.siegbahn@ericsson.com Tel: +46 10 717 0811	

1 Table of Contents

2 Summary of SAR Test Report[1]

2.1 Equipment under test (EUT)

Description	Notebook PC with built-in Ericsson F3607gw Mobile Broadband Module
Brand Names	Dell inc. (host device) Ericsson (wireless module)
Model Names	Inspirion 1012 – P04T – P04T001 (host device) F3607gw (wireless module)
Alternative wireless module name	Dell 5540 HSPA mobile broadband mini-card
Identification number (host devices)	D-1012-32-859 and D-1012-32-861
IMEI Number (wireless modules):	004401700230697 and 004401700234228
Serial Number (wireless modules):	A400840882 and A400842858
FCC ID Number (wireless modules)	VV7-MBMF3607GW1-D and VV7-MBMF3607GW2-D
IC Canada reg. Number (wireless modules)	287AG-MBMF3607GW1 and 287AG-MBMF3607GW2
Hardware status (wireless modules)	Prototypes
Type of Unit	Portable Tranceiver
Antennas	Integrated in screen part of host device

Frequency Band	**850**	**FDD V**	**900**	**FDD VIII**	**1800**	**1900**	**FDD II**	**FDD I**
Modes	GSM GPRS EDGE	UMTS HSPA	GSM GPRS EDGE	UMTS HSPA	GSM GPRS EDGE	GSM GPRS EDGE	UMTS HSPA	UMTS HSPA
Supported	☑	☑	☑	☑	☑	☑	☑	☑
Covered by report	☑	☑	☑	☑	☑	☑	☑	☑
Data and connectivity	*GPRS/EDGE multislot class 10, GPRS capability class B* *HSDPA Category 8 (up to 7.2Mbps), HSUPA Category 5 (up to 2.0Mbps)*							
Exposure environment	*General public / Occupational*							

2.2 Results

The maximum 1g and 10g SAR values are given in the tables below. The device conforms to the requirements of the relevant standards when the maximum SAR value is less than or equal to the limit.

Results applicable to the 1g SAR limit:

Test position	**Mode**	**Channel/ Frequency (MHz)**	**Max *SAR1g* (W/kg)**	**SAR*1g* limit[2] (W/kg)**	**Result**
Base facing phantom (0 mm)	GSM 850 (EDGE, 2TS)	190 / 836.6	0.02	GP[3]: 1.6 O[3]: 8.0	**PASSED**
Base facing phantom (0 mm)	GSM 1900 (GPRS, 2TS)	661 / 1880	0.01	GP: 1.6 O: 8.0	**PASSED**
Base facing phantom (0 mm)	UMTS FDD V (HSDPA sub 1)	4183 / 836.6	0.01	GP: 1.6 O: 8.0	**PASSED**
Base facing phantom (0 mm)	UMTS FDD II (HSDPA sub 1)	9400 / 1880	0.03	GP: 1.6 O: 8.0	**PASSED**
Extended Uncertainty (k=2) 95%			*± 21.9 % (1g)*		

Results applicable to the 10g SAR limit:

Test position	**Mode**	**Channel/ Frequency (MHz)**	**Max *SAR10g* (W/kg)**	**SAR*10g* limit (W/kg)**	**Result**
Base facing phantom (0 mm)	GSM 900 (GPRS, 2TS)	37 / 897.4	<0.01	GP: 2.0 O: 10	**PASSED**
Base facing phantom (0 mm)	UMTS FDD VIII (HSDPA sub 1)	2787 / 897.4	<0.01	GP: 2.0 O: 10	**PASSED**
Base facing phantom (0 mm)	GSM 1800 (GPRS, 2TS)	699 / 1747.6	0.01	GP: 2.0 O: 10	**PASSED**
Base facing phantom (0 mm)	UMTS FDD I (12.2 kbps RMC)	9750 / 1950	0.01	GP: 2.0 O: 10	**PASSED**
Extended Uncertainty (k=2) 95%			*± 21.4 % (10g)*		

[1] This page contains a summary of the test results. The full report provides a complete description of all test details and results.
[2] SAR limit applicable in USA and Canada.
[3] GP=General public, O=Occupational.

3 General information

The test results reported in this document have been obtained by SAR measurements in accordance with the International standard IEC 62209-2 (CDV) [1], the European standard EN 62311[4] [2] and the FCC OET Bulletin 65 Supplement C [3]. The purpose of the tests was to verify that the EUT is in compliance with the appropriate RF exposure standards, recommendations and limits [3]-[9].

Two identical host devices (identification numbers D-1012-32-859 and D-1012-32-861) were used for compliance testing. The D-1012-32-859 host device was equipped with the KRD 131 15/11 F3607gw module, whereas the D-1012-32-861 was equipped with the KRD 131 15/12 F3607gw module. The KRD 131 15/11 module supports UMTS bands I, II, V, and VI[5], whereas the KRD 131 15/12 module supports UMTS bands I, II, and VIII. All tests except at UMTS band VIII were conducted using the D-1012-32-859 host and the KRD 131 15/11 wireless module.

4 Equipment under test

The tables below summarize the technical data for the equipment under test (EUT). Photographs of the device are presented in Appendix A.

Description	Notebook PC with built-in Ericsson F3607gw Mobile Broadband Module	
Brand Names	Dell inc. (host device); Ericsson (wireless module)	
Model Names	Inspirion 1012 (host device); F3607gw (wireless module)	
Alternative wireless module name	Dell 5540 HSPA mobile broadband mini-card	
Identification numbers (host devices)	D-1012-32-859 and D-1012-32-861	
Hardware Version Number (host devices)	A00	
Type numbers (wireless modules)	KRD 131 15/11 and KRD 131 15/12	
IMEI Numbers (wireless modules)	004401700230697 and 004401700234228	
Serial Numbers (wireless modules)	A400840882 and A400842858	
Hardware Revision (wireless modules)	EP 4.1 and EP 1.2	
Software Revision (wireless module)	Rev A	
FCC ID Number (wireless module)	VV7-MBMF3607GW1-D and VV7-MBMF3607GW2-D	
IC Canada reg. Number (wireless module)	287AG-MBMF3607GW1 and 287AG-MBMF3607GW2	
Type of Unit	Portable Tranceiver	
Antennas	Integrated in screen part of host device.	
Mode(s) covered by this report and specified output powers by the customer	GSM/GPRS/EDGE 850/900 GSM/GPRS/EDGE 1800/1900 UMTS/HSPA FDD I/II/V/VIII	33 dBm 30 dBm 24 dBm
Data and connectivity	GPRS multislot/capability class: 10/B; EDGE multislot class: 10 HSDPA Category 8 (up to 7.2Mbps); HSUPA Category 5 (up to 2.0Mbps)	
Transmitter frequency range (MHz)	GSM 850: 824.2 – 848.8 UMTS FDD V: 826.4 – 846 6 GSM 900: 880.2 – 914.8 UMTS FDD VIII: 882.4 – 912.6 GSM 1800: 1710.2 – 1784.8 GSM 1900: 1850.2 – 1909.8 UMTS FDD II: 1852.4 – 1907.6 UMTS FDD I: 1922.4 – 1977.6	
Modulations/Crest factors	GMSK (GPRS/EDGE): 217 Hz / 4, QPSK (UMTS/HSPA): 0 / 1	
Power Supply Requirement / Battery type:	11.1 V dc / Li-ion	

[4] This standard specifies several compliance assessment methods, including SAR measurements. SAR measurement is part of the Ericsson EMF Research Laboratory accreditation.
[5] This frequency band is a sub-band of band V and is therefore automatically covered.

Mode	Measured output power[6] (dBm)		
	Low ch	Mid ch	High ch
GPRS 850[7]	32.2	32.6	32.8
EDGE 850	32.1	32.5	32.7
GPRS 1900	29.5	29.9	29.6
EDGE 1900	29.5	29.8	29.6
UMTS FDD V (12.2 kbps RMC)[8]	23.7	24.0	23.8
UMTS FDD V (HSDPA Subtest 1)	23.6	24.0	23.7
UMTS FDD V (HSDPA Subtest 2)	22.9	23.2	23.1
UMTS FDD V (HSDPA Subtest 3)	22.9	23.2	23.0
UMTS FDD V (HSDPA Subtest 4)	23.0	23.2	23.0
UMTS FDD V (HSUPA Subtest 1)	22.9	23.2	23.0
UMTS FDD V (HSUPA Subtest 2)	23.3	23.6	23.5
UMTS FDD V (HSUPA Subtest 3)	22.4	22.7	22.5
UMTS FDD V (HSUPA Subtest 4)	21.4	21.7	21.5
UMTS FDD V (HSUPA Subtest 5)	22.9	23.2	23.0
UMTS FDD VIII (12.2 kbps RMC)	24.1	24.2	24.3
UMTS FDD VIII (HSDPA Subtest 1)	24.0	24.2	24.2
UMTS FDD VIII (HSDPA Subtest 2)	23.4	23.6	23.5
UMTS FDD VIII (HSDPA Subtest 3)	23.4	23.5	23.5
UMTS FDD VIII (HSDPA Subtest 4)	23.4	23.6	23.5
UMTS FDD VIII (HSUPA Subtest 1)	23.4	23.6	23.6
UMTS FDD VIII (HSUPA Subtest 2)	23.6	23.8	23.8
UMTS FDD VIII (HSUPA Subtest 3)	22.9	23.0	23.0
UMTS FDD VIII (HSUPA Subtest 4)	21.9	22.0	22.1
UMTS FDD VIII (HSUPA Subtest 5)	23.3	23.5	23.5

5 Test equipment

5.1 Dosimetric system

The SAR measurements were conducted using the DASY4 professional near-field scanner by Schmid & Partner Engineering AG. The system is based on the E-field probe technique and includes a high precision 6-axis robot, liquid-filled plastic phantoms and miniature electric field probes. The dosimetric probe is sensitive to E-fields and incorporates three small dipoles arranged so that the overall response is close to isotropic. The probe sensors are covered by an outer protective shell made of plastic

Measurements are conducted in a metal screen room, which is designed to provide shielding from external radiofrequency signals and to prevent devices under test from interfering with local wireless networks. The ambient noise level is kept low so that the 1-gram averaged SAR is below 12 mW/kg when the device under test (DUT) is turned off. The electromagnetic field reflections in the laboratory are kept low.

The laptop extension kit by Schmid & Partner Engineering AG for wireless enabled laptop computers was used. This kit is a lightweight extension that facilitates the testing of larger devices according to [1] and fits on the upper part of the mounting device stand.

An uncertainty budget including total uncertainty (k=1) and expanded uncertainty (k=2) for 1g and 10g SAR assessments is given in Section 8.

The equipment list is given below. In Appendix E calibration parameters for the SAR test probe(s) are listed and in Appendix F calibration certificate(s) of the SAR test probe(s) are attached [10].

[6] Measured at module main antenna port.
[7] For the GSM bands the average burst power was measured.
[8] For the UMTS bands the average RMS power was measured.

Description	Serial number	Calibration due date	Calibration interval
Probe electronics, DAE3	S/N 422	2010-04-14	12 months
E-field (SAR) probe, ES3DV3	S/N 3113	2010-04-14	12 months
Dipole validation kit, D835V2	S/N 413	NA	NA
Dipole validation kit, D900V2	S/N 1d039	NA	NA
Dipole validation kit, D1800V2	S/N 203	NA	NA
Dipole validation kit, D1900V2	S/N 510	NA	NA
Dipole validation kit, D2000V2	S/N 1003	NA	NA
ELI-4 flat phantom	S/N 1003	NA	NA

5.2 Additional equipment

Description	Serial number	Calibration due date	Calibration interval
Dielectric probe kit, HP 85070C	S/N US99360060	NA	NA
Network analyzer, Agilent E5071C	MY46104892	2010-07-02	12 months
Power meter, R&S NRVS	S/N 848888/052	2010-05-28	12 months
Power sensor, R&S NRV-Z5	S/N 849895/030	2010-05-28	12 months
Universal radio communication tester, R&S CMU 200	S/N 107639	2010-06-04	12 months
Thermometer, EBRO TFX-392SKWT	S/N 10130918	2010-10-19	12 months

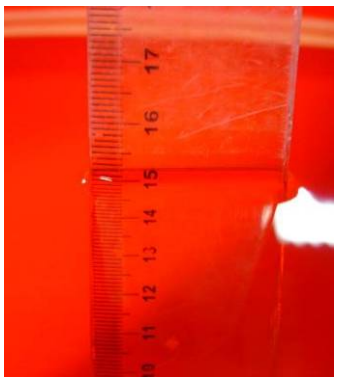
6 Electrical parameters of the tissue simulating liquids

The parameters of the tissue simulating liquids were measured with a dielectric probe kit prior to the SAR measurements and the results are shown below. The measured values were within 5% of the specified values in [1] and [3] and the mass density of the liquid entered into the DASY4 program was 1000 kg/m^3. The depth of the tissue simulating liquid was 15±0.5 cm. Pictures of liquid depth for FCC band liquids are shown below.

f (MHz)	Tissue type	Measured/Specification	ε_r	σ (S/m)
835	Body (Muscle)	Measured	55.3	0.97
		Specified value [3]	55.2	0.97
		Difference (%)	±0	±0
900	Head	Measured	40.2	0.95
		Specified value [1]	41.5	0.97
		Difference (%)	-3	-2
1800	Head	Measured	38.1	1.41
		Specified value [1]	40.0	1.40
		Difference (%)	-5	+1
1900	Body (Muscle)	Measured[9]	51.1 50.9	1.60 1.59
		Specified value [3]	53.3	1.52
		Difference (%)	-4 -5	+5 +5
2000	Head	Measured	38.9	1.44
		Specified value [1]	40.0	1.40
		Difference (%)	-3	+3

[9] The liquid parameters were measured at more than one occasion.

Measured level (153 mm) of 835 MHz muscle tissue simulating liquid in the ELI-4 phantom



Measured level (152 mm) of 1900 MHz muscle tissue simulating liquid in the ELI-4 phantom

7 SAR system performance check

System performance checks of the SAR test system were conducted prior to the SAR measurements using the D835V2, D900V2, D1800V2, D1900V2 and D2000V2 dipole validation kits and the obtained results are shown in the table below. The system performance check measurements were conducted at 835, 900, 1800, 1900 and 2000 MHz. The forward power was measured using the R&S power meter. Thereafter the dipole was connected via a directional coupler and the return power was measured at the return port in order to determine the radiated power of the dipole. The radiated power was for all cases close to 250 mW as shown in the table below. The measured 1g and 10g averaged SAR was normalized to 1 W and compared with the references [11], [12]. SAR distribution plots from the system performance checks are given in Appendix C. The results are within 10% of the reference values [11], [12] . Evaluations prior to the SAR testing showed that the maximum SAR system noise was below 2 mW/kg, which is below the requirements. The temperature of the test facility during the system performance checks was in the range 20°C to 25°C.

f (MHz)	Tissue type	Measured/ Reference	Radiated power (mW)	SAR 1g (W/kg)	SAR 10g (W/kg)	ε_r	σ (S/m)	Liquid temp (°C)	Date
835	Body (muscle)	Measured	248	9.5	6.3	55.3	0.97	21.1	091107
		Reference [11]	-	9.75	6.39	55.2	0.97	-	-
		Difference (%)	-	-3	-1	±0	±0	-	-
900	Head	Measured	250	11.1	7.1	40.2	0.95	21.1	091106
		Reference [12]	-	10.8	6.9	41.5	0.97	-	-
		Difference (%)	-	+3	+3	-3	-2	-	-
1800	Head	Measured	248.8	38.3	20.0	38.1	1.41	21.0	091104
		Reference [12]	-	38.1	19.8	40.0	1.40	-	-
		Difference (%)	-	+1	+1	-5	+1	-	-
1900	Body (muscle)	Measured	249.8	42.0	21.9	51.1	1.60	21.4	091104
		Reference [11]	-	40.4	21.1	53.3	1.52	-	-
		Difference (%)	-	+4	+4	-4	+5	-	-
2000	Head	Measured	251	43.0	22.0	38.9	1.44	22.1	091105
		Reference [12]	-	41.1	21.1	40.0	1.40	-	-
		Difference (%)	-	+5	+4	-3	+3	-	-

8 Uncertainty evaluation of SAR measurement system DASY4 according to IEC 62209-2 [1] and IEEE 1528 [12]

Uncertainty Component	Section in IEEE 1528	Uncer. (%)	Prob Dist.	Div.	$C_{i,1g}$	$C_{i,10g}$	Std. Uncer. (1g) (%)	Std. Uncer. (10g) (%)
Measurement System								
Probe Calibration	E2.1	±5.9	N	1	1	1	±5.9	±5.9
Axial Isotropy	E2.2	±4.7	R	√3	0.7	0.7	±1.9	±1.9
Spherical Isotropy	E2.2	±9.6	R	√3	0.7	0.7	±3.9	±3.9
Boundary Effect	E2.3	±1.0	R	√3	1	1	±0.6	±0.6
Linearity	E2.4	±4.7	R	√3	1	1	±2.7	±2.7
System Detection Limits	E2.5	±1.0	R	√3	1	1	±0.6	±0.6
Readout electronics	E2.6	±0.3	N	1	1	1	±0.3	±0.3
Response time	E2.7	±0.8	R	√3	1	1	±0.5	±0.5
Integration time	E2.8	±2.6	R	√3	1	1	±1.5	±1.5
RF Ambient Noise	E6.1	±3.0	R	√3	1	1	±1.7	±1.7
RF Ambient Reflections	E6.1	±3.0	R	√3	1	1	±1.7	±1.7
Probe Positioner	E6.2	±0.4	R	√3	1	1	±0.2	±0.2
Probe Positioning	E6.3	±2.9	R	√3	1	1	±1.7	±1.7
Max. SAR Evaluation	E5	±1.0	R	√3	1	1	±0.6	±0.6
Measurement System Uncertainty							±8.6	±8.6
Test Sample Related								
Device positioning	E4.2	±2.9	N	1	1	1	±2.9	±2.9
Device holder uncertainty	E4.1	±3.6	N	1	1	1	±3.6	±3.6
Power drift	6.6.3	±5.0	R	√3	1	1	±2.9	±2.9
Test Sample Related Uncertainty							±5.5	±5.5
Phantom and Tissue Parameters								
Phantom uncertainty	E3.1	±4.0	R	√3	1	1	±2.3	±2.3
Liquid conductivity (meas uncertainty)	E3.3	±2.5	N	1	0.64	0.43	±1.6	±1.1
Liquid conductivity (target)	E3.2	±5.0	R	√3	0.64	0.43	±1.8	±1.2
Liquid Permittivity (meas uncertainty)	E3.3	±2.5	N	1	0.6	0.49	±1.5	±1.2
Liquid Permittivity (target)	E3.2	±5.0	R	√3	0.6	0.49	±1.7	±1.4
Phantom and Tissue Parameters Uncertainty							±4.9	±3.4
Combined standard uncertainty							**±10.9**	**±10.7**
Extended standard uncertainty (k=2)							**±21.9**	**±21.4**

9 SAR measurement configurations

The EUT (see Figure A.1) is a laptop smaller than a traditional full size laptop with a screen size of 10.1 inches. The EUT is equipped with an Ericsson mobile broadband module (see Figure A.2) connected to two internal mobile communication antennas, the main antenna and the auxiliary antenna. The main Wireless Wide Area Network (WWAN) antenna is used for transmission (see location in top left part of Figure A.1). The auxiliary WWAN antenna is used for reception only.

The EUT also supports simultaneous Wireless Local Area Network (WLAN) connectivity. SAR testing of Wireless LAN has not been conducted since WLAN transmission is covered in separate reports. An FCC permission to use the KDB616217 policy of adding individual 1g SAR values for WWAN in this report to individual 1g SAR values for WLAN of other reports has been obtained (Inquiry Tracking Number: 256299).

The EUT can only be configured in laptop mode, i.e. the screen can not be rotated and folded onto the keyboard section.

SAR testing was conducted with the bottom part of the base towards the phantom (0 mm separation distance), with the screen opened 90°. The bottom left part of Figure A.1 shows the base of the laptop. Since the intended use described in the user manual of the EUT specifies that a separation distance of >20 cm should be kept between the user (or any other person in the vicinity) and the antennas, no other test positions were considered [1].

The SAR testing was conducted at the middle channel of each tested band only [13].

For the GSM bands SAR measurements with GPRS (2TS[10]) and EDGE (2TS) transmission activated were conducted [14].

For the UMTS bands SAR measurements with RMC 12.2 kbps, HSDPA (Subtest 1) and HSPA (Subtest 5) transmission activated were conducted [15].

SAR testing of Bluetooth has been excluded based on principles specified in [13] (Section 3b) and [1] (Section K2.2).

10 SAR test results

The tables in this section show the measured 1g and 10g averaged SAR for the device. All measurements were conducted with a separation distance of 0 mm (touch position) between the EUT and the flat oval ELI-4 phantom (thickness 2 ± 0.2 mm). A coarse rectangular 300x210 mm area scan (grid step 30 mm) covering the entire device under test was first used to locate the SAR maxima. Thereafter a 60x60 mm fine area scan (grid step 10 mm for frequencies above 1 GHz and 15 mm for frequencies below 1 GHz) centered around the SAR maxima was assessed. Finally a 32x32x30 mm (in some cases larger) zoom scan (8x8x5 mm grid step) was used to determine the 1g and 10g averaged SAR in the region of maximum SAR. A sophisticated method called the modified Quadratic Shepard's method is used for maximum search, interpolation and extrapolation to the surface of the phantom (which is unreachable due to probe case and boundary effects) in order to accurately determine the 1g and 10g averaged SAR.

A universal radio communication tester was used to control the device during the SAR measurements. The temperature of the test facility during the tests was in the range 20 to 25ºC. During the tests, the temperature of the tissue simulating liquid was within ±2ºC from the liquid temperature at system performance check. Very low SAR results (close to noise level) were obtained. Therefore the power drift measurements were influenced by noise and were not within ±0.2 dB.

10.1 Results for the GPRS/EDGE 850 modes

Test position	Mode	f (MHz)	Measured SAR (W/kg)	
			SAR_{1g}	SAR_{10g}
Base facing phantom	GPRS (2TS)	836.6	0.02	0.01
	EDGE (2TS)	836.6	0.02	0.01

In Figure D.1 the SAR distribution for the maximum configuration for the GPRS/EDGE 850 band is shown.

[10] Two active uplink time slots.

10.2 Results for the UMTS FDD V mode

Test position	Mode	f (MHz)	Measured SAR (W/kg)	
			SAR_{1g}	SAR_{10g}
Base facing phantom	12.2 kbps RMC	836.6	0.01	0.01
	HSDPA Subtest 1	836.6	0.01	0.01
	HSPA Subtest 5	836.6	0.01	0.01

In Figures D.2 and D.3 the SAR distributions for the maximum configuration and the 12.2 kbps RMC configuration for the UMTS FDD V band are shown.

10.3 Results for the GPRS/EDGE 1900 modes

Test position	Mode	f (MHz)	Measured SAR (W/kg)	
			SAR_{1g}	SAR_{10g}
Base facing phantom	GPRS (2TS)	1880	0.01	0.01
	EDGE (2TS)	1880	0.01	0.01

In Figure D.4 the SAR distribution for the maximum configuration for the GPRS/EDGE 1900 band is shown.

10.4 Results for the UMTS FDD II mode

Test position	Mode	f (MHz)	Measured SAR (W/kg)	
			SAR_{1g}	SAR_{10g}
Base facing phantom	12.2 kbps RMC	1880	0.03	0.02
	HSDPA Subtest 1	1880	0.03	0.02
	HSPA Subtest 5	1880	0.03	0.02

In Figures D.5 and D.6 the SAR distributions for the maximum configuration and the 12.2 kbps RMC configuration for the UMTS FDD II band are shown.

10.5 Results for the GPRS/EDGE 900 mode

Test position	Mode	f (MHz)	Measured SAR (W/kg)	
			SAR_{1g}	SAR_{10g}
Base facing phantom	GPRS (2TS)	897.4	0.01	<0.01
	EDGE (2TS)	897.4	<0.01	<0.01

In Figure D.7 the SAR distribution for the maximum configuration for the GPRS/EDGE 900 band is shown.

10.6 Results for the UMTS FDD VIII mode

Test position	Mode	f (MHz)	Measured SAR (W/kg)	
			SAR_{1g}	SAR_{10g}
Base facing phantom	12.2 kbps RMC	897.4	<0.01	<0.01
	HSDPA Subtest 1	897.4	0.01	<0.01
	HSPA Subtest 5	897.4	0.01	<0.01

In Figure D.8 the SAR distribution for the maximum configuration for the UMTS FDD VIII band is shown.

10.7 Results for the GPRS/EDGE 1800 mode

Test position	Mode	f (MHz)	Measured SAR (W/kg)	
			SAR_{1g}	SAR_{10g}
Base facing phantom	GPRS (2TS)	1747.6	0.01	0.01
	EDGE (2TS)	1747.6	0.01	0.01

In Figure D.9 the SAR distribution for the maximum configuration for the GPRS/EDGE 1800 band is shown.

10.8 Results for the UMTS FDD I mode

Test position	Mode	f (MHz)	Measured SAR (W/kg)	
			SAR_{1g}	SAR_{10g}
Base facing phantom	12.2 kbps RMC	1950	0.01	0.01
	HSDPA Subtest 1	1950	0.01	0.01
	HSPA Subtest 5	1950	0.01	0.01

In Figure D.10 the SAR distribution for the maximum configuration for the UMTS FDD I band is shown.

11 Conclusion

The results in Section 10 show that the maximum SAR for the EUT is below the applicable SAR limits. Consequently, the EUT is in compliance with the appropriate RF exposure standards and recommendations.

12 References

[1] IEC 62209-2, “Procedure to determine the specific absorption rate (SAR) for mobile wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)”, CDV, July 2008.

[2] EN 62311, “Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz), European standard, January 2008.

[3] FCC, “Evaluating Compliance with FCC Guidelines from Human Exposure To Radiofrequency Electromagnetic Fields”, Supplement C Edition 01-01 to OET Bulletin 65 Edition 97-01, June 2001.

[4] FCC, Code of Federal Regulations CFR title 47, part 2.1093 “Radiofrequency radiation exposure evaluation: portable devices.”, Federal Communications Commission (FCC), October 2008.

[5] ICNIRP, “Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz)”, International Commission on Non-Ionizing Radiation Protection (ICNIRP), Health Physics, vol. 74, pp 494-522, April 1998.

[6] Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 HZ to 300 GHz) (Official Journal L 197 of 30 July 1999).

[7] ARPANSA, “Radiation Protection Standard for Maximum Exposure Levels for Radiofrequency Fields – 3 kHz to 300 GHz (2002)”, Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), May 2002.

[8] Radio Standard Specification (RSS) 102, (Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands), Industry Canada, 2009.

[9] IEEE Std C95.1-2005 (Revision of IEEE Std C95.1-1991), “Safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz to 300 GHz”, The Institute of Electrical and Electronics Engineers Inc., New York, 2006.

[10] FCC KDB450824 D01. “SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz – 3 GHz”, Rev. 1.1, January 2007.

[11] EAB/TF-03:090, “Calculation of reference SAR values for system performance checks with muscle tissue simulating liquid”, Ericsson technical report, December 2006.

[12] IEEE, Standard 1528, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques.”, The Institute for Electrical and Electronics Engineers (IEEE) Inc., June 2003.

[13] FCC KDB447498 D01. “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, v03r03, January 2009.

[14] FCC KDB941225 D03. “Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE”, December 2008.

[15] FCC KDB941225 D01. “SAR Measurement Procedures for 3G Devices – CDMA 2000 / Ev-Do – WCDMA / HSDPA / HSPA-, v02, October 2007.

13 Revision History

Rev.	Date	Description
A	2009-11-13	First revision
B	2009-12-08	Reference added Device information extended SAR measurement system information extended Interpolation/extrapolation information added System performance check information extended Additional SAR plots added

APPENDIX A: Photographs of the EUT

Pictures are found in EAB:09-074473

Pictures are found in EAB:09-074473

Pictures are found in EAB:09-074473

Figure A.1 Top left: View of EUT with screen open. Top right: View of EUT with screen closed. Bottom left: View of base of EUT.

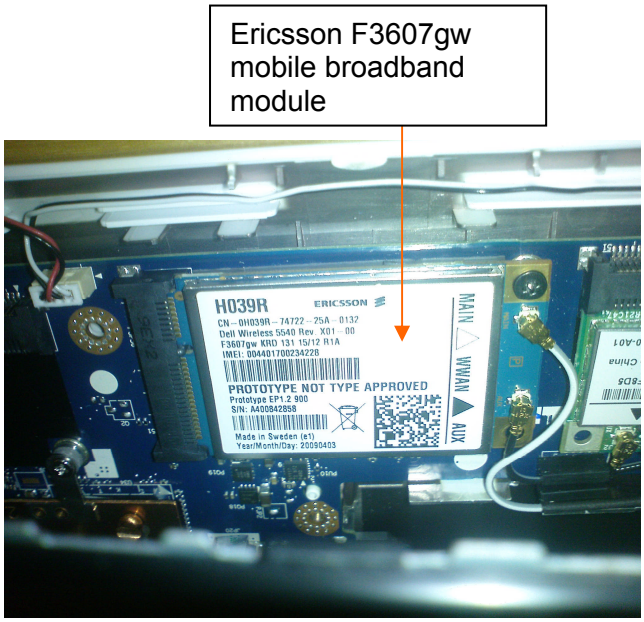


Figure A.2 Internal view showing the Ericsson F3607gw mobile broadband module.

APPENDIX B: Photographs of the EUT when positioned for SAR measurements

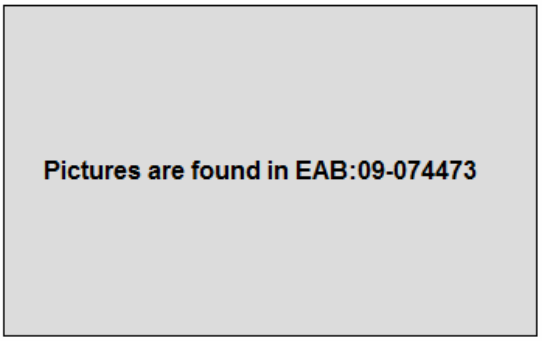


Figure B.1 EUT positioned with the base facing the ELI 4 phantom at 0 mm separation distance (touch position).

APPENDIX C: SAR distribution plots for the system performance checks

System performance check at 835 MHz (Body) conducted on the 7th of November

Date/Time: 2009-11-07 12:25:50

-Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
-Medium: Body 835 MHz; $\sigma = 0.973$ mho/m; $\varepsilon_r = 55.3$; $\rho = 1000$ kg/m^3

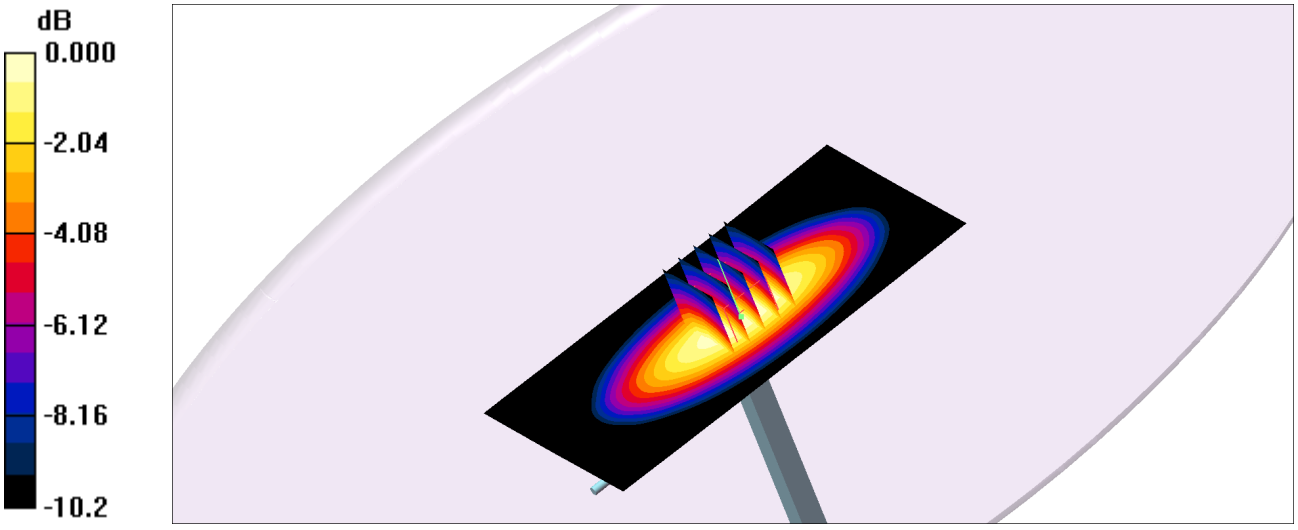
DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(5.59, 5.59, 5.59)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

d=15mm, Pin=248 mW/Area Scan 2 (61x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.59 mW/g

d=15mm, Pin=248 mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 51.1 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 3.47 W/kg
SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.58 mW/g

Maximum value of SAR (measured) = 2.58 mW/g



0 dB = 2.58mW/g

System performance check at 900 MHz conducted on the 6th of November

Date/Time: 2009-11-06 09:23:18

-Communication System: CW; Frequency: 900 MHz;Duty Cycle: 1:1
-Medium: Head 900 MHz; $\sigma = 0.95$ mho/m; $\varepsilon_r = 40.2$; $\rho = 1000$ kg/m^3

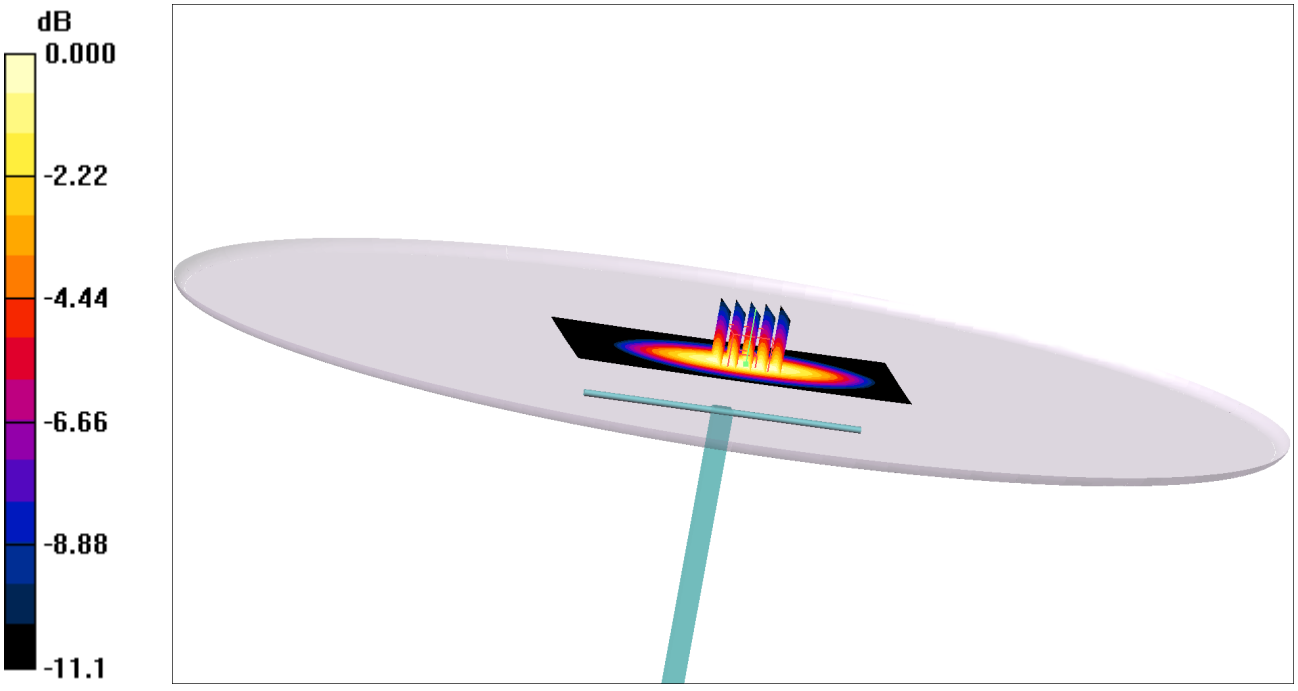
DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(5.56, 5.56, 5.56)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

d=15mm, Pin= 250 mW/Area Scan 2 (61x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 3.01 mW/g

d=15mm, Pin= 250 mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 55.8 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 4.19 W/kg
SAR(1 g) = 2.76 mW/g; SAR(10 g) = 1.77 mW/g

Maximum value of SAR (measured) = 2.98 mW/g



0 dB = 2.98mW/g

System performance check at 1800 MHz conducted on the 4th of November

Date/Time: 2009-11-04 15:55:46

-Communication System: CW; Frequency: 1800 MHz;Duty Cycle: 1:1
-Medium: Head 1800 MHz; σ = 1.41 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3

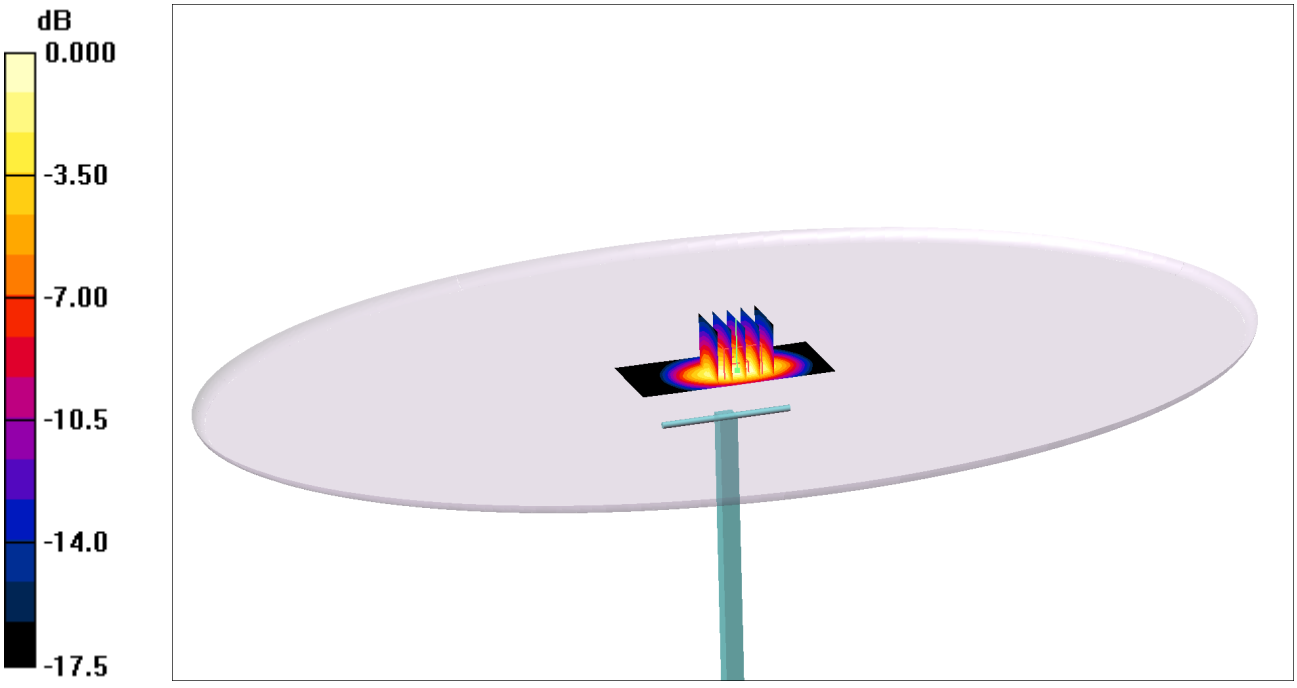
DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(4.79, 4.79, 4.79)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

d=10mm, Pin=248.8 mW/Area Scan 2 (51x111x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 10.8 mW/g

d=10mm, Pin=248.8 mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.9 V/m; Power Drift = -0.123 dB
Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 9.53 mW/g; SAR(10 g) = 4.97 mW/g

Maximum value of SAR (measured) = 10.7 mW/g



0 dB = 10.7mW/g

System performance check at 1900 MHz (Body) conducted on the 4th of November

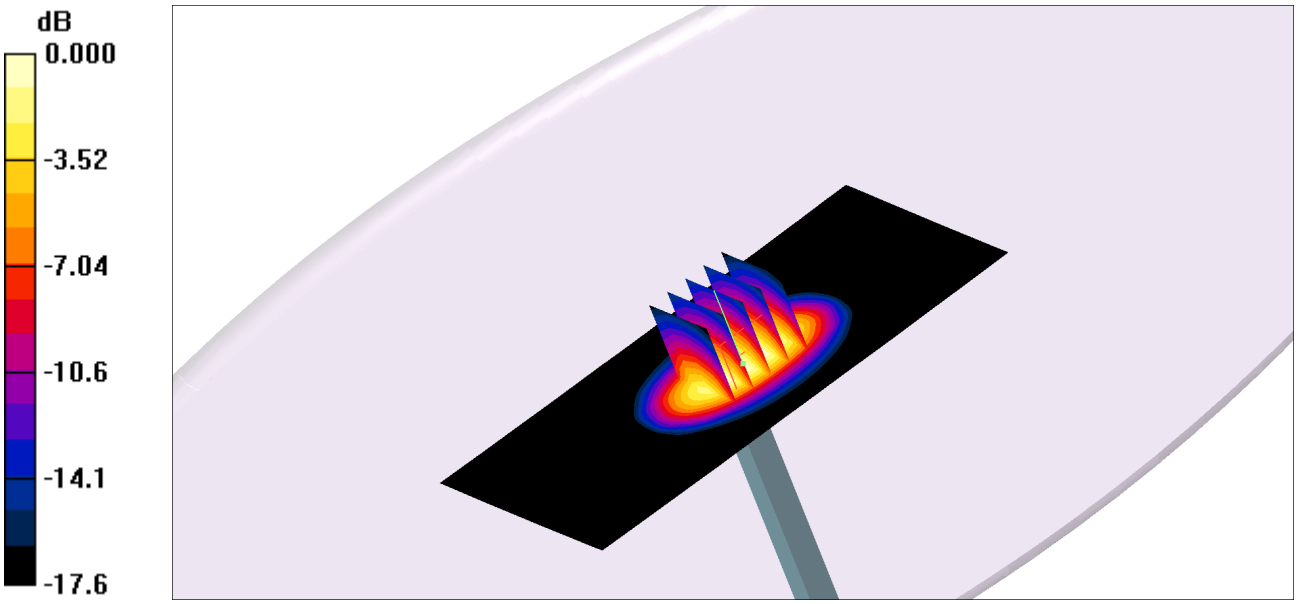
Date/Time: 2009-11-04 19:13:02

-Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
-Medium: Body 1900 MHz; σ = 1.6 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(4.57, 4.57, 4.57)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA;
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

d=10mm, Pin=249.8 mW/Area Scan 2 (91x181x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 11.9 mW/g

d=10mm, Pin=249.8 mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 84.7 V/m; Power Drift = -0.090 dB
Peak SAR (extrapolated) = 18.7 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.47 mW/g
Maximum value of SAR (measured) = 11.9 mW/g



0 dB = 11.9mW/g

System performance check at 2000 MHz conducted on the 5th of November

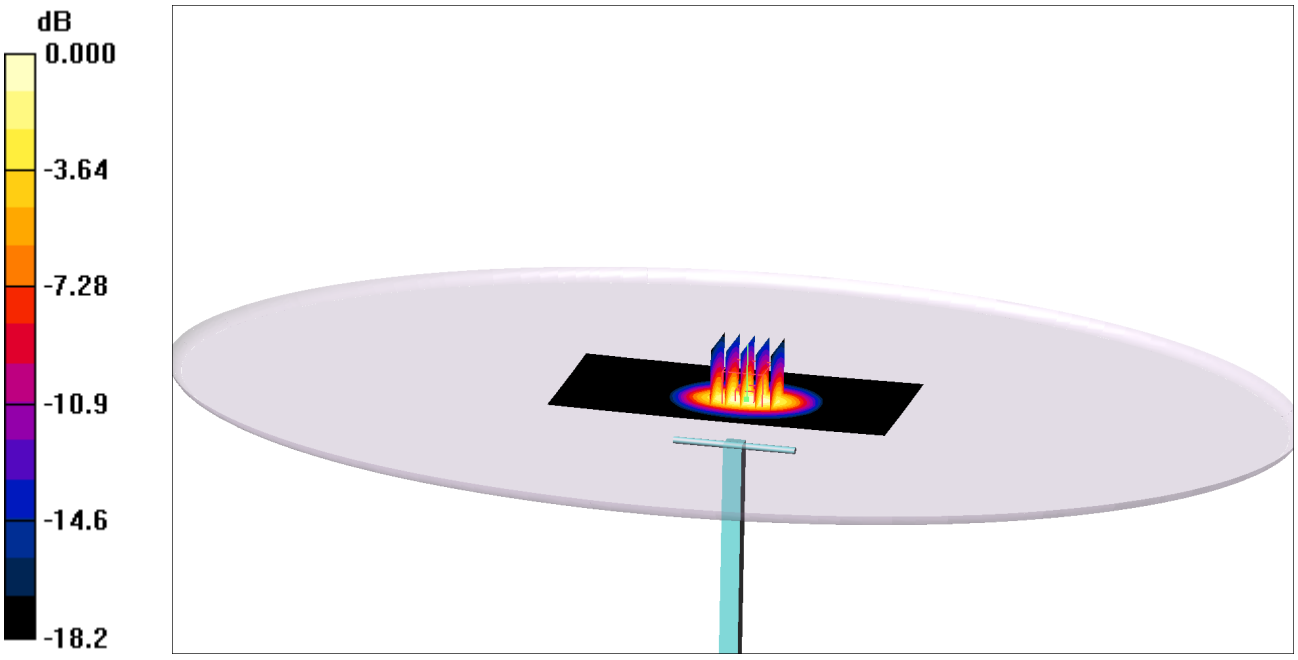
Date/Time: 2009-11-05 13:13:58

-Communication System: CW; Frequency: 2000 MHz;Duty Cycle: 1:1
-Medium: Head 2000 MHz; σ = 1.44 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(4.63, 4.63, 4.63)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA;
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

d=10mm, Pin= 251 mW/Area Scan 2 (91x181x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 12.0 mW/g

d=10mm, Pin= 251 mW/Zoom Scan (5x5x7) (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 83.5 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 20.3 W/kg
SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.52 mW/g
Maximum value of SAR (measured) = 12.2 mW/g



0 dB = 12.2mW/g

APPENDIX D: SAR distribution plots

Date/Time: 2009-11-07 14:20:56

-Communication System: GPRS 850 (2ts); Frequency: 836.6 MHz;Duty Cycle: 1:4.15
-Medium: Body 835 MHz; $\sigma = 0.974$ mho/m; $\varepsilon_r = 55.3$; $\rho = 1000$ kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(5.59, 5.59, 5.59)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

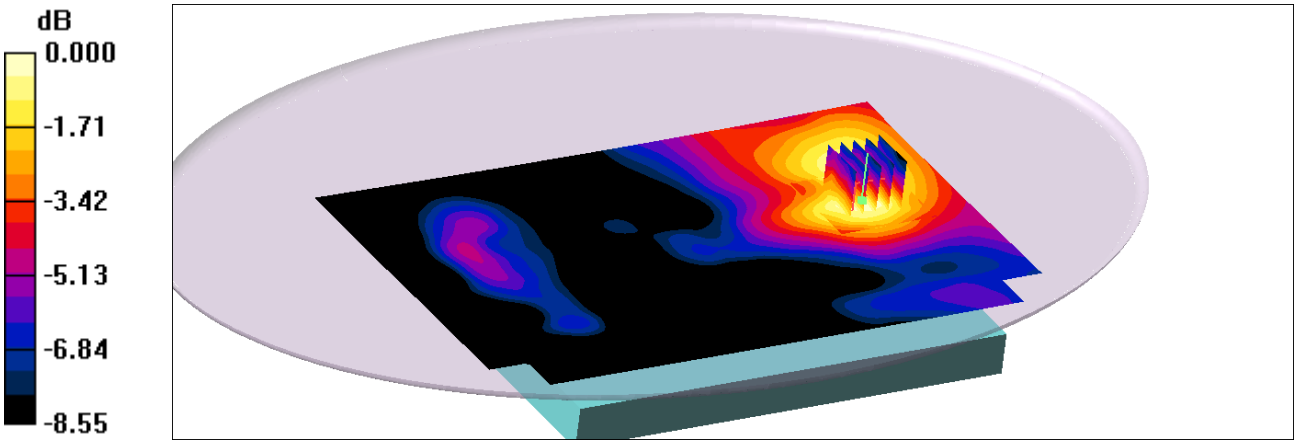
EDGE (2TS), 0 mm, BASE, MID/Large scan 2 (91x141x1): Measurement grid: dx=25mm, dy=25mm

Maximum value of SAR (interpolated) = 0.023 mW/g

EDGE (2TS), 0 mm, BASE, MID/Area scan 2 2 (61x61x1): Measurement grid: dx=10mm, dy=10mm

EDGE (2TS), 0 mm, BASE, MID/Zoom Scan (7x7x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.79 V/m; Power Drift = 0.676 dB
Peak SAR (extrapolated) = 0.029 W/kg
SAR(1 g) = 0.02 mW/g; SAR(10 g) = 0.01 mW/g

Maximum value of SAR (measured) = 0.022 mW/g



0 dB = 0.022mW/g

Figure D.1 SAR distribution of the EUT, transmitting in the mid channel of the GSM850 band (EDGE with two active uplink timeslots). The EUT is positioned with the base facing the phantom shell with a separation distance of 0 mm (touch position).

Date/Time: 2009-11-07 14:46:17

-Communication System: WCDMA 850; Frequency: 836.6 MHz;Duty Cycle: 1:1
-Medium: Body 835 MHz; σ = 0.973 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(5.59, 5.59, 5.59)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA;
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Base 0 mm, RMC 12.2 kbps/Area Scan 2 (71x101x1): Measurement grid: dx=30mm, dy=30mm

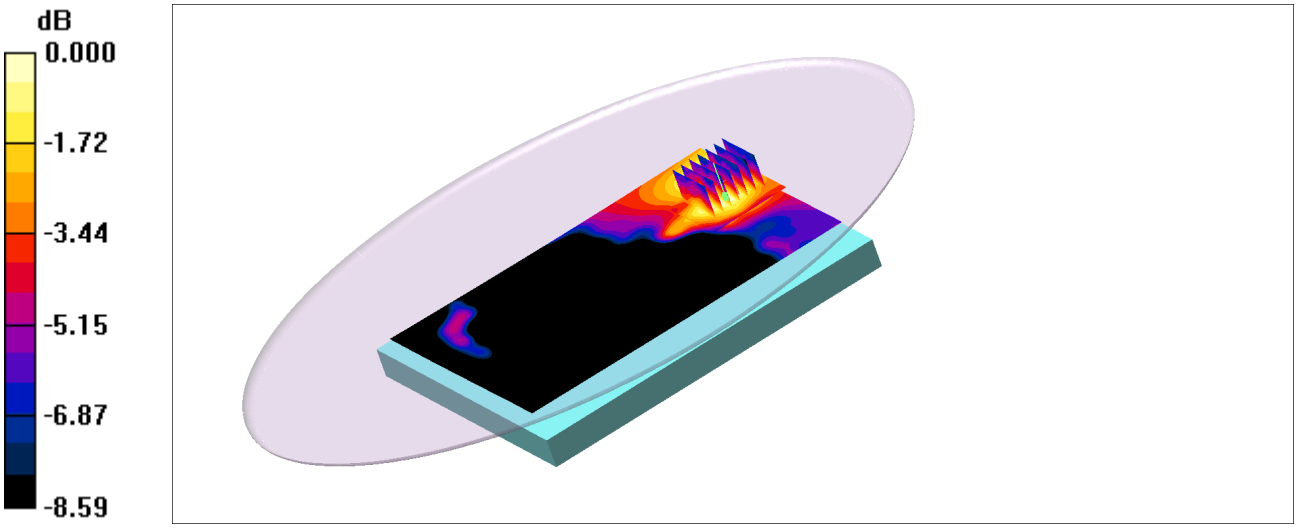
Maximum value of SAR (interpolated) = 0.012 mW/g

Base 0 mm, RMC 12.2 kbps/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.013 mW/g

Base 0 mm, RMC 12.2 kbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.33 V/m; Power Drift = 2.23 dB
Peak SAR (extrapolated) = 0.016 W/kg
SAR(1 g) = 0.01 mW/g; SAR(10 g) = <0.01 mW/g

Maximum value of SAR (measured) = 0.012 mW/g



0 dB = 0.012mW/g

Figure D.2 SAR distribution of the EUT, transmitting in the mid channel of the UMTS FDD V band (RMC 12.2 kbps). The EUT is positioned with the base facing the phantom shell with a separation distance of 0 mm (touch position).

Date/Time: 2009-11-07 15:16:01

-Communication System: WCDMA 850; Frequency: 836.6 MHz;Duty Cycle: 1:1
-Medium: Body 835 MHz; $\sigma = 0.973$ mho/m; $\varepsilon_r = 55.3$; $\rho = 1000$ kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(5.59, 5.59, 5.59)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

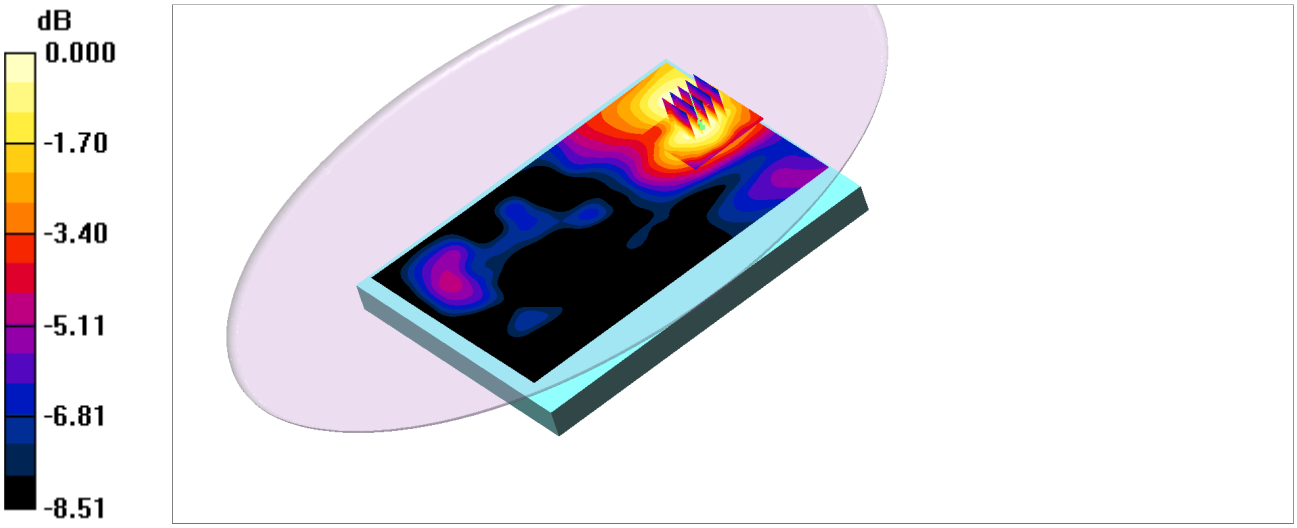
Base 0 mm, HSDPA subtest1/Area Scan 2 (71x101x1): Measurement grid: dx=30mm, dy=30mm

Maximum value of SAR (interpolated) = 0.013 mW/g

Base 0 mm, HSDPA subtest1/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm

Base 0 mm, HSDPA subtest1/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.29 V/m; Power Drift = 1.47 dB
Peak SAR (extrapolated) = 0.017 W/kg
SAR(1 g) = 0.01 mW/g; SAR(10 g) = <0.01 mW/g

Maximum value of SAR (measured) = 0.012 mW/g



0 dB = 0.012mW/g

Figure D.3 SAR distribution of the EUT, transmitting in the mid channel of the UMTS FDD V band (HSDPA subtest 1). The EUT is positioned with the base facing the phantom shell with a separation distance of 0 mm (touch position).

Date/Time: 2009-11-04 19:48:13

-Communication System: GPRS 1900 (2ts); Frequency: 1880 MHz;Duty Cycle: 1:4.15
-Medium: Body 1900 MHz; σ = 1.6 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(4.57, 4.57, 4.57)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

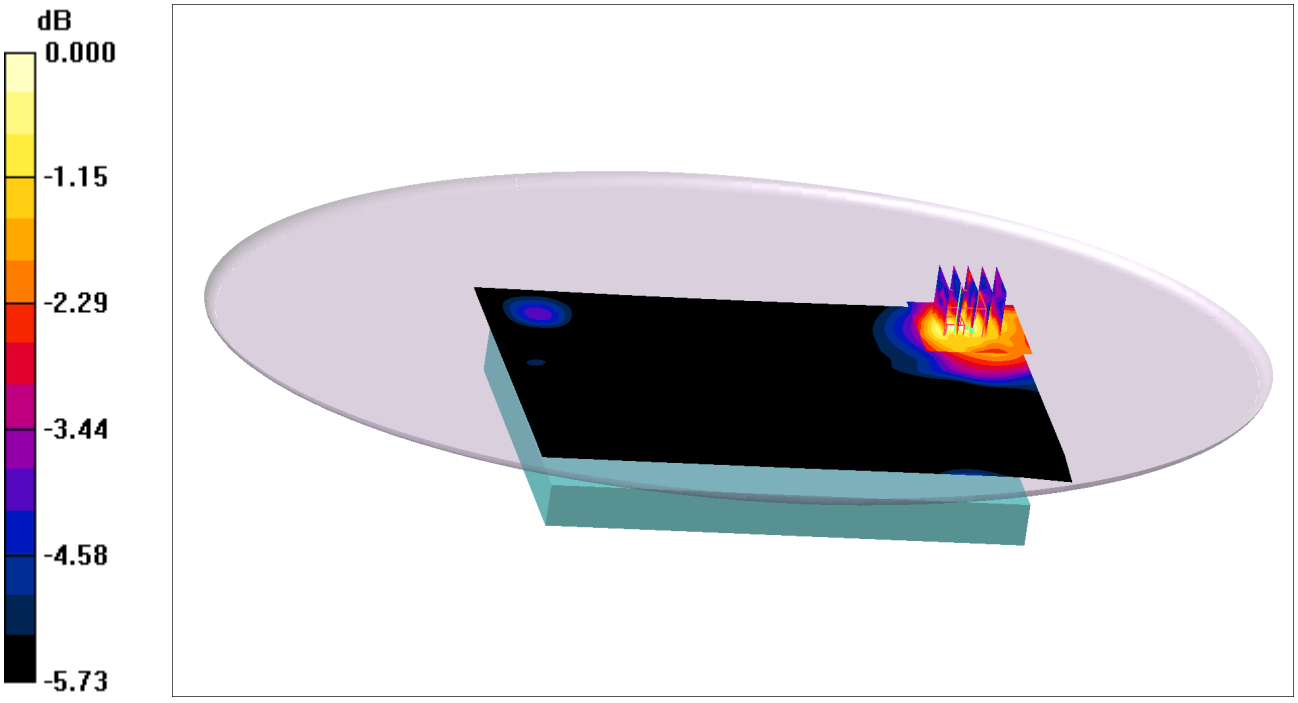
GPRS (2TS), 0 mm, BASE, MID/Large scan 2 (71x101x1): Measurement grid: dx=30mm, dy=30mm

Maximum value of SAR (interpolated) = 0.014 mW/g

GPRS (2TS), 0 mm, BASE, MID/Area scan 2 2 (61x61x1): Measurement grid: dx=10mm, dy=10mm

GPRS (2TS), 0 mm, BASE, MID/Zoom Scan (7x7x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.49 V/m; Power Drift = -0.301 dB
Peak SAR (extrapolated) = 0.022 W/kg
SAR(1 g) = 0.01 mW/g; SAR(10 g) = 0.01 mW/g

Maximum value of SAR (measured) = 0.015 mW/g



0 dB = 0.015mW/g

Figure D.4 SAR distribution of the EUT, transmitting in the mid channel of the GSM1900 band (GPRS with two active uplink timeslots). The EUT is positioned with the base facing the phantom shell with a separation distance of 0 mm (touch position).

Date/Time: 2009-11-05 10:49:28

-Communication System: WCDMA 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
-Medium: Body 1900 MHz; σ = 1.59 mho/m; ε_r = 50.9; ρ = 1000 kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(4.57, 4.57, 4.57)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA;
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

RMC 12.2 kbps/Area Scan 2 (71x101x1): Measurement grid: dx=30mm, dy=30mm

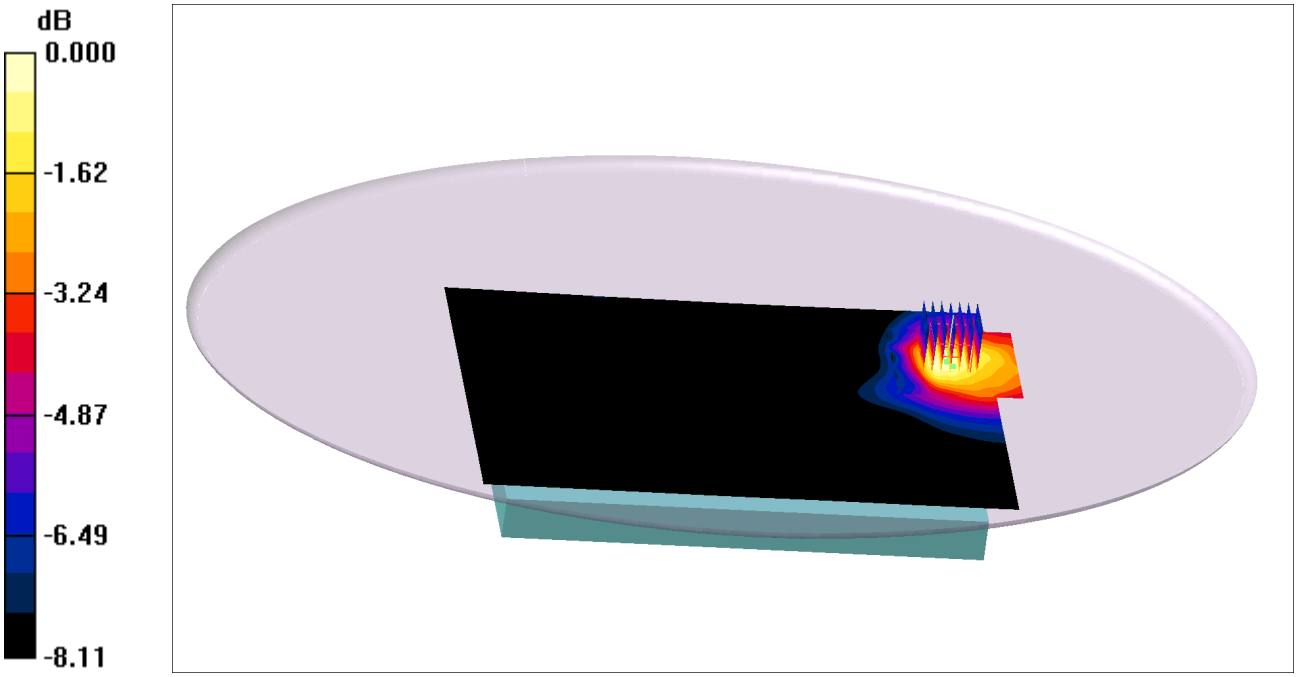
Maximum value of SAR (interpolated) = 0.027 mW/g

RMC 12.2 kbps/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.028 mW/g

RMC 12.2 kbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.48 V/m; Power Drift = 0.204 dB
Peak SAR (extrapolated) = 0.040 W/kg
SAR(1 g) = 0.03 mW/g; SAR(10 g) = 0.02 mW/g

Maximum value of SAR (measured) = 0.029 mW/g



0 dB = 0.029mW/g

Figure D.5 SAR distribution of the EUT, transmitting in the mid channel of the UMTS FDD II band (RMC 12.2 kbps). The EUT is positioned with the base facing the phantom shell with a separation distance of 0 mm (touch position).

Date/Time: 2009-11-05 12:07:26

-Communication System: WCDMA 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
-Medium: Body 1900 MHz; σ = 1.59 mho/m; ε_r = 50.9; ρ = 1000 kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(4.57, 4.57, 4.57)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

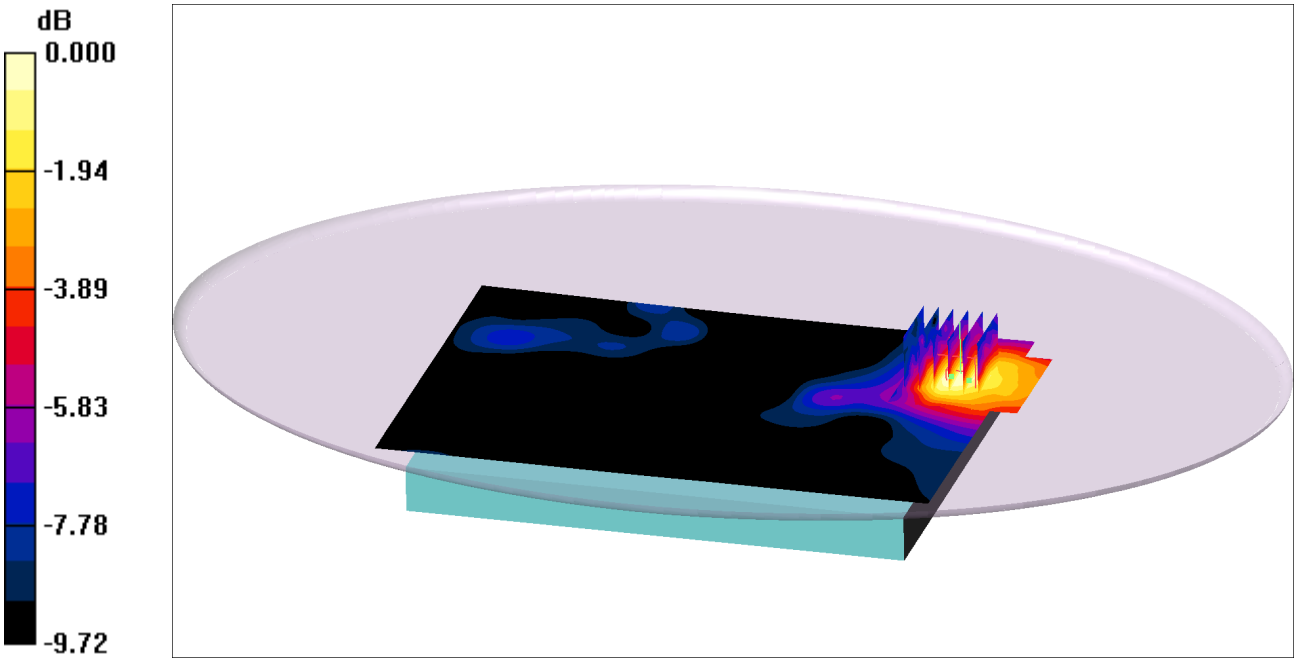
Base 0 mm, HSDPA subtest 1/Area Scan 2 (71x101x1): Measurement grid: dx=30mm, dy=30mm

Maximum value of SAR (interpolated) = 0.036 mW/g

Base 0 mm, HSDPA subtest 1/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm

Base 0 mm, HSDPA subtest 1/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.49 V/m; Power Drift = 0.353 dB
Peak SAR (extrapolated) = 0.051 W/kg
SAR(1 g) = 0.03 mW/g; SAR(10 g) = 0.02 mW/g

Maximum value of SAR (measured) = 0.035 mW/g



0 dB = 0.035mW/g

Figure D.6 SAR distribution of the EUT, transmitting in the mid channel of the UMTS FDD II band (HSDPA subtest 1). The EUT is positioned with the base facing the phantom shell with a separation distance of 0 mm (touch position).

Date/Time: 2009-11-06 12:51:23

-Communication System: GPRS 900 (2ts); Frequency: 897.4 MHz;Duty Cycle: 1:4.15
-Medium: Head 900 MHz; $\sigma = 0.95$ mho/m; $\varepsilon_r = 40.2$; $\rho = 1000$ kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(5.56, 5.56, 5.56)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

GPRS (2TS), 0 mm, BASE, MID/Large scan 2 (91x141x1): Measurement grid: dx=25mm, dy=25mm

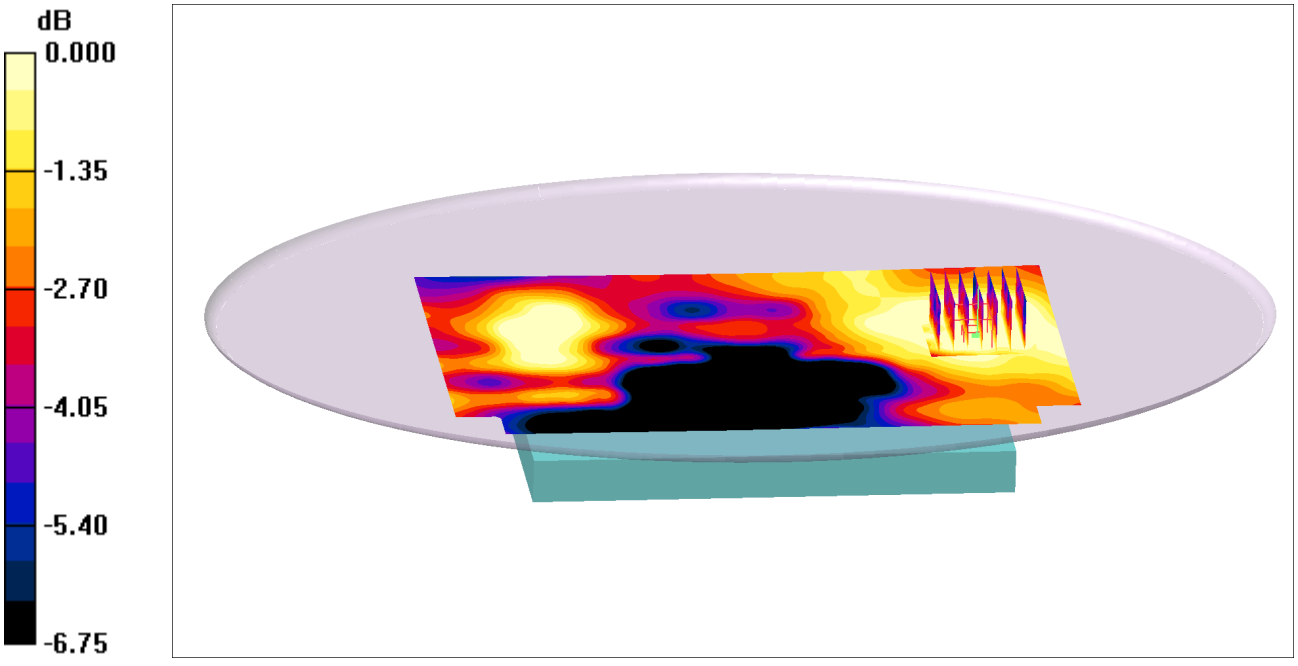
Maximum value of SAR (interpolated) = 0.007 mW/g

GPRS (2TS), 0 mm, BASE, MID/Area scan 2 2 (61x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.006 mW/g

GPRS (2TS), 0 mm, BASE, MID/Zoom Scan (7x7x7) 2 (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.33 V/m; Power Drift = 1.18 dB
Peak SAR (extrapolated) = 0.008 W/kg
SAR(1 g) = 0.01 mW/g; SAR(10 g) = <0.01 mW/g

Maximum value of SAR (measured) = 0.005 mW/g



0 dB = 0.005mW/g

Figure D.7 SAR distribution of the EUT, transmitting in the mid channel of the GSM 900 band (GPRS with two active uplink timeslots). The EUT is positioned with the base facing the phantom shell with a separation distance of 0 mm (touch position).

Date/Time: 2009-11-06 15:54:10

-Communication System: WCDMA 900; Frequency: 897.4 MHz;Duty Cycle: 1:1
-Medium: Head 900 MHz; $\sigma = 0.95$ mho/m; $\varepsilon_r = 40.2$; $\rho = 1000$ kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(5.56, 5.56, 5.56)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

WCDMA (HSDPA subtest 1), 0 mm, BASE, MID/Large scan 2 2 (91x141x1): Measurement grid: dx=25mm, dy=25mm

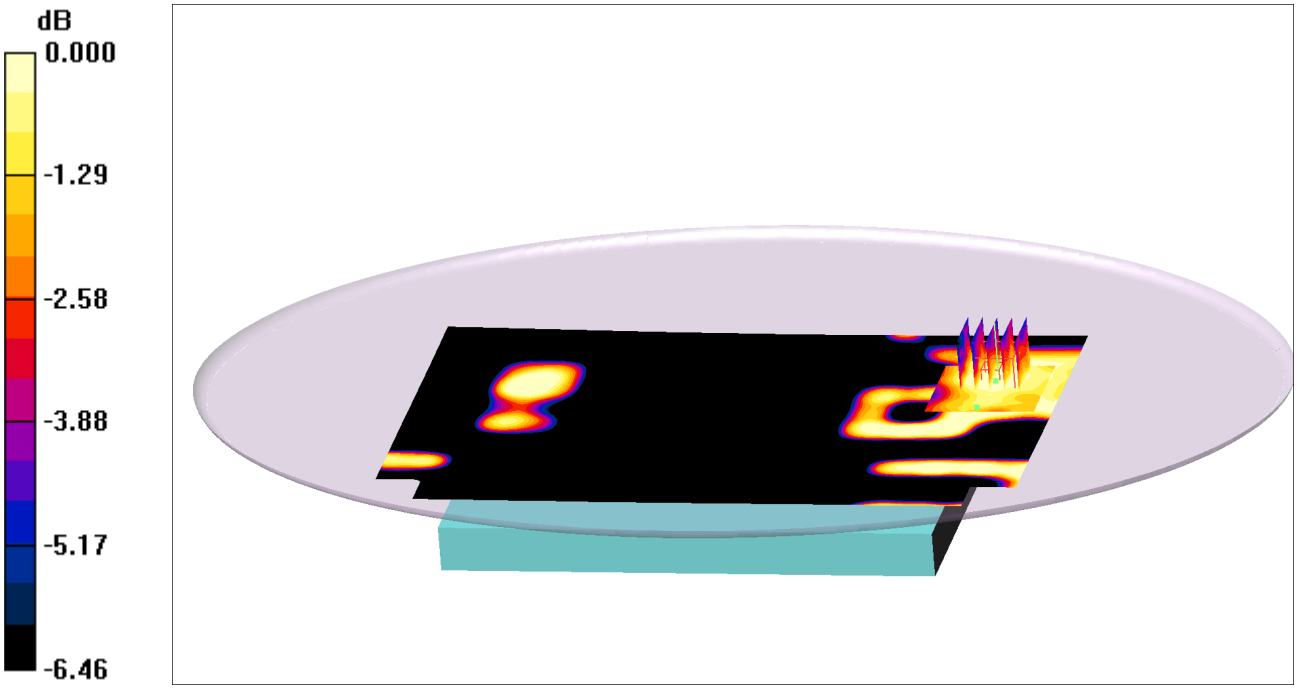
Maximum value of SAR (interpolated) = 0.008 mW/g

WCDMA (HSDPA subtest 1), 0 mm, BASE, MID/Area scan 2 2 (61x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.007 mW/g

WCDMA (HSDPA subtest 1), 0 mm, BASE, MID/Zoom Scan (7x7x7) 2 (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.600 V/m; Power Drift = 6.49 dB
Peak SAR (extrapolated) = 0.009 W/kg
SAR(1 g) = 0.01 mW/g; SAR(10 g) = <0.01 mW/g

Maximum value of SAR (measured) = 0.006 mW/g



0 dB = 0.006mW/g

Figure D.8 SAR distribution of the EUT, transmitting in the mid channel of the UMTS FDD VIII band (HSDPA subtest 1). The EUT is positioned with the base facing the phantom shell with a separation distance of 0 mm (touch position).

Date/Time: 2009-11-04 16:43:01

-Communication System: GPRS 1800 (2ts); Frequency: 1747.6 MHz;Duty Cycle: 1:4.15
-Medium: Head 1800 MHz; σ = 1.41 mho/m; ε_r = 38.1; ρ = 1000 kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(4.79, 4.79, 4.79)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

GPRS (2TS), 0 mm, BASE, MID/Large scan 2 (81x111x1): Measurement grid: dx=25mm, dy=25mm

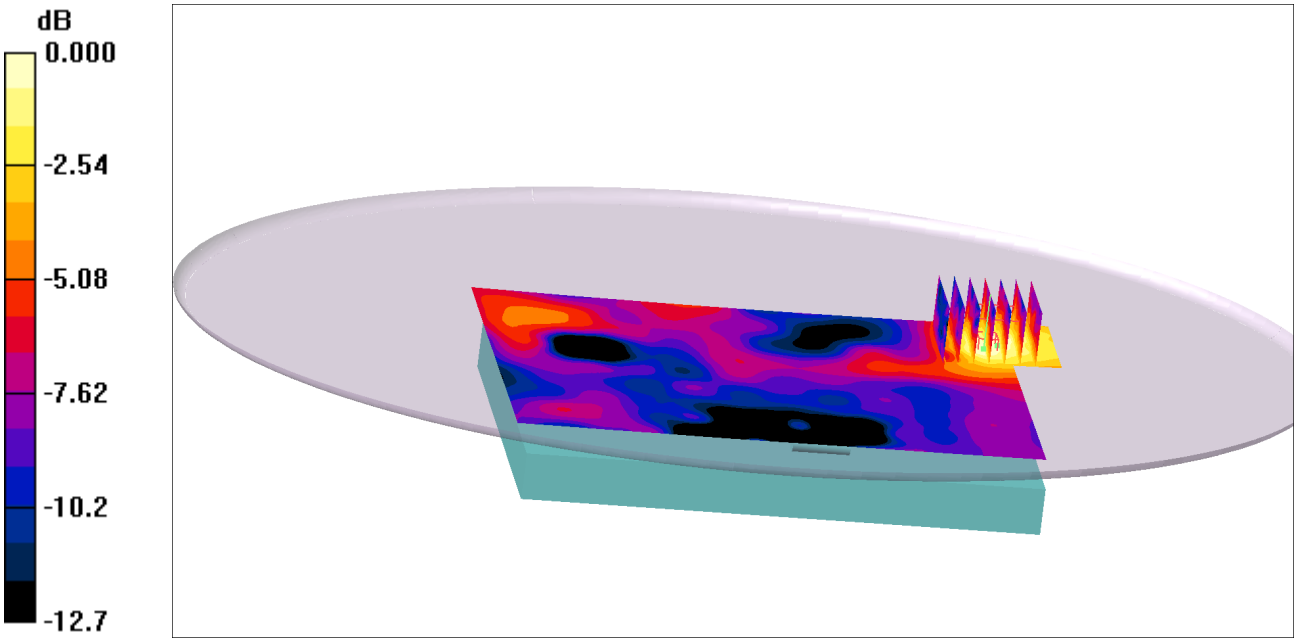
Maximum value of SAR (interpolated) = 0.012 mW/g

GPRS (2TS), 0 mm, BASE, MID/Area scan 2 2 (61x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.015 mW/g

GPRS (2TS), 0 mm, BASE, MID/Zoom Scan (7x7x7) 2 (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.736 V/m; Power Drift = 4.68 dB
Peak SAR (extrapolated) = 0.019 W/kg
SAR(1 g) = 0.01 mW/g; SAR(10 g) = 0.01 mW/g

Maximum value of SAR (measured) = 0.013 mW/g



0 dB = 0.013mW/g

Figure D.9 SAR distribution of the EUT, transmitting in the mid channel of the GSM 1800 band (GPRS with two active uplink timeslots). The EUT is positioned with the base facing the phantom shell with a separation distance of 0 mm (touch position).

Date/Time: 2009-11-05 13:51:38

-Communication System: WCDMA 2100; Frequency: 1950 MHz;Duty Cycle: 1:1
-Medium: Head 2000 MHz; σ = 1.44 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3

DASY4 Configuration:
-Probe: ES3DV3 - SN3113; ConvF(4.63, 4.63, 4.63)
-Electronics: DAE3 Sn422
-Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA
-Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

Base 0 mm, RMC 12.2 kbps/Area Scan 2 (71x101x1): Measurement grid: dx=30mm, dy=30mm

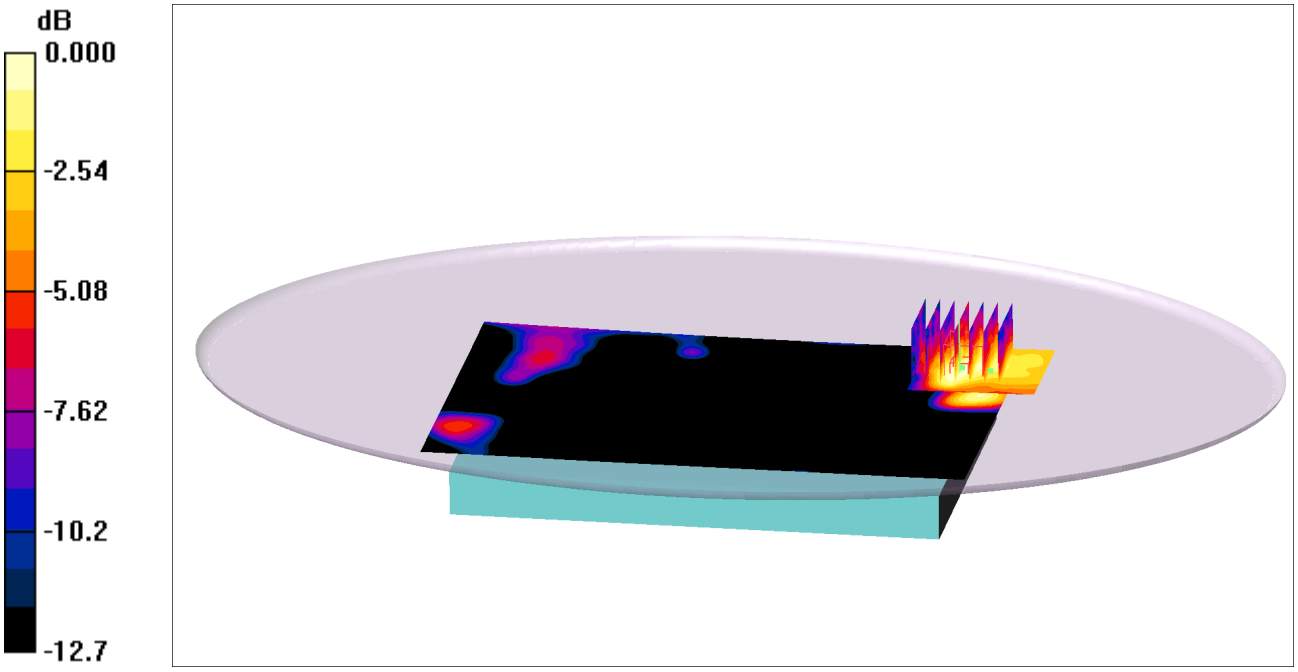
Maximum value of SAR (interpolated) = 0.020 mW/g

Base 0 mm, RMC 12.2 kbps/Area Scan (71x71x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.015 mW/g

Base 0 mm, RMC 12.2 kbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.861 V/m; Power Drift = 0.841 dB
Peak SAR (extrapolated) = 0.024 W/kg
SAR(1 g) = 0.01 mW/g; SAR(10 g) = 0.01 mW/g

Maximum value of SAR (measured) = 0.015 mW/g



0 dB = 0.015mW/g

Figure D.10 SAR distribution of the EUT, transmitting in the mid channel of the UMTS FDD I band (12.2 kbps RMC). The EUT is positioned with the base facing the phantom shell with a separation distance of 0 mm (touch position).

APPENDIX E: Probe calibration parameters

ES3DV3, S/N: 3113

Diode compression:

Parameter	Value in mV
DCP X	95 (S/N 3113)
DCP Y	94 (S/N 3113)
DCP Z	93 (S/N 3113)

Sensitivity in free space:

Parameter	Value in $\mu V/(V/m)^2$
Norm X	1.19 (S/N 3113)
Norm Y	1.14 (S/N 3113)
Norm Z	1.31 (S/N 3113)

Sensitivity in tissue simulating liquid

Muscle 835 MHz; ε_r=55.2 ± 5%, σ=0.97± 5% S/m.

Parameter	Value
ConvF X	5.59 (S/N 3113)
ConvF Y	5.59 (S/N 3113)
ConvF Z	5.59 (S/N 3113)

Head 900 MHz; ε_r=41.5 ± 5%, σ=0.97± 5% S/m.

Parameter	Value
ConvF X	5.56 (S/N 3113)
ConvF Y	5.56 (S/N 3113)
ConvF Z	5.56 (S/N 3113)

Head 1800 MHz; ε_r=40.0 ± 5%, σ=1.40± 5% S/m.

Parameter	Value
ConvF X	4.79 (S/N 3113)
ConvF Y	4.79 (S/N 3113)
ConvF Z	4.79 (S/N 3113)

Muscle 1900 MHz; ε_r=53.3 ± 5%, σ=1.52± 5% S/m.

Parameter	Value
ConvF X	4.57 (S/N 3113)
ConvF Y	4.57 (S/N 3113)
ConvF Z	4.57 (S/N 3113)

Head 2000 MHz; ε_r=40.0 ± 5%, σ=1.40± 5% S/m.

Parameter	Value
ConvF X	4.63 (S/N 3113)
ConvF Y	4.63 (S/N 3113)
ConvF Z	4.63 (S/N 3113)

Probe tip to sensor center: 2.0 mm

APPENDIX F: Probe calibration certificates

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Ericsson AB

Certificate No: ES3-3113_Apr09

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3113
Calibration procedure(s)	QA CAL-01.v6 and QA CAL-23.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	April 21, 2009
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Fin Bomholt	R&D Director	

Issued: April 22, 2009

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3113

Manufactured:	June 3, 2006
Last calibrated:	April 14, 2008
Recalibrated:	April 21, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ES3DV3 SN:3113 **April 21, 2009**

DASY - Parameters of Probe: ES3DV3 SN:3113

Sensitivity in Free Space[A] Diode Compression[B]

NormX	**1.19** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**95** mV
NormY	**1.14** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**94** mV
NormZ	**1.31** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**93** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	10.3	6.3
SAR_{be} [%]	With Correction Algorithm	0.9	0.6

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**3.0 mm**	**4.0 mm**
SAR_{be} [%]	Without Correction Algorithm	9.3	5.7
SAR_{be} [%]	With Correction Algorithm	0.8	0.5

Sensor Offset

Probe Tip to Sensor Center	**2.0** mm

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

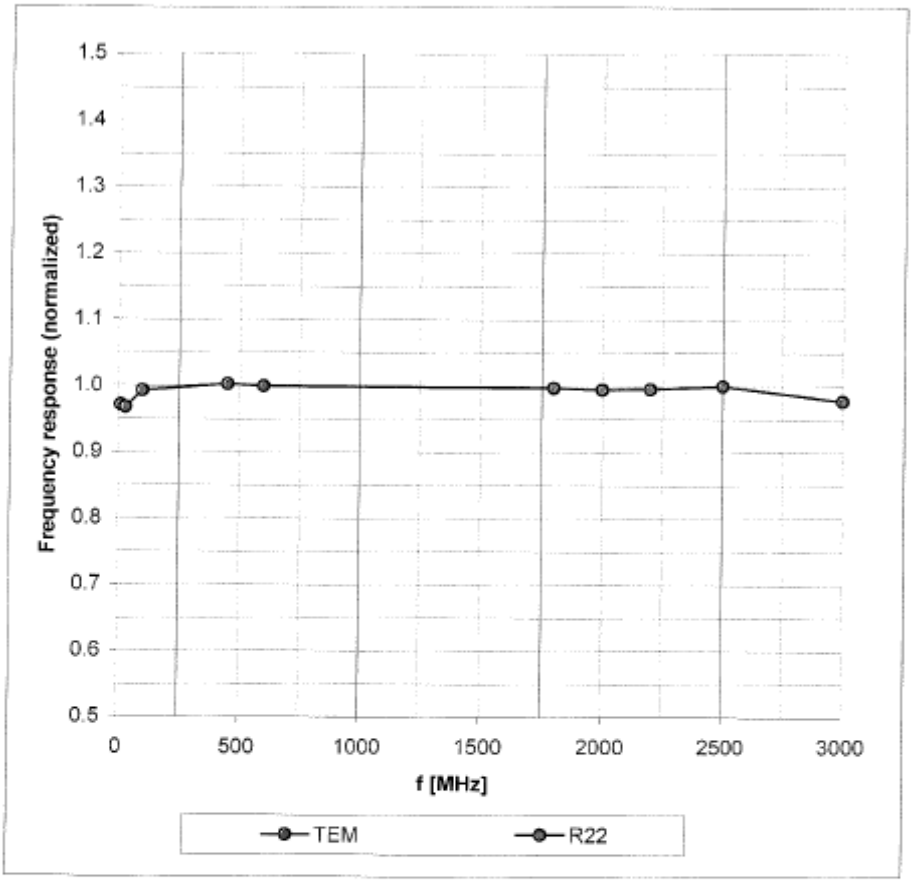
[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

ES3DV3 SN:3113 **April 21, 2009**

Frequency Response of E-Field

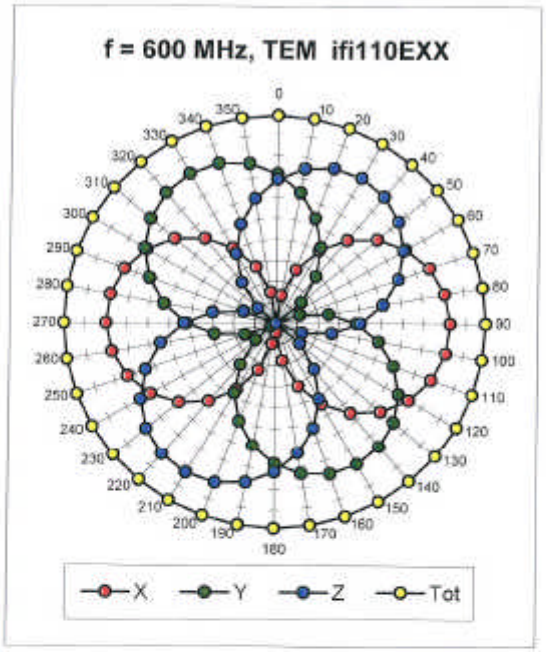
(TEM-Cell:ifi110 EXX, Waveguide: R22)

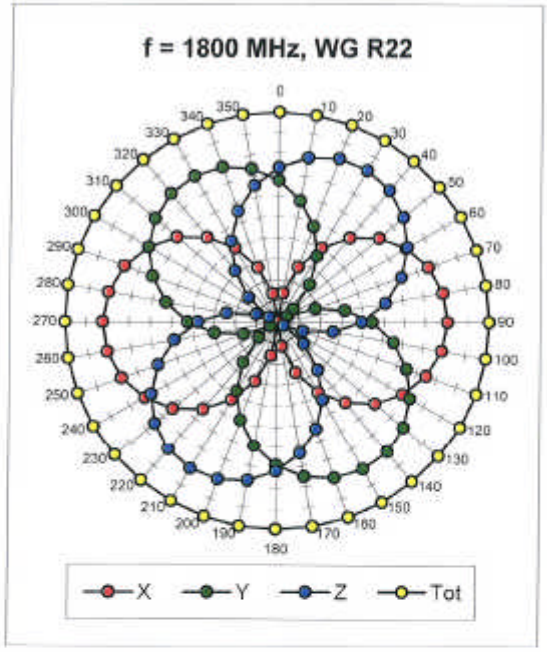


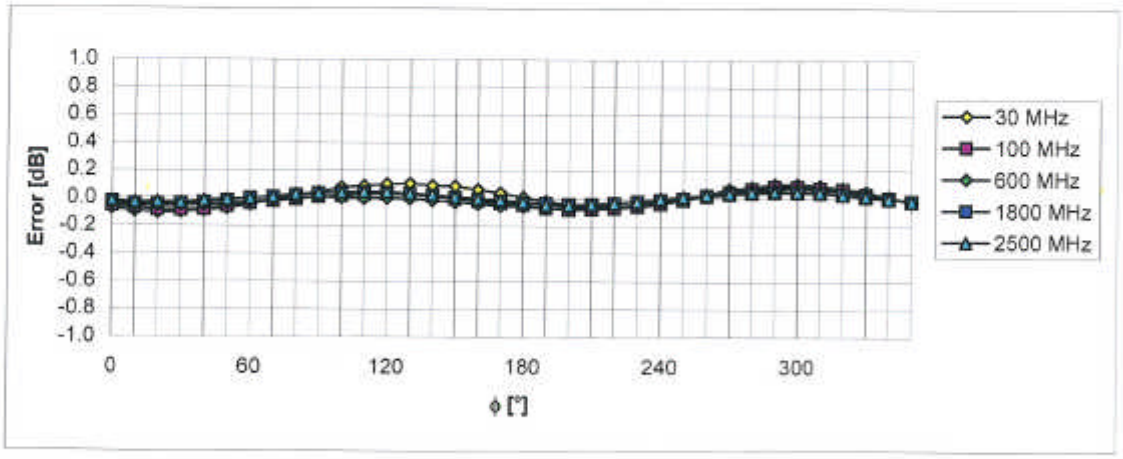
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ES3DV3 SN:3113 **April 21, 2009**

Receiving Pattern (ϕ), ϑ = 0°





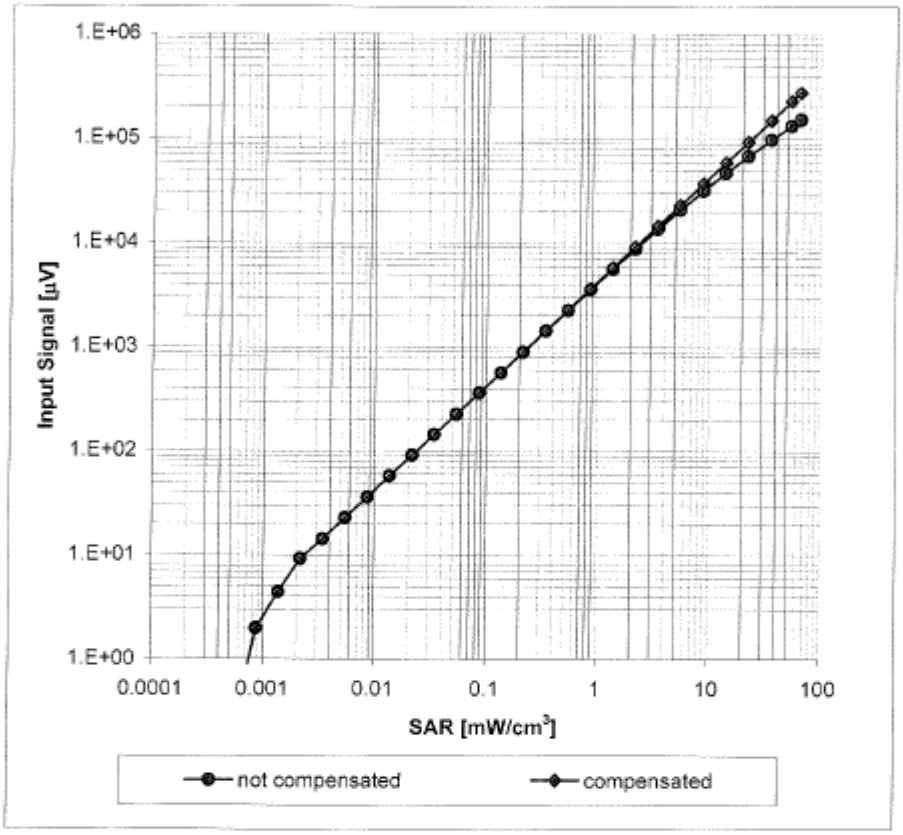


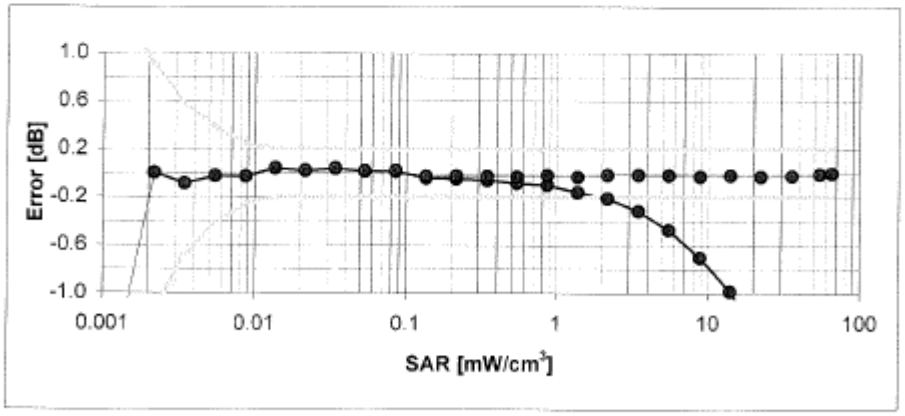
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ES3DV3 SN:3113 **April 21, 2009**

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)

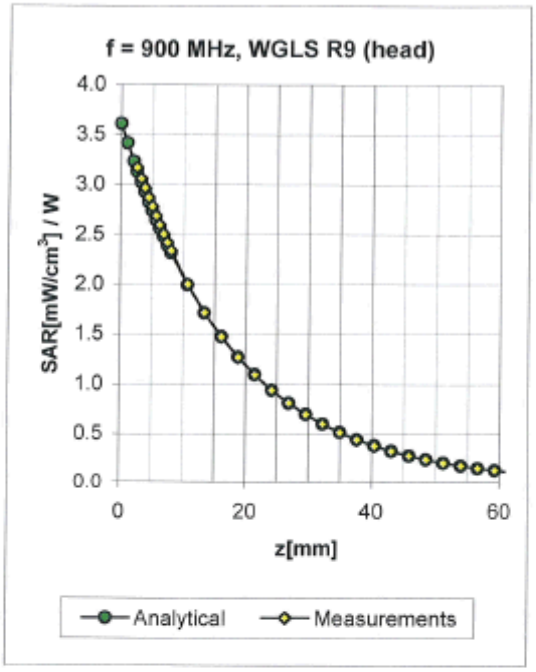


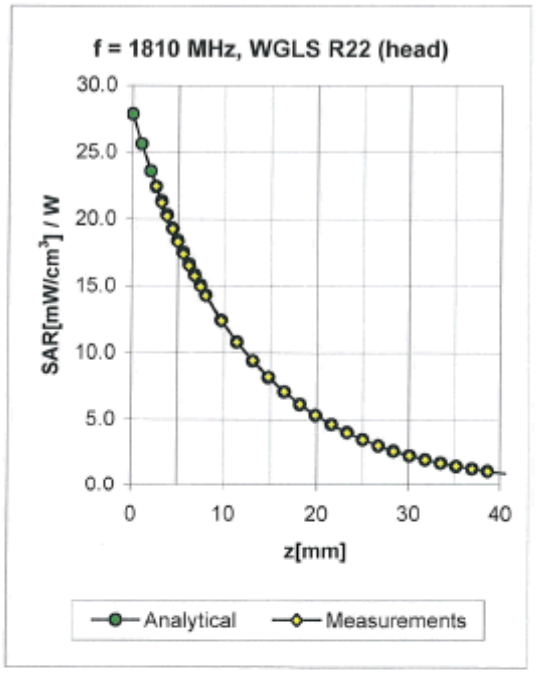


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

ES3DV3 SN:3113 **April 21, 2009**

Conversion Factor Assessment





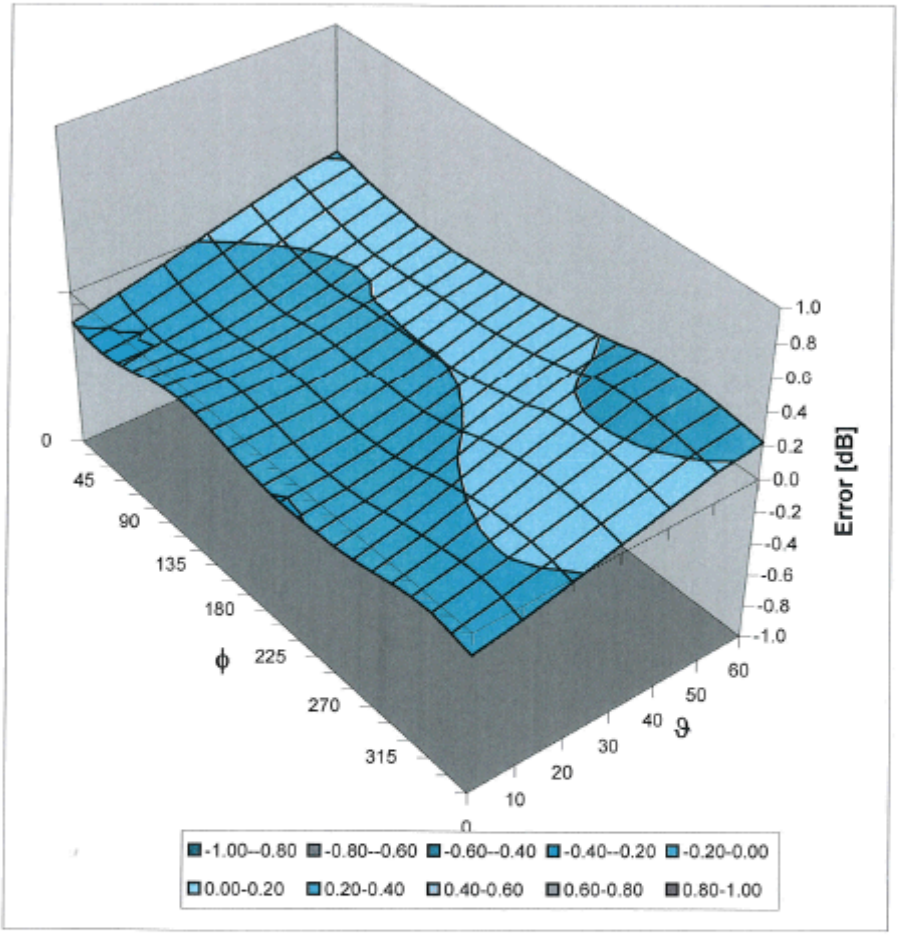
f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.76	1.16	5.56 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.42	1.69	4.79 ± 11.0% (k=2)
2000	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.42	1.63	4.63 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.48	1.58	4.25 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.85	1.13	5.59 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.34	2.22	4.57 ± 11.0% (k=2)
2000	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.34	2.35	4.42 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.73	1.40	3.98 ± 11.0% (k=2)

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ES3DV3 SN:3113 **April 21, 2009**

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)