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CONFORMANCE TEST REPORT FOR

HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS

Report No.: SRTC2014-H024-E0044

Product Name: GSM/GPRS/EDGE/UMTS

Digital Mobile Phone with Bluetooth and Wi-Fi

Product Model: Philips S388

Applicant: Shenzhen Sang Fei Consumer Communications Co., Ltd.

Manufacturer: Shenzhen Sang Fei Consumer Communications Co., Ltd.

Specification: FCC Part 2.1093

FCC RF Exposure KDB Procedures

IEEE Std 1528-2003

IEEE Std 1528a-2005

FCC ID: VQRCTS388

The State Radio_monitoring_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

Tel: 86-10-68009202 Fax: 86-10-68009205

Executive summary

Test report no.:	SRTC2014-H024-E0044
Product Model:	Philips S388
Period of test:	2014.07.07~2014.07.09
Date of report:	2014.07.14
Laboratory:	The State Radio_monitoring_center Testing Center (SRTC)
Test has been Carried out in accordance with:	The tests documented in this report were performed in accordance with FCC 47 CFR Parts 1 & 2, IEEE Std 1528-2003, IEEE Std 1528a-2005 and following FCC RF exposure KDB procedures: o 447498 D01 General RF Exposure Guidance v05r01 o 648474 D04 SAR Handsets Multi Xmiter and Ant v01r01 o 941225 D01 SAR test for 3G devices v02 o 941225 D02 HSPA and 1x Advanced v02r02 o 941225 D03 SAR Test Reduction GSM GPRS EDGE v01 o 941225 D06 Hot Spot SAR v01r01 o 248227 D01 SAR Meas for 802 11abg v01r02 o 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01 o 865664 D02 SAR Reporting v01r01
Documentation:	The documentation of the testing performed on the tested devices is archived for 5 years at SRTC

Result summary:

Mode	CH/*f*(MHz)	Power (dBm)	Position	SAR Limit (1g avg) (W/kg)	Reported SAR (1g avg)(W/kg)	Result
GSM1900 （EGPRS）	661/1850.2	25.12	Towards ground （10mm Gap）	1.6	1.117	PASS

This Test Report Is Issued by: Mr. Song Qizhu Director of the test lab	Checked by: Mr. Wang Junfeng Deputy director of the test lab
Tested by: Mr. Zhang Wentao Test engineer	Issued date: **2014.07.18**

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1. GENERAL INFORMATION

1.1 Notes of the test report

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio_monitoring_center Testing Center (SRTC).
The test results relate only to individual items of the samples which have been tested.

1.2 Information about the testing laboratory

Company: The State Radio_monitoring_center Testing Center (SRTC)
Address: No.80 Beilishi Road, Xicheng District, Beijing China
City: Beijing
Country or Region: China
Contacted person: Wang Junfeng
Tel: +86 10 68009181 +86 10 68009202
Fax: +86 10 68009195 +86 10 68009205
Email: wangjf@srrc.org.cn / wangjunfeng@srtc.org.cn

1.3 Applicant's details

Company: Shenzhen Sang Fei Consumer Communications Co., Ltd.
Address: 11 Science & Technology Rd., Shenzhen Hi-tech Industrial Park, Nanshan District
City: Shenzhen
Country or Region: China
Grantee Code: VQR
Contacted person: Helen.Lin
Tel: 86-755-33308888
Fax: 86-755-26614979
Email: Helen.Lin@sangfei.com

1.4 Manufacturer's details

Company: Shenzhen Sang Fei Consumer Communications Co., Ltd.
Address: 11 Science & Technology Rd., Shenzhen Hi-tech Industrial Park, Nanshan District
City: Shenzhen
Country or Region: China
Contacted person: Helen.Lin
Tel: 86-755-33308888
Fax: 86-755-26614979
Email: Helen.Lin@sangfei.com

1.5 Test Details

Period of test	2014.07.07~2014.07.09
Battery	Shenzhen cyclelong power-tech Co., ltd/AB1700AWML
Headsets	Shenzhen TENJI Industrial Co., Ltd./ TJ-101100
State of sample	Production unit
H/W Version S/W Version	TMBKa S388_M6582M_1425_V01A_AM
IMEI	No 1: 864359021775338 No 2: 864359021775361
Notes	---

1.6 Maximum Results

The maximum reported SAR values for Head configuration and Body Worn configuration are given as follows. The device conforms to the requirements of the standard(s) when the maximum reported SAR value is less than or equal to the limit.

1.6.1 Highest SAR Summary

Exposure Posltion	Frequency Band	1g-SAR Reported Result (W/kg)	Highest 1g-SAR Reported Result (W/kg)
Head	GSM 850	0.233	0.595
	GSM 1900	0.365	
	WCDMA Band 2	0.595	
	WCDMA Band 5	0.157	
	WLAN 2.4GHz Band	0.455	
Body (10mm Gap)	GSM 850	0.660	1.117
	GSM 1900	1.117	
	WCDMA Band 2	1.002	
	WCDMA Band 5	0.443	
	WLAN 2.4GHz Band	0.201	

2. DESCRIPTION OF THE DEVICE UNDER TEST

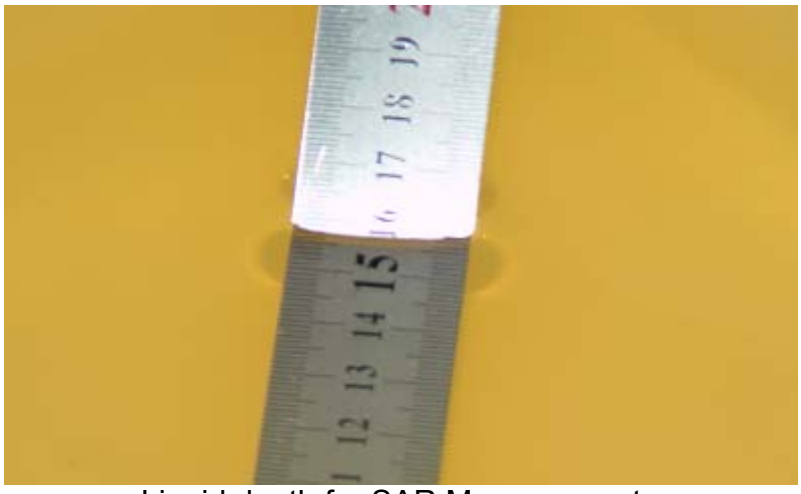
Device category	production unit
Exposure environment	General population/uncontrolled
Description of the Antenna	The device has an internal antenna.

2.1 Wireless Technologies

Wireless Technology and Frequency Bands	GSM Band : GSM850/PCS1900 WCDMA Band: FDD II/FDD V Wi-Fi Band: 2.4GHz~2.4835GHz Bluetooth Band: 2.4GHz~2.4835GHz
Mode	GSM ☒Voice (GMSK) ☒GPRS (GMSK) ☒EDGE (GMSK) WCDMA ☒UMTS Rel. 99 (Voice & Data) ☒HSDPA (Rel. 5) ☒HSUPA (Rel. 6) ☐HSPA+ (Rel.) ☐DC-HSDPA (Rel.) Wi-Fi 2.4GHz (802.11b/g/n) ☒802.11b ☒802.11g ☒802.11n (20MHz) ☒802.11n (40MHz) Bluetooth Ver. 3.0 ☒BR(GFSK) ☒EDR(π/4 DQPSK , 8-DPSK) ☐BLE(GFSK)
Duty Cycle	GSM Voice: 12.5%; GPRS: 12.5% (1 Slot), 25% (2 Slots), 37.5% (3 Slots), 50% (4 Slots) WCDMA: 100% Wi-Fi 802.11b/g/n: 100% Bluetooth: 32.25% (DH1), 66.68% (DH3), 77.52% (DH5)
GPRS Multi-Slot Class	☐Class 8 - One Up ☐Class 10 - Two Up ☒Class 12 - Four Up
Mobile Phone Capability	☐Class A - Mobile phones can be connected to both GPRS and GSM services simultaneously. ☒Class B - Mobile phones can be attached to both GPRS and GSM services, using one service at a time. ☐Class C - Mobile phones are attached to either GPRS or GSM voice service. You need to switch manually between services
DTM (Dual Transfer Mode)	Not Supported

2.2 Picture to demonstrate the required liquid depth

the liquid depth in the used SAM phantoms



Liquid depth for SAR Measurement

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (ºC)	21.0 to 23.0
Ambient humidity (RH %)	30 to 45

3.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester. Communication between the device and the call tester was established by air link.
The device output power was set to maximum power level for all tests; a fully charged battery was used for every test sequence.
In all operating bands the measurements were performed on lowest, middle and highest channels.

3.3 SAR Measurement Set-up

The system is based on a high precision robot (working range greater than 0.9m), which positions the probes with a positional repeatability of better than ± 0.02mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length =300mm) to the data acquisition unit. A cell controller system contains the power supply, robot controller, teaches pendant (Joystick), and remote control, is used to drive the robot motors.

The PC consists of the Micron Pentium IV computer with Win7 system and SAR Measurement Software DASY5 Professional, A/D interface card, monitor, mouse, and keyboard. The Stäubli Robot is connected
to the cell controller to allow software manipulation of the robot.
A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAEand transfers data to the PC plug-in card. The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines.
The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection
The robot uses its own controller with a built in VME-bus computer.

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

The measurements were performed using an automated near-field scanning system, DASY5,manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements was the ‘advanced extrapolation’ algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE4	546	1 year	2014.08.13
DAE4	725	1year	2014.08.16
Dosimetric E-field Probe ES3DV3	3127	1 year	2014.08.21
Dosimetric E-field Probe EX3DV4	3708	1 year	2014.10.22
Dipole Validation Kit D835V2	4d023	1 year	2014.10.22
Dipole Validation Kit D1900V2	5d113	1 year	2014.10.16
Dipole Validation Kit D2450V2	738	1 year	2014.10.17
DASY5 No.1	52.8.7.1137	N/A	N/A
DASY5 No.2	52.8.7.1137	N/A	N/A

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	E4428C	MY45280865	1 year	2014.08.20
Signal Generator	SML 03	103514	1 year	2014.08.20
Amplifier	5S1G4	0323472	N/A	N/A
Amplifier	5S1G4	301305	N/A	N/A
Power meter	E4417A	MY45101182	1 year	2014.08.20
Power Sensor	E4412A	MY41502214	1 year	2014.08.20
Power Sensor	E4412A	MY41502130	1 year	2014.08.20
Power meter	E4417A	MY45101004	1 year	2014.08.20
Power Sensor	E9300B	MY41496001	1 year	2014.08.20
Power Sensor	E9300B	MY41496003	1 year	2014.08.20
Communications Test Set	8960	GB43194054	1 year	2014.08.20
Communication Tester	CMU200	114666	1 year	2014.08.20
Network Analyzer	8714ET	US40372083	1 year	2014.08.20
Dielectric Probe Kit	85070D	US33030365	N/A	N/A

Detailed information of Isotropic E-field Probe Type ES3DV3

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Dynamic Range	5 μW/g to > 100 W/kg; Linearity: ± 0.2 dB
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones

Detailed information of Isotropic E-field Probe Type EX3DV4

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Optical Surface Detection	± 0.3 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Dynamic Range	10 μW/g to > 100 W/kg Linearity: ± 0.2 dB (noise: typically < 1 μW/g)
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

4.2 Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twin headed "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 - 2003.
System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.
The SPEAG device holder (see Section 5.1) was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 - 2003 and FCC Supplement C to OET Bulletin 65. All tests were carried out using simulants whose dielectric parameters were within ± 5% of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.
The depth of the tissue simulant was 15.0 ± 0.5 cm measured from the ear reference point during system checking and device measurements.

4.3.1 Tissue Simulant Recipes

The following recipe(s) were used for Head and Body tissue stimulant(s):

835MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Water	41.45	52.50
Sugar	56.00	45.0
Nacl	1.45	1.40
Cellulose	1.00	1.00
Preventol	0.10	0.10

1900MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Water	44,45	70.17
DGBE	55.24	29.44
Nacl	0.31	0.39

2450MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Water	55.00	68.64
DGBE	45.00	31.37
Nacl	0.00	0.00

4.3.2 System Checking

The manufacturer calibrates the probes annully. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system checking results (dielectric parameters and SAR values) are given in the table below.

Date Tested	System Serial No.	System dipole	T.S. Liquid	SAR measured (normalized to 1W)		Target (Ref.Value)	Delta (%)	Tolerance (%)
2014.07.07	No.1	D835V2	Head	1g	9.56	9.47	0.95	±10
2014.07.07	No.1	D835V2	Body	1g	9.60	9.28	3.45	±10
2014.07.08	No.1	D1900V2	Head	1g	40.40	40.40	0.00	±10
2014.07.08	No.2	D1900V2	Body	1g	39.56	40.90	3.28	±10
2014.07.09	No.2	D2450V2	Head	1g	54.80	53.20	3.01	±10
2014.07.09	No.2	D2450V2	Body	1g	52.40	49.30	6.29	±10

Plots of the system checking scans are given in Appendix A.

4.3.3 Tissue Simulants used in the Measurements

For the measurement of the following parameters the HP 85070D dielectric probe kit is used, representing the open-ended coaxial probe measurement procedure.

Date Tested	Freq.(MHz)	Liquid parameters	measured	Target	Delta(%)	Tolerance(%)
2014.07.07	Head 835	εr	42.11	41.50	1.47	±5
		σ[S/m]	0.98	0.90	1.09	±5
2014.07.07	Body 835	εr	53.85	55.20	2.45	±5
		σ[S/m]	0.98	0.97	1.03	±5
2014.07.08	Head 1900	εr	40.84	40.00	2.10	±5
		σ[S/m]	1.54	1.40	1.10	±5
2014.07.08	Body 1900	εr	52.18	53.30	2.10	±5
		σ[S/m]	1.63	1.52	1.07	±5
2014.07.09	Head 2450	εr	39.21	39.20	0.00	±5
		σ[S/m]	1.79	1.80	0.56	±5
2014.07.09	Body 2450	εr	52.04	52.70	1.25	±5
		σ[S/m]	1.97	1.95	1.03	±5

5. DESCRIPTION OF THE TEST PROCEDURE

5.1 Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the Dasy system.

Device holder supplied by SPEAG

5.2 Test positions

5.2.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.
The positions used in the measurements were according to IEEE 1528 - 2003 "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

5.2.2 Body Worn Configuration

The device was placed in the SPEAG holder below the flat section of the phantom. The distance between the device and the phantom was kept at the separation distance using a separate flat spacer that was removed before the start of the measurements. And the distance is 10mm.The device was oriented with its antenna facing the phantom since this orientation gives higher results.

5.3 Scan Procedure

First, area scans were used for determination of the field distribution and the approximate location of the local peak SAR values. The SAR distribution is scanned along the inside surface, at least for an area larger than the projection of the handset and antenna. The angle between the probe axis and the surface normal line is recommended but not required to be less than 30°. The SAR distribution is first measured on a 2-D coarse grid. The scan region should cover all areas that are exposed and encompassed by the projection of the handset. It is a 15 mm × 15 mm measurement grid used when two staggered one-dimensional cubic splines are used to estimate the maximum SAR location. Next, a zoom scan, a minimum of 7 x 7x7 points covering a volume of at least 30x30x30mm, was performed around the highest E-field value to determine the averaged SAR value. Drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan.

5.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.
The interpolation, extrapolation and maximum search routines within DASY5 are all based on the modified Quadratic Shepard's method (Robert J. Renka, "Multivariate Interpolation Of Large Sets Of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).
The interpolation scheme combines a least-square fitted function method with a weighted average method. A trivariate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighbouring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.
In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

6. MEASUREMENT UNCERTAINTY

DASY5 Uncertainty Budget								
Error description	Uncertainty value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std.Unc (1g).	Std.Unc. (10g)	(vi) Veff
Measurement system								
Probe calibration	±6.0%	N	1	1	1	±6.0%	±6.0%	∞
Axial isotropy	±4.7%	R	$\sqrt{3}$	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical isotropy	±9.6%	R	$\sqrt{3}$	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effects	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Linearity	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%	∞
System detection limits	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Readout electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response time	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%	∞
Integration time	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF ambient noise	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
RF ambient reflections	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Probe positioner	±0.4%	R	$\sqrt{3}$	1	1	±0.2%	±0.2%	∞
Probe positioning	±2.9%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Max.SAR Eval.	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Test Sample Related								
Device holder	±3.6%	N	1	1	1	±3.6%	±3.6%	5
Device Positioning	±2.9%	N	1	1	1	±2.9%	±2.9%	145
Power drift	±5.0%	R	$\sqrt{3}$	1	1	±2.9%	±2.9%	∞
Phantom and Setup								
Phantom uncertainty	±4.0%	R	$\sqrt{3}$	1	1	±2.3%	±2.3%	∞
Liquid conductivity(target.)	±5.0%	R	$\sqrt{3}$	0.64	0.43	±1.8%	±1.2%	∞
Liquid conductivity(mea.)	±2.5%	R	$\sqrt{3}$	0.64	0.43	±0.9%	±0.6%	∞
Liquid Permittivity(target.)	±5.0%	R	$\sqrt{3}$	0.60	0.49	±1.7%	±1.4%	∞
Liquid Permittivity(mea.)	±2.5%	R	$\sqrt{3}$	0.60	0.49	±0.9%	±0.7%	∞
Combined std. Uncertainty						±10.9%	±10.7%	387
Expanded STD Uncertainty						**±21.7%**	**±21.4%**	

7. RF Output Power Measurement

7.1 Manufacturing Tolerance

GSM

GSM 850			
Channel	Channel 251	Channel 189	Channel 128
Tolerance (dBm)	31.0~34.0	31.0~34.0	31.0~34.0
GSM 1900			
Channel	Channel 810	Channel 661	Channel 512
Tolerance (dBm)	28.0~31.0	28.0~31.0	28.0~31.0

GSM 850 GPRS				
Channel		251	189	128
1 Txslot	Tolerance (dBm)	31.0~34.0	31.0~34.0	31.0~34.0
2 Txslot	Tolerance (dBm)	30.0~33.0	30.0~33.0	30.0~33.0
3 Txslot	Tolerance (dBm)	28.0~31.0	28.0~31.0	28.0~31.0
4 Txslot	Tolerance (dBm)	27.5~30.5	27.5~30.5	27.5~30.5
GSM 850 EDGE (GMSK)				
Channel		251	189	128
1 Txslot	Tolerance (dBm)	31.0~34.0	31.0~34.0	31.0~34.0
2 Txslot	Tolerance (dBm)	30.0~33.0	30.0~33.0	30.0~33.0
3 Txslot	Tolerance (dBm)	28.0~31.0	28.0~31.0	28.0~31.0
4 Txslot	Tolerance (dBm)	27.5~30.5	27.5~30.5	27.5~30.5

GSM 1900 GPRS				
Channel		810	661	512
1 Txslot	Tolerance (dBm)	28.0~31.0	28.0~31.0	28.0~31.0
2 Txslot	Tolerance (dBm)	27.0~30.0	27.0~30.0	27.0~30.0
3 Txslot	Tolerance (dBm)	25.0~28.0	25.0~28.0	25.0~28.0
4 Txslot	Tolerance (dBm)	23.5~26.5	23.5~26.5	23.5~26.5
GSM 1900 EDGE (GMSK)				
Channel		810	661	512
1 Txslot	Tolerance (dBm)	28.0~31.0	28.0~31.0	28.0~31.0
2 Txslot	Tolerance (dBm)	27.0~30.0	27.0~30.0	27.0~30.0
3 Txslot	Tolerance (dBm)	25.0~28.0	25.0~28.0	25.0~28.0
4 Txslot	Tolerance (dBm)	23.5~26.5	23.5~26.5	23.5~26.5

WCDMA

WCDMA Band2			
Channel	9262	9400	9538
Tolerance (dBm)	20.0~23.0	20.0~23.0	20.0~23.0
WCDMA Band5			
Channel	4132	4183	4233
Tolerance (dBm)	20.0~23.0	20.0~23.0	20.0~23.0

HSUPA Band2				
Channel		9262	9400	9538
Sub test 1	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 2	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 3	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 4	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
Sub test 5	Tolerance (dBm)	19.0~23.0	19.0~23.0	19.0~23.0

HSUPA Band5				
Channel		4132	4183	4233
Sub test 1	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 2	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 3	Tolerance (dBm)	18.0~22.0	18.0~22.0	18.0~22.0
Sub test 4	Tolerance (dBm)	17.0~21.0	17.0~21.0	17.0~21.0
Sub test 5	Tolerance (dBm)	19.0~23.0	19.0~23.0	19.0~23.0

Bluetooth

GFSK			
Channel	0	39	78
Tolerance (dBm)	0.0~4.0	0.0~4.0	0.0~4.0
π/4DQPSK			
Channel	0	39	78
Tolerance (dBm)	0.0~4.0	0.0~4.0	0.0~4.0
8DPSK			
Channel	0	39	78
Tolerance (dBm)	0.0~4.0	0.0~4.0	0.0~4.0

Wi-Fi

802.11b			
Channel	1	6	11
Tolerance (dBm)	15.5~18.5	15.5~18.5	15.5~18.5
802.11g			
Channel	1	6	11
Tolerance (dBm)	10.0~14.0	10.0~14.0	10.0~14.0
802.11n HT20 (MCS0~MCS3)			
Channel	1	6	11
Tolerance (dBm)	11.5~16.5	11.5~16.5	11.5~16.5
802.11n HT20 (MCS4~MCS7)			
Channel	1	6	11
Tolerance (dBm)	10~15	10~15	10~15
802.11n HT40 (MCS0~MCS3)			
Channel	1	6	11
Tolerance (dBm)	8~16	8~16	8~16
802.11n HT40 (MCS4~MCS7)			
Channel	1	6	11
Tolerance (dBm)	7~14	7~14	7~14

7.2 GSM Measurement result

Conducted Power

Mode	GSM850(Head) Duty cycle: 1:8(12.5%)			GSM1900(Head) Duty cycle: 1:8(12.5%)		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
Measured Power(dBm)	32.48	32.52	32.50	28.92	29.05	29.39

GPRS Measured Power

Mode	GPRS850			GPRS1900		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	32.48	32.53	32.50	28.90	29.04	29.37
3Downlink2uplinkPower(dBm)	31.52	31.60	31.64	27.86	28.10	28.62
2Downlink3uplinkPower(dBm)	29.78	29.90	30.00	25.93	26.23	26.94
1Downlink4uplinkPower(dBm)	28.99	29.20	29.28	25.13	25.39	26.17

EDGE Measured Power

Mode	EDGE850(GMSK)			EDGE1900(GMSK)		
	EDGE850(8PSK)			EDGE1900(8PSK)		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	32.45	32.49	32.45	28.88	29.02	29.32
	----	----	----	----	----	----
3Downlink2uplinkPower(dBm)	31.49	31.57	31.60	27.83	28.07	28.58
	----	----	----	----	----	----
2Downlink3uplinkPower(dBm)	29.76	29.89	30.00	25.96	26.23	26.95
	----	----	----	----	----	----
1Downlink4uplinkPower(dBm)	29.04	29.19	29.28	25.12	25.44	26.13
	----	----	----	----	----	----

GPRS Averaged Power

Mode	GPRS850			GPRS1900		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	23.45	23.50	23.47	19.87	20.01	20.34
3Downlink2uplinkPower(dBm)	25.50	25.58	25.62	21.84	22.08	22.60
2Downlink3uplinkPower(dBm)	25.52	25.64	25.74	21.67	21.97	22.68
1Downlink4uplinkPower(dBm)	**25.98**	**26.19**	**26.27**	**22.12**	**22.38**	**23.16**

Division Factors(for Measured Power and Averaged Power):

To average the power, the division factor is as follows:

1TX-slot (4Downlink1uplink)= 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots(3Downlink2uplink) = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots (2Downlink3uplink)= 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots (1Downlink4uplink)= 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 4Txslots (1Downlink4uplink) for GPRS.

EDGE Averaged Power

Mode	EDGE850(GMSK)			EDGE1900(GMSK)		
	EDGE850(8PSK)			EDGE1900(8PSK)		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
4Downlink1uplinkPower(dBm)	23.42	23.46	23.42	19.85	19.99	20.29
	----	----	----	----	----	----
3Downlink2uplinkPower(dBm)	25.47	25.55	25.58	21.81	22.05	22.56
	----	----	----	----	----	----
2Downlink3uplinkPower(dBm)	25.50	25.63	25.74	21.70	21.97	22.69
	----	----	----	----	----	----
1Downlink4uplinkPower(dBm)	**26.03**	**26.18**	**26.27**	**22.11**	**22.43**	**23.12**
	----	----	----	----	----	----

Division Factors(for Measured Power and Averaged Power):

To average the power, the division factor is as follows:

1TX-slot (4Downlink1uplink)= 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB

2TX-slots(3Downlink2uplink) = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB

3TX-slots (2Downlink3uplink)= 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB

4TX-slots (1Downlink4uplink)= 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB

According to the conducted power as above, the body measurements are performed with 4Txslots (1Downlink4uplink) for EDGE(GMSK).

7.3 WCDMA Measurement result

The following procedures are according to FCC KDB Publication 941225 D01 "SAR Measurement Procedures for 3G Devices" v02, October 2007.

Release 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The DUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

Mode	Subtest	Rel99
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

Measured Results

Mode	WCDMA Band2			WCDMA Band5		
Channel	9262	9400	9538	4132	4183	4233
Frequency(MHz)	1852.4	1880	1907.6	826.4	836.6	846.6
RB test mode1+64kRMC(dBm)	21.07	21.32	21.62	21.31	22.15	21.48
RB test mode1+12.2kRMC(dBm)	**21.05**	**21.35**	**21.67**	**21.36**	**22.16**	**2.48**
RB test mode1+144kRMC(dBm)	21.09	21.33	21.62	21.34	22.17	21.49
RB test mode1+384kRMC(dBm)	21.08	21.34	21.66	21.36	22.17	21.50
AMR Voice test mode+12.2kRMC(dBm)	21.04	21.35	21.69	21.35	22.12	21.45

HSDPA

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM(dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0
3	15/15	8/15	64	15/18	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} =8⇔A_{hs}=β_{hs}/β_c=30/15⇔β_{hs}=30/15*β_c.

Note2:CM=1 for β_c/β_d=12/15, β_{hs}/β_c=24/15.

Note3:For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC(TF1,TF1) to β_c=11/15 and β_d=15/15.

Measured Results

Mode	HSDPA Band 2			HSDPA Band 5		
Channel	9262	9400	9538	4132	4183	4233
Frequency(MHz)	1852.4	1880	1907.6	826.4	836.6	846.6
sub-test1(dBm)	20.81	20.90	21.03	20.39	20.97	20.57
sub-test2(dBm)	20.80	20.90	21.04	20.40	20.94	20.56
sub-test3(dBm)	20.33	20.44	20.59	19.95	20.49	20.10
sub-test4(dBm)	20.31	20.43	20.57	19.93	20.46	20.08

HSPA (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}(1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	2.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	2.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	2.0	21	81

Note1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} =8⇔A_{hs}=β_{hs}/β_c=30/15⇔β_{hs}=30/15*β_c.

Note2:CM=1 for β_c/β_d =12/15,β_{hs}/β_c=24/15.For all other combinations of DPDCH,DPCCH,HS-DPCCH,E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC(TF1,TF1) to β_c=10/15 and β_d=15/15.

Note4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC(TF1,TF1) to β_c=14/15 and β_d=15/15.

NOTE5: Testing UE using E-DPDCH Physical layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

NOTE6:β_{ed} can not be set directly; it is set by Absolute Grant Value.

Measure Results

Mode	HSUPA Band 2			HSUPA Band 5		
Channel	9262	9400	9538	4132	4183	4233
Frequency(MHz)	1852.4	1880	1907.6	826.4	836.6	846.6
sub-test1(dBm)	18.50	18.60	18.80	18.70	19.20	18.70
sub-test2(dBm)	18.50	18.60	18.80	18.70	19.10	18.80
sub-test3(dBm)	18.50	18.50	18.70	18.70	19.20	18.80
sub-test4(dBm)	17.90	18.00	18.20	18.20	18.60	18.20
sub-test5(dBm)	20.50	20.50	20.70	20.60	21.10	20.70

UMTS SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02.

HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

7.4 Bluetooth Measurement result

Modulation type	Test Result (mW)		
	2402MHz(Ch0)	2441MHz(Ch39)	2480MHz(Ch78)
GFSK	1.41	1.74	1.88
π/4DQPSK	0.81	1.02	1.13
8DPSK	0.79	1.04	1.10

Modulation type	Test Result (dBm)		
	2402MHz(Ch0)	2441MHz(Ch39)	2480MHz(Ch78)
GFSK	1.50	2.40	**2.74**
π/4DQPSK	-0.93	0.09	0.52
8DPSK	-1.01	0.15	0.42

7.5 Wi-Fi Measurement result

Test Mode	Data Rate (Mbps)	Test Result (mW)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462MHz (Ch11)
802.11b	1	47.21	48.87	**49.66**
	2	44.98	47.21	49.09
	5.5	46.24	46.77	48.98
	11	40.93	44.26	45.19
802.11g	6	21.43	43.85	23.82
	9	20.04	40.46	22.18
	12	19.63	39.08	21.13
	18	18.03	36.56	19.50
	24	16.33	34.12	17.42
	36	14.19	28.77	15.28
	48	12.76	25.29	13.55
	54	12.02	24.89	13.12
802.11n (HT20)	6.5	21.58	43.85	23.66
	13	20.04	39.90	20.37
	19.5	18.92	37.15	19.59
	26	15.96	32.28	17.18
	39	14.32	29.11	15.28
	52	12.45	25.35	13.55
	58.5	12.22	24.66	12.79
	65	11.43	23.12	12.13
Test Mode	Data Rate (Mbps)	Test Result (mW)		
		2422MHz (Ch3)	2437MHz (Ch6)	2462MHz (Ch11)
802.11n (HT40)	13.5	11.14	39.08	40.55
	27	9.79	32.36	32.81
	40.5	8.67	27.67	29.11
	54	7.59	25.00	25.47
	81	6.56	21.53	21.63
	108	5.81	19.50	19.86
	121.5	5.52	17.58	18.54
	135	5.47	17.22	17.95

Test Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462MHz (Ch11)
802.11b	1	16.74	16.89	**16.96**
	2	16.53	16.74	16.91
	5.5	16.65	16.70	16.90
	11	16.12	16.46	16.55
802.11g	6	13.31	16.42	13.77
	9	13.02	16.07	13.46
	12	12.93	15.92	13.25
	18	12.56	15.63	12.90
	24	12.13	15.33	12.41
	36	11.52	14.59	11.84
	48	11.06	14.03	11.32
	54	10.80	13.96	11.18
802.11n (HT20)	6.5	13.34	16.42	13.74
	13	13.02	16.01	13.09
	19.5	12.77	15.70	12.92
	26	12.03	15.09	12.35
	39	11.56	14.64	11.84
	52	10.95	14.04	11.32
	58.5	10.87	13.92	11.07
	65	10.58	13.64	10.84
Test Mode	Data Rate (Mbps)	Test Result (dBm)		
		2422MHz (Ch3)	2437MHz (Ch6)	2462MHz (Ch11)
802.11n (HT40)	13.5	10.47	15.92	16.08
	27	9.91	15.10	15.16
	40.5	9.38	14.42	14.64
	54	8.80	13.98	14.06
	81	8.17	13.33	13.35
	108	7.64	12.90	12.98
	121.5	7.42	12.45	12.68
	135	7.38	12.36	12.54

7.6 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied. The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by: [(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR, where
f(GHz) is the RF channel transmit frequency in GHz Power and distance are rounded to the nearest mW and mm before calculation The result is rounded to one decimal place for comparison According to the KDB447498 appendix A, the SAR test exclusion threshold for 2450MHz at 10 mm test separation distances is 19 mW.

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm
Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

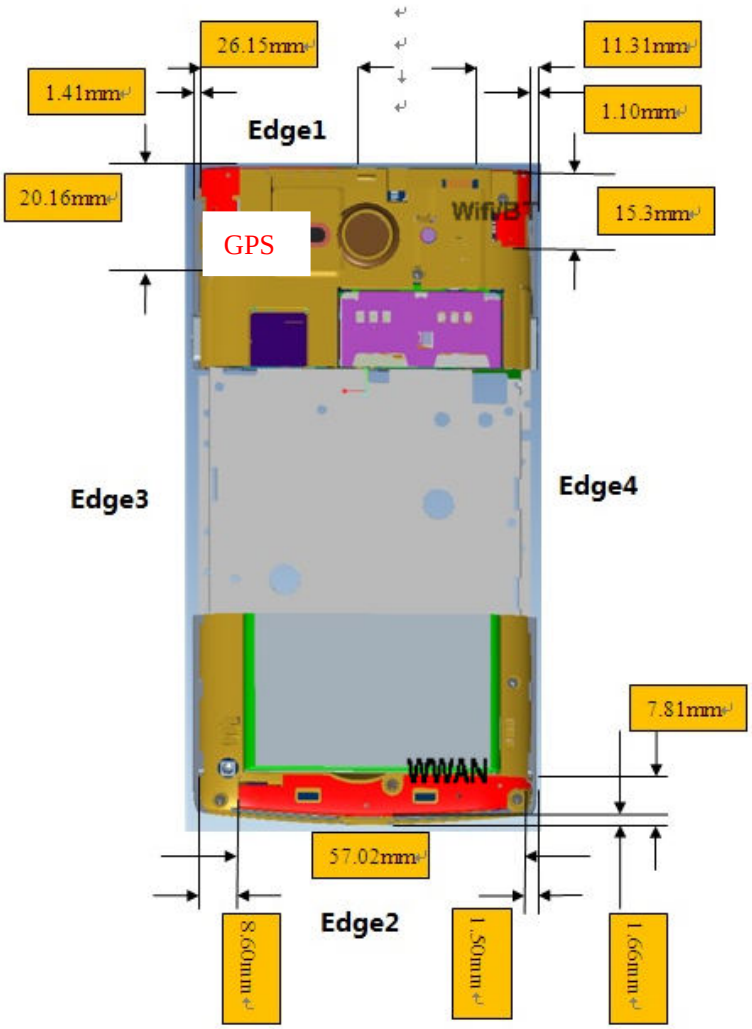
Summary of Transmitters

Band/Mode	F(GHz)	SAR test exclusion threshold (mW)	RF output power (mW)
Bluetooth	2.480	19	1.88
2.4GHz WLAN 802.11 b	2.462	19	49.66

According to the conducted power measurement results, we can draw the conclusion that:
stand-alone SAR for WiFi should be performed. Then, simultaneous transmission SAR for WiFi is considered with measurement results of GSM and WiFi. Stand-alone SAR and simultaneous transmission SAR for Bluetooth should not be performed.

8. RF Exposure Conditions

Refer to the follow picture“Antenna Locations & Separation Distances” for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.



8.1 Head Exposure Conditions

For WWAN, WiFi

Test Configurations	SAR Required	Note
Left Touch	yes	/
Left Tilt (15°)	yes	/
Right Touch	yes	/
Right Tilt (15°)	yes	/

8.2 Body-worn Accessory Exposure conditions

For WWAN

Test Configurations	SAR Required	Note
Rear	yes	/
Front	yes	/

For WiFi

Test Configurations	SAR Required	Note
Rear	yes	/
Front	yes	/

8.3 Hotspot Exposure Conditions

For WWAN

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	yes	/
Front	<25 mm	yes	/
Edge1 (top)	122 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR v01r01
Edge2 (Bottom)	1.66 mm	Yes	/
Edge3 (Left)	8.60 mm	Yes	/
Edge4 (Right)	1.50 mm	Yes	/

For WiFi

Test Configurations	Antenna-to-edge/surface	SAR Required	Note
Rear	<25 mm	yes	/
Front	<25 mm	yes	/
Edge1 (top)	1.41 mm	Yes	/
Edge2 (Bottom)	115 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR v01r01
Edge3 (Left)	52 mm	No	SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR v01r01
Edge4 (Right)	1.10mm	Yes	/

9. SAR Test result

In order to determine the largest value of the peak spatial-average SAR of a handset, all device positions, configurations, and operational modes should be tested for each frequency band according to Steps 1 to 3 below.
Step 1: The tests should be performed at the channel that is closest to the center of the transmit frequency band.
a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom),
b) all configurations for each device position in a), e.g., antenna extended and retracted, and
c) All operational modes for each device position in item a) and configuration in item b) in each frequency band, e.g., analog and digital, If more than three frequencies need to be tested (i.e., Nc > 3), then all frequencies, configurations and modes shall be tested for all of the above test conditions.
Step 2: For the condition providing the highest peak spatial-average SAR determined in Step 1 for each frequency, perform all tests at all other test frequency channels, e.g., lowest and highest frequencies. In addition, for all other conditions (device position, configuration, and operational mode) where

the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies should be tested as well.
Step 3: Examine all data to determine the largest value of the peak.
Note:
1. Per KDB 447498 D01v05, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
Reported SAR(W/kg)= Measured SAR(W/kg)* Scaling Factor
2. Per KDB 447498 D01v05, for each exposure position, if the highest output channel reported SAR ≤0.8W/kg, other channels SAR testing are not necessary.
3. In the report the test position “Mobile phone screen Towards Ground” abbreviated as “TG”,and “Mobile phone screen Towards Phantom” abbreviated as “TP”.

The measured and reported Head/body SAR values for the test device are tabulated below:

Mode: GSM 850
fL(MHz)=824.2MHz fM(MHz)=836.4MHz fH(MHz)= 848.8MHz
SAR Values（Head，850MHz Band）

Limit of SAR (W/kg): <1.6W/kg(1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Left cheek	GSM	L	32.48	34.00	----	----	----
		M	32.52	34.00	1.41	0.165	0.232
		H	32.50	34.00	----	----	----
Left Tilted		L	32.48	34.00	----	----	----
		M	32.52	34.00	1.41	0.138	0.194
		H	32.50	34.00	----	----	----
Right cheek		L	32.48	34.00	----	----	----
		M	32.52	34.00	1.41	**0.166**	**0.233**
		H	32.50	34.00	----	----	----
Right Tilted		L	32.48	34.00	----	----	----
		M	32.52	34.00	1.41	0.160	0.225
		H	32.50	34.00	----	----	----

Mode: GSM850 (GSM/GPRS/EDGE)

fL(MHz)=824.2MHz fM(MHz)=836.4MHz fH(MHz)= 848.8MHz

SAR Values（body，850MHz Band

Limit of SAR (W/kg): <1.6W/kg(1g Average)

Test Case		Ch	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1 g Average	1g Average
TG	GSM With headset	L	32.48	34.00	----	----	----
		M	32.52	34.00	1.41	0.282	0.397
		H	32.50	34.00	----	----	----
	GPRS	L	28.99	30.50	----	----	----
		M	29.20	30.50	1.35	**0.489**	**0.660**
		H	29.28	30.50	----	----	----
	EDGE	L	29.04	30.50	----	----	----
		M	29.19	30.50	1.35	0.467	0.631
		H	29.28	30.50	----	----	----
TP	GSM With headset	L	32.48	34.00	----	----	----
		M	32.52	34.00	1.41	0.192	0.270
		H	32.50	34.00	----	----	----
	GPRS	L	28.99	30.50	----	----	----
		M	29.20	30.50	1.35	0.371	0.500
		H	29.28	30.50	----	----	----
	EDGE	L	29.04	30.50	----	----	----
		M	29.19	30.50	1.35	0.367	0.496
		H	29.28	30.50	----	----	----
EDGE 2	GPRS	M	29.20	30.50	1.35	0.064	0.086
EDGE 3		M	29.20	30.50	1.35	0.104	0.140
EDGE 4		M	29.20	30.50	1.35	0.128	0.173

Note: The distance between the EUT and the phantom bottom is 10mm.

Mode: GSM1900

fL(MHz)=1850.2MHz fM(MHz)=1880.0MHz fH(MHz)=1909.8MHz

SAR Values（Head，1900MHz Band）

Limit of SAR (W/kg): <1.6W/kg(1g Average)

Test Case		CH	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1g Average	1g Average
Left cheek	GSM	L	29.82	31.00	----	----	----
		M	29.05	31.00	1.57	**0.233**	**0.365**
		H	29.39	31.00	----	----	----
Left Tilted		L	29.82	31.00	----	----	----
		M	29.05	31.00	1.57	0.072	0.112
		H	29.39	31.00	----	----	----
Right cheek		L	29.82	31.00	----	----	----
		M	29.05	31.00	1.57	0.190	0.298
		H	29.39	31.00	----	----	----
Right Tilted		L	29.82	31.00	----	----	----
		M	29.05	31.00	1.57	0.107	0.168
		H	29.39	31.00	----	----	----

Mode: GSM1900 (GSM/GPRS/EDGE)

fL(MHz)=1850.2MHz fM(MHz)=1880.0MHz fH(MHz)=1909.8MHz

SAR Values（body，1900MHz Band）

Limit of SAR (W/kg):<1.6W/kg(1g Average)

Test Case		CH	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1 g Average	1g Average
TG	GSM With headset	L	29.82	31.00	----	----	----
		M	29.05	31.00	1.57	0.372	0.583
		H	29.39	31.00	----	----	----
	GPRS	L	25.13	26.50	----	----	----
		M	25.39	26.50	1.29	0.702	0.906
		H	26.17	26.50	----	----	----
	EDGE	L	25.12	26.50	1.37	0.813	**1.117**
		L Repeat	25.12	26.50	1.37	0.813	**1.117**
		M	25.44	26.50	1.28	0.771	0.984
		H	26.13	26.50	1.09	**0.854**	0.930
		H Repeat	26.13	26.50	1.09	0.811	0.883
TP	GSM With headset	L	29.82	31.00	----	----	----
		M	29.05	31.00	1.57	0.313	0.490
		H	29.39	31.00	----	----	----
	GPRS	L	25.13	26.50	----	----	----
		M	25.39	26.50	1.29	0.543	0.701
		H	26.17	26.50	----	----	----
	EDGE	L	25.12	26.50	----	----	----
		M	25.44	26.50	1.28	0.496	0.633
		H	26.13	26.50	----	----	----
EDGE 2	EDGE	M	26.13	26.50	1.09	0.742	0.808
EDGE 3		M	26.13	26.50	1.09	0.188	0.205
EDGE 4		M	26.13	26.50	1.09	0.133	0.145

Note: The distance between the EUT and the phantom bottom is 10mm.

Mode: WCDMA BAND2

fL(MHz)=1852.4MHz fM(MHz)=1880MHz fH(MHz)= 1907.6MHz

SAR Values（Head，WCDMA BAND2）

Limit of SAR (W/kg):<1.6W/kg(1g Average)

Test Case		CH	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
position	mode					1 g Average	1g Average
Left cheek	RB test mode1+ 12.2kRMC	L	21.05	23.00	----	----	----
		M	21.35	23.00	1.46	**0.407**	**0.595**
		H	21.67	23.00	----	----	----
Left Tilted		L	21.05	23.00	----	----	----
		M	21.35	23.00	1.46	0.134	0.196
		H	21.67	23.00	----	----	----
Right cheek		L	21.05	23.00	----	----	----
		M	21.35	23.00	1.46	0.270	0.395
		H	21.67	23.00	----	----	----
Right Tilted		L	21.05	23.00	----	----	----
		M	21.35	23.00	1.46	0.180	0.263
		H	21.67	23.00	----	----	----

Mode: WCDMA BAND2

fL(MHz)=1852.4MHz fM(MHz)=1880MHz fH(MHz)= 1907.6MHz

SAR Values（body，WCDMA BAND2）

Limit of SAR (W/kg): <1.6W/kg(1g Average)

Test Case		CH	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
Position	mode					1 g Average	1g Average
TG	RB test mode1+12.2kRMC with headset	L	21.05	23.00	----	----	----
		M	21.35	23.00	1.46	**0.** 518	0.757
		H	21.67	23.00	----	----	----
TP	RB test mode1+12.2kRMC with headset	L	21.05	23.00	----	----	----
		M	21.35	23.00	1.46	0.437	0.639
		H	21.67	23.00	----	----	----
EDGE 2	RB test mode1+12.2kRMC	M	21.35	23.00	1.46	0.685	**1.002**
EDGE 3		M	21.35	23.00	1.46	0.115	0.168
EDGE 4		M	21.35	23.00	1.46	0.107	0.156

Note: The distance between the EUT and the phantom bottom is 10mm.

Mode: WCDMA BAND5

fL(MHz)=826.4MHz fM(MHz)=836.6MHz fH(MHz)= 846.6MHz

SAR Values（Head，WCDMA BAND5）

Limit of SAR (W/kg): <1.6W/kg(1g Average)

Test Case		CH	Measure Conducted Power (dBm)	Tune-uplimit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
Position	mode					1 g Average	1g Average
Left cheek	RB test mode1+ 12.2kRMC	L	21.36	23.00	----	----	----
		M	22.16	23.00	1.21	**0.129**	**0.157**
		H	21.48	23.00	----	----	----
Left Tilted		L	21.36	23.00	----	----	----
		M	22.16	23.00	1.21	0.102	0.124
		H	21.48	23.00	----	----	----
Right cheek		L	21.36	23.00	----	----	----
		M	22.16	23.00	1.21	0.126	0.153
		H	21.48	23.00	----	----	----
Right Tilted		L	21.36	23.00	----	----	----
		M	22.16	23.00	1.21	0.125	0.152
		H	21.48	23.00	----	----	----

Mode: WCDMA BAND5

fL(MHz)=826.4MHz fM(MHz)=836.6MHz fH(MHz)= 846.6MHz

SAR Values（body，WCDMA BAND5）

Limit of SAR (W/kg): <1.6W/kg(1g Average)

Test Case		CH	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Results (W/kg)	Reported Results (W/kg)
Position	mode					1 g Average	1g Average
TG	RB test mode1+12.2kRMC with headset	L	21.36	23.00	----	----	----
		M	22.16	23.00	1.21	0.241	0.292
		H	21.48	23.00	----	----	----
TP	RB test mode1+12.2kRMC with headset	L	21.36	23.00	----	----	----
		M	22.16	23.00	1.21	0.193	0.234
		H	21.48	23.00	----	----	----
EDGE 2	RB test mode1+12.2kRMC	M	22.16	23.00	1.21	0.038	0.046
EDGE 3		M	22.16	23.00	1.21	0.070	0.085
EDGE 4		M	22.16	23.00	1.21	**0.365**	**0.443**

Note: The distance between the EUT and the phantom bottom is 10mm.

Mode: WiFi

SAR Values (WIFI 802.11b - Head)

Limit of SAR (W/kg):<1.6W/kg(1g Average)

Test Case		CH	Measurement Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Result(W/kg)	Reported Result (W/kg)
Position	mode					1 g Average	1g Average
Left cheek	1Mbps	1	16.74	18.5	----	----	----
		6	16.89	18.5	----	----	----
		11	16.96	18.5	1.43	0.135	0.192
Left Tilt	1Mbps	1	16.74	18.5	----	----	----
		6	16.89	18.5	----	----	----
		11	16.96	18.5	1.43	0.131	0.187
Right cheek	1Mbps	1	16.74	18.5	----	----	----
		6	16.89	18.5	----	----	----
		11	16.96	18.5	1.43	**0.319**	**0.455**
Right tilt	1Mbps	1	16.74	18.5	----	----	----
		6	16.89	18.5	----	----	----
		11	16.96	18.5	1.43	0.266	0.379

SAR Values (WIFI 802.11b - Body)

Limit of SAR (W/kg):<1.6W/kg(1g Average)

Test Case		CH	Measure Conducted Power (dBm)	Tune-up limit (dBm)	Scaling Factor	Measure Result (W/kg)	Reported Result (W/kg)
Position	mode					1 g Average	1g Average
TG	1Mbps	1	16.74	18.50	----	----	----
		6	16.89	18.50	----	----	----
		11	16.96	18.50	1.43	**0.141**	**0.201**
TP	1Mbps	1	16.74	18.50	----	----	----
		6	16.89	18.50	----	----	----
		11	16.96	18.50	1.43	0.108	0.154
Edge 1	1Mbps	1	16.74	18.50	----	----	----
		6	16.89	18.50	----	----	----
		11	16.96	18.50	1.43	0.074	0.105
Edge 4	1Mbps	1	16.74	18.50	----	----	----
		6	16.89	18.50	----	----	----
		11	16.96	18.50	1.43	0.059	0.084

Note: The distance between the EUT and the phantom bottom is 10mm.

9.1 SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.
The following procedures are applied to determine if repeated measurements are required.
1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

9.1.1 The Highest Measured SAR configuration in Each Frequency Band

Frequency band(MHz)	Air interface	Head(w/kg)	Body(w/kg)
850	GSM 850 WCDMA Band V	<0.8 W/kg	<0.8 W/kg
1900	GSM 1900 WCDMA Band II	<0.8 W/kg	>0.8 W/kg
2450	WiFi 802.11b/g/n	<0.8 W/kg	<0.8 W/kg

9.1.2 Repeated Measurement Results

Body-worn Exposure Condition

SAR Measurement Variability

Frequency		Test Position	Original SAR (W/kg)	First Repeated SAR (W/kg)	The Ratio	Second Repeated SAR(W/kg)
MHz	Ch.					
1850.2	512	Towardsground/GPRS	0.813	0.813	1.00	/
1909.8	810	Towardsground/GPRS	0.854	0.811	1.05	/

9.2 Simultaneous Transmission SAR Analysis

The sum of SAR values for GSM & WiFi (Hotspot)

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY
GSM	0.297	1.117
WiFi	0.455	0.201
Sum	**0.752**	**1.318**

According to the above tables, the sum of SAR values for GSM and WiFi ＜1.6W/kg. So simultaneous transmission SAR are not required for WiFi transmitter.

The sum of SAR values for WCDMA &WiFi (Hotspot)

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY
WCDMA	0.395	1.002
WiFi	0.455	0
Sum	**0.850**	**1.002**

According to the above tables, the sum of SAR values for GSM and WiFi ＜1.6W/kg. So simultaneous transmission SAR are not required for WiFi transmitter.

According to the formula(KDB447498 4.3.2) the Bluetooth sar as follow:
[(max.power of channel,including tune-up tolerance,mw)/(min.test separation distance,mm)][√f(GHz)/x] W/kg for test separation distances≦50mm.
Head :
min.test separation distance = 5mm
Body:
min.test separation distance = 10mm
Where x=7.5 for 1-g SAR,and x=18.75 for 10-g SAR.

The sum of SAR values for GSM & Bluetooth

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY
GSM	0.365	1.117
Bluetooth	0.104	0.052
Sum	**0.469**	**1.169**

According to the above tables, the sum of SAR values for GSM and Bluetooth ＜ 1.6W/kg. So simultaneous transmission SAR are not required for Bluetooth transmitter.

The sum of SAR values for WCDMA & Bluetooth

	MAXIMUM SAR VALUE FOR HEAD	MAXIMUM SAR VALUE FOR BODY
WCDMA	0.595	1.002
Bluetooth	0.104	0
Sum	**0.699**	**1.002**

According to the above tables, the sum of SAR values for GSM and Bluetooth ＜ 1.6W/kg. So simultaneous transmission SAR are not required for Bluetooth transmitter.

APPENDIX A: SYSTEM CHECKING SCANS

SYSTEM CHECKING SCANS	835MHz Head

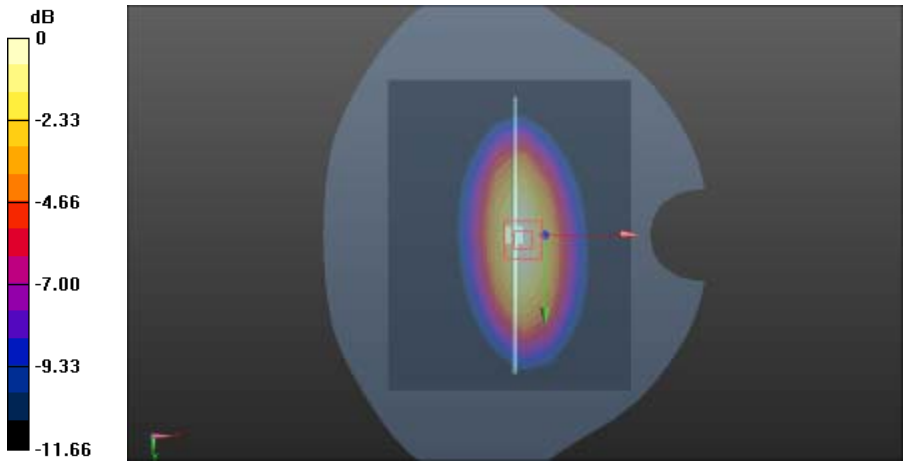
Communication System: UID 0, CW (0); Frequency: 835 MHz
Medium parameters used (extrapolated): f = 835 MHz; σ = 0.979 S/m; ε_r = 42.108; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.08, 9.08, 9.08); Calibrated: 10/22/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequencies 835MHz Head/d=15mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Area Scan (10x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 3.07 W/kg

System Performance Check at Frequencies 835MHz Head/d=15mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.361 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.68 W/kg
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.52 W/kg
Maximum value of SAR (measured) = 3.08 W/kg



0 dB = 3.08 W/kg = 4.89 dBW/kg

SYSTEM CHECKING SCANS	835MHz Flat

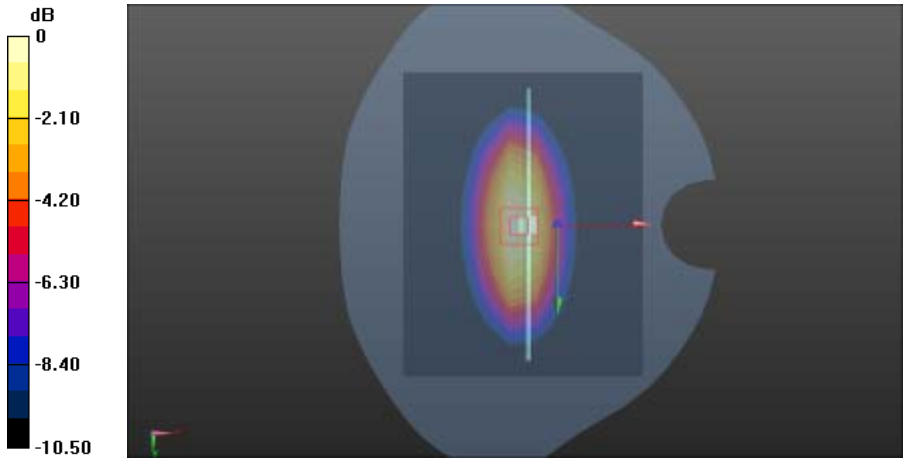
Communication System: UID 0, CW (0); Frequency: 835 MHz
Medium parameters used (extrapolated): f = 835 MHz; σ = 0.978 S/m; ε_r = 53.846; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequencies 835MHz Flat/d=15mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Area Scan (10x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.82 W/kg

System Performance Check at Frequencies 835MHz Flat/d=15mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.430 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 3.63 W/kg
SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 3.06 W/kg



0 dB = 3.06 W/kg = 4.86 dBW/kg

SYSTEM CHECKING SCANS	1900MHz Head

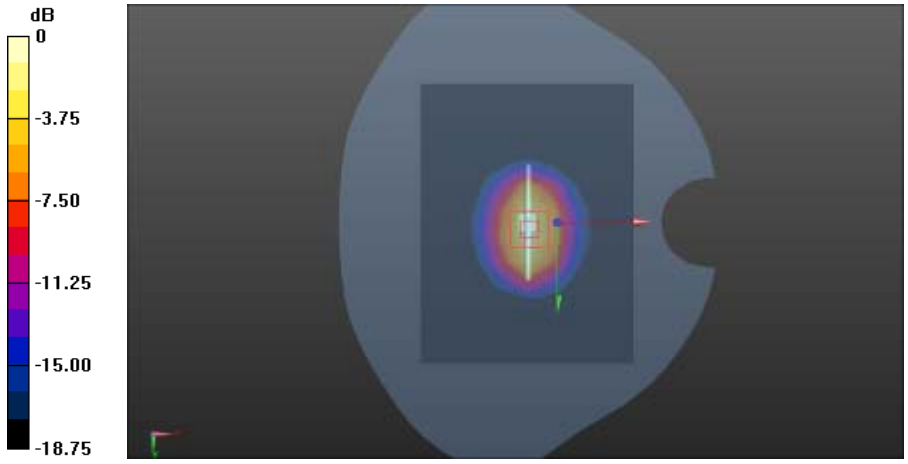
Communication System: UID 0, CW (0); Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.54 S/m; ε_r = 40.84; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(7.87, 7.87, 7.87); Calibrated: 10/22/2013;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

System Performance Check at Frequencies 1900MHz Head/d=10mm, Pin=250mW, dist=2.0mm (EX-Probe)/Area Scan (9x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 14.1 W/kg

System Performance Check at Frequencies 1900MHz Head/d=10mm, Pin=250mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.769 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 19.4 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.12 W/kg
Maximum value of SAR (measured) = 14.8 W/kg



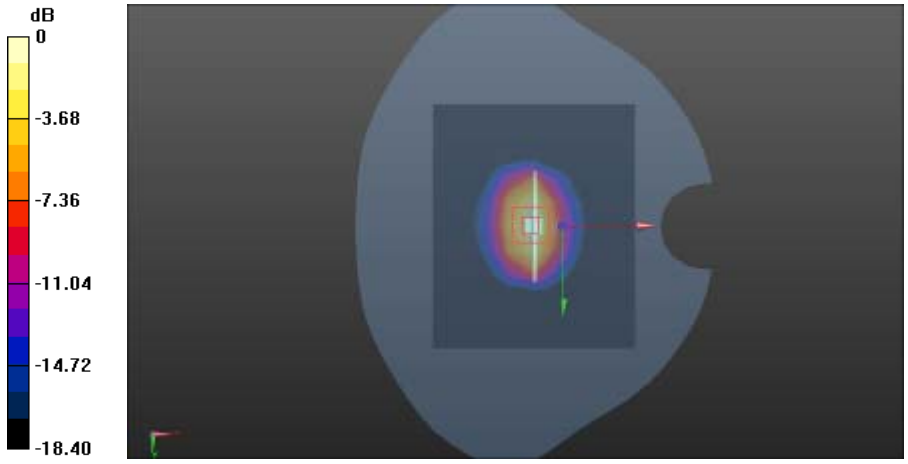
0 dB = 14.8 W/kg = 11.70 dBW/kg

SYSTEM CHECKING SCANS	1900MHz Flat

Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.63 S/m; ε_r = 52.184; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)
  System Performance Check at Frequencies 1900MHz Flat/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Area Scan (9x11x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 12.2 W/kg
  System Performance Check at Frequencies 1900MHz Flat/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 90.433 V/m; Power Drift = 0.15 dB
  Peak SAR (extrapolated) = 18.2 W/kg
  SAR(1 g) = 9.89 W/kg; SAR(10 g) = 5.09 W/kg
  Maximum value of SAR (measured) = 12.6 W/kg



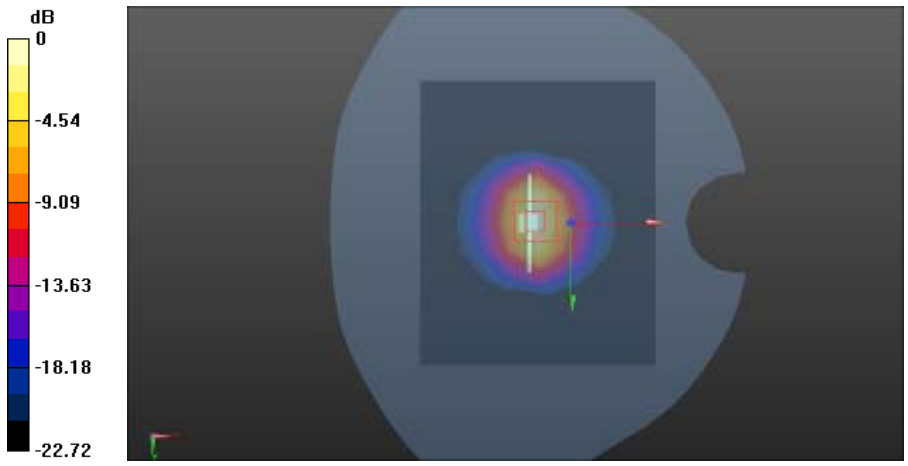
0 dB = 12.6 W/kg = 11.00 dBW/kg

SYSTEM CHECKING SCANS	2450MHz Head

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.79 S/m; ε_r = 39.208; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.38, 4.38, 4.38); Calibrated: 2013/8/21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1660; Type: QD000P40CD; Serial: TP:1660
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)
  System Performance Check at Frequencies 2450MHz Head/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Area Scan (9x11x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 18.0 W/kg
  System Performance Check at Frequencies 2450MHz Head/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 90.433 V/m; Power Drift = 0.15 dB
  Peak SAR (extrapolated) = 28.5 W/kg
  SAR(1 g) = 13.7 W/kg; SAR(10 g) = 6.34 W/kg
  Maximum value of SAR (measured) = 18.1 W/kg



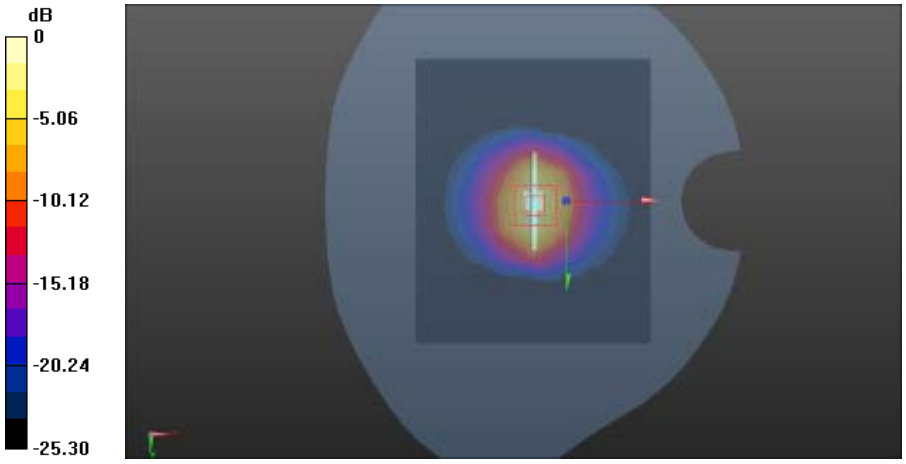
0 dB = 18.1 W/kg = 12.58 dBW/kg

SYSTEM CHECKING SCANS	2450MHz Flat

Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.965 S/m; ε_r = 52.042; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.07, 4.07, 4.07); Calibrated: 2013/8/21;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1660; Type: QD000P40CD; Serial: TP:1660
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)
  System Performance Check at Frequencies 2450MHz Flat/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Area Scan (9x11x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 17.4 W/kg
  System Performance Check at Frequencies 2450MHz Flat/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 90.433 V/m; Power Drift = 0.15 dB
  Peak SAR (extrapolated) = 29.6 W/kg
  SAR(1 g) = 13.1 W/kg; SAR(10 g) = 5.82 W/kg



0 dB = 17.4 W/kg = 12.41 dBW/kg

APPENDIX B: MEASUREMENT SCANS

GSM (850MHz/Head)

Left Side	Cheek	**836.6 MHz**

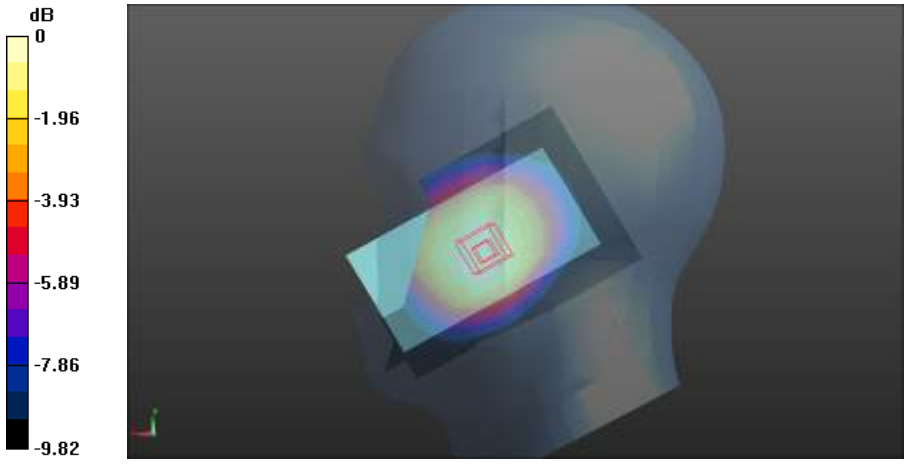
Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.98 S/m; ε_r = 42.097; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.08, 9.08, 9.08); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Head-Section Left HSL 850/850GSM Hsl touch M/Area Scan (8x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.184 W/kg

Head-Section Left HSL 850/850GSM Hsl touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.240 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.210 W/kg
SAR(1 g) = 0.165 W/kg; SAR(10 g) = 0.123 W/kg
Maximum value of SAR (measured) = 0.173 W/kg



0 dB = 0.173 W/kg = -7.62 dBW/kg

Left Side	Tilt	**836.6 MHz**

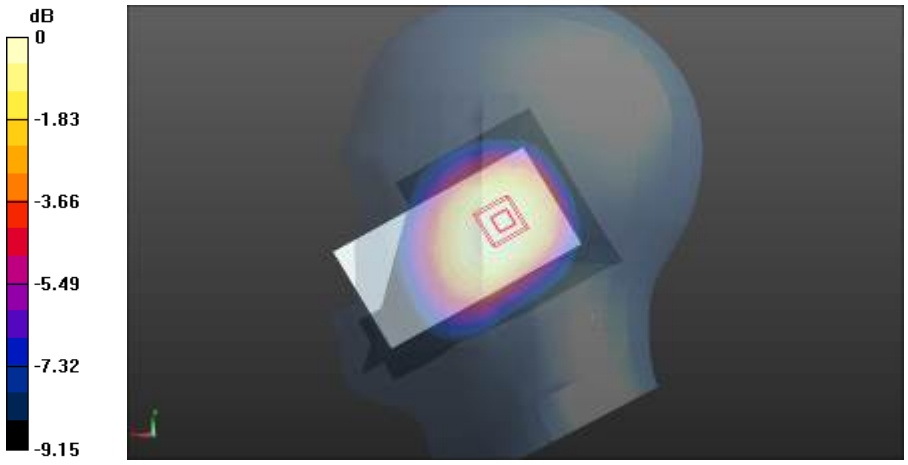
Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.98 S/m; ε_r = 42.097; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.08, 9.08, 9.08); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Head-Section Left HSL 850/850GSM Hsl tilt M/Area Scan (8x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.142 W/kg

Head-Section Left HSL 850/850GSM Hsl tilt M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.540 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.177 W/kg
SAR(1 g) = 0.138 W/kg; SAR(10 g) = 0.102 W/kg
Maximum value of SAR (measured) = 0.146 W/kg



0 dB = 0.146 W/kg = -8.36 dBW/kg

Right Side	Cheek	**836.6 MHz**

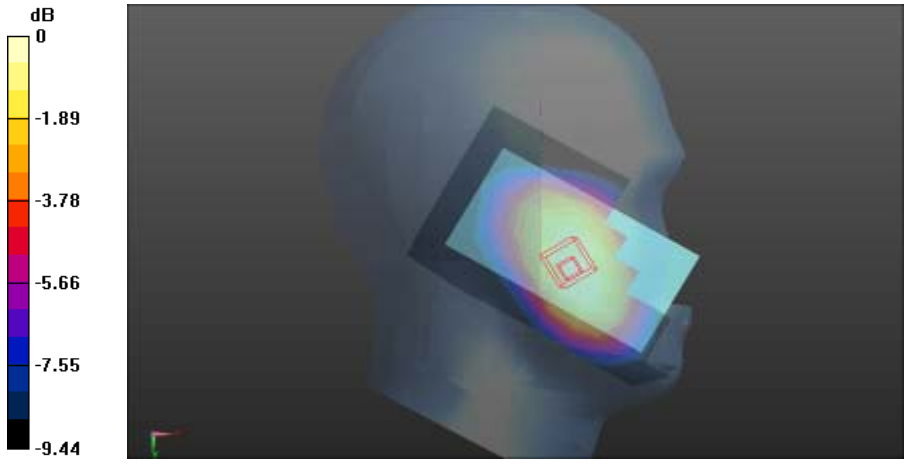
Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.98 S/m; ε_r = 42.097; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.08, 9.08, 9.08); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Head-Section Right HSL 850/850GSM HSL touch M/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.169 W/kg

Head-Section Right HSL 850/850GSM HSL touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.554 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.216 W/kg
SAR(1 g) = 0.166 W/kg; SAR(10 g) = 0.123 W/kg
Maximum value of SAR (measured) = 0.175 W/kg



0 dB = 0.175 W/kg = -7.57 dBW/kg

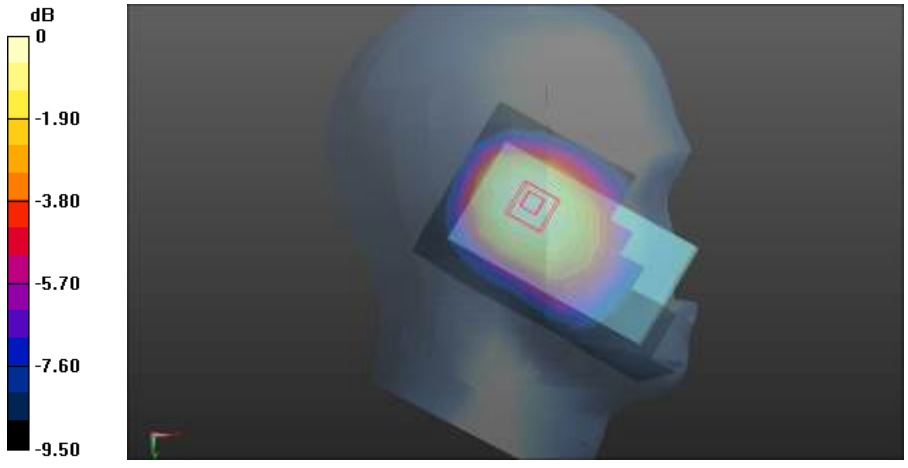
Right Side	Tilt	**836.6 MHz**

Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.98 S/m; ε_r = 42.097; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.08, 9.08, 9.08); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Head-Section Right HSL 850/850GSM HSL tilt M/Area Scan (8x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.169 W/kg
Head-Section Right HSL 850/850GSM HSL tilt M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.557 V/m; Power Drift = -0.20 dB
Peak SAR (extrapolated) = 0.210 W/kg
SAR(1 g) = 0.160 W/kg; SAR(10 g) = 0.117 W/kg
Maximum value of SAR (measured) = 0.168 W/kg



0 dB = 0.168 W/kg = -7.75 dBW/kg

GSM with headset (850MHz/Flat)

FLAT	TP	**836.6 MHz**

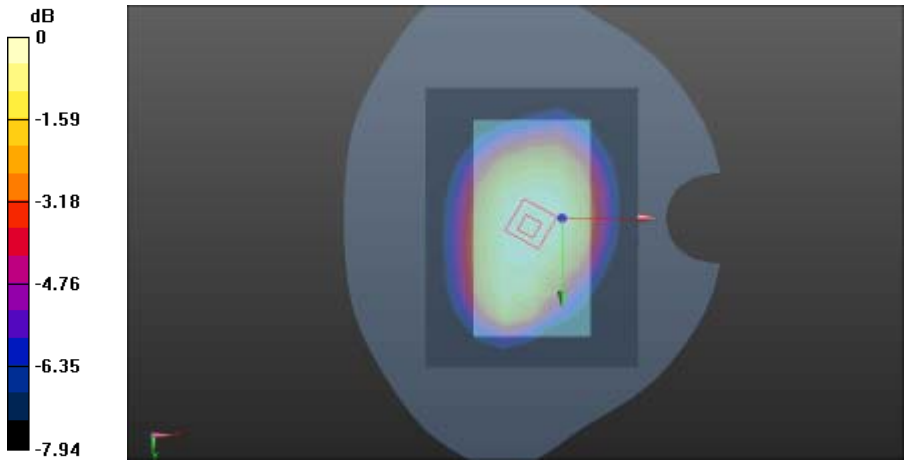
Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL 850 TP/850GSM TP M/Area Scan (9x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.202 W/kg

Flat-Section MSL 850 TP/850GSM TP M/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.293 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.241 W/kg
SAR(1 g) = 0.192 W/kg; SAR(10 g) = 0.148 W/kg
Maximum value of SAR (measured) = 0.200 W/kg



0 dB = 0.200 W/kg = -6.99 dBW/kg

FLAT	TG	**836.6 MHz**

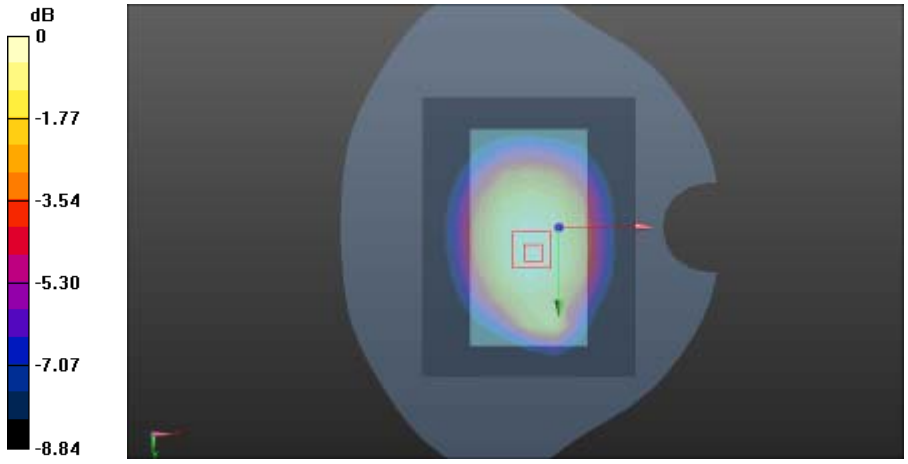
Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL 850 TG/850GSM TG M/Area Scan (9x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.292 W/kg

Flat-Section MSL 850 TG/850GSM TG M/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.700 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.358 W/kg
SAR(1 g) = 0.282 W/kg; SAR(10 g) = 0.214 W/kg
Maximum value of SAR (measured) = 0.296 W/kg



0 dB = 0.296 W/kg = -5.29 dBW/kg

GSM (850MHz with GPRS/Flat)

FLAT	TP	**836.6 MHz**

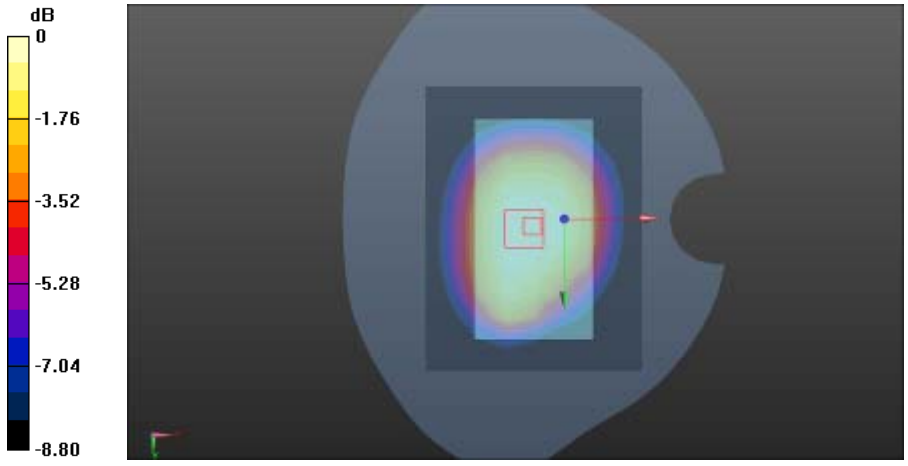
Communication System: UID 10028 - DAA, GPRS-FDD (TDMA, GMSK, TN 0-1-2-3);
Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL 850 TP/850GPRS TP M/Area Scan (9x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.382 W/kg

Flat-Section MSL 850 TP/850GPRS TP M/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.035 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.473 W/kg
SAR(1 g) = 0.371 W/kg; SAR(10 g) = 0.282 W/kg
Maximum value of SAR (measured) = 0.387 W/kg



0 dB = 0.387 W/kg = -4.12 dBW/kg

FLAT	TG	**836.6 MHz**

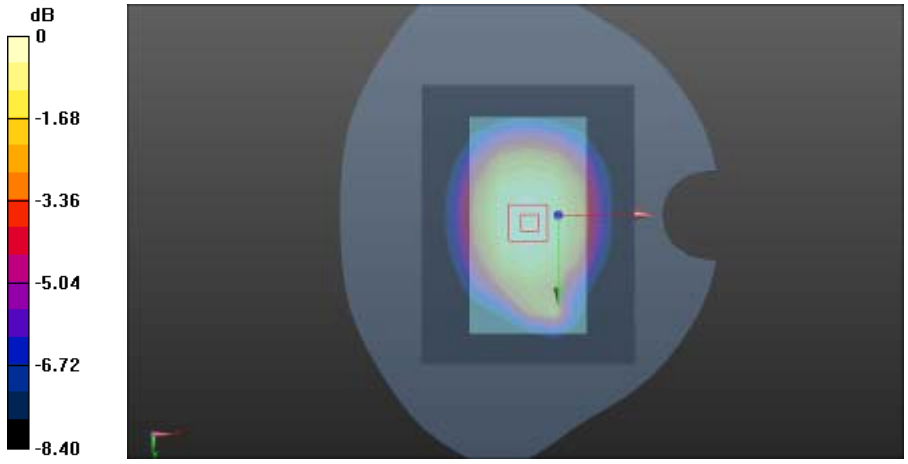
Communication System: UID 10028 - DAA, GPRS-FDD (TDMA, GMSK, TN 0-1-2-3);
Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL 850 TG/850GPRS TG M/Area Scan (9x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.501 W/kg

Flat-Section MSL 850 TG/850GPRS TG M/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.733 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.614 W/kg
SAR(1 g) = 0.489 W/kg; SAR(10 g) = 0.371 W/kg
Maximum value of SAR (measured) = 0.514 W/kg



0 dB = 0.514 W/kg = -2.89 dBW/kg

GSM (850MHz with EDGE/Flat)

FLAT	TP	**836.6 MHz**

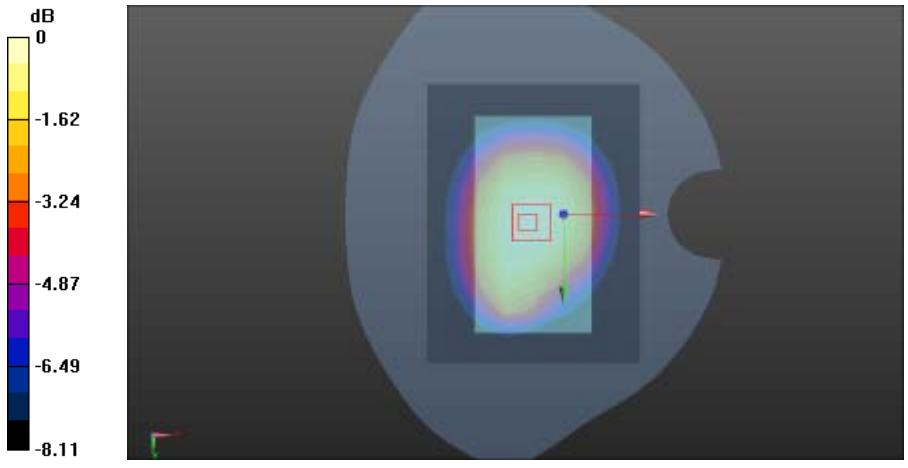
Communication System: UID 10058 - DAA, EDGE-FDD (TDMA, GMSK, TN 0-1-2-3);
Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL 850 TP/850EDGE TP M/Area Scan (9x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.370 W/kg

Flat-Section MSL 850 TP/850EDGE TP M/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.614 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.469 W/kg
SAR(1 g) = 0.367 W/kg; SAR(10 g) = 0.283 W/kg
Maximum value of SAR (measured) = 0.386 W/kg



0 dB = 0.386 W/kg = -4.13 dBW/kg

FLAT	TG	**836.6 MHz**

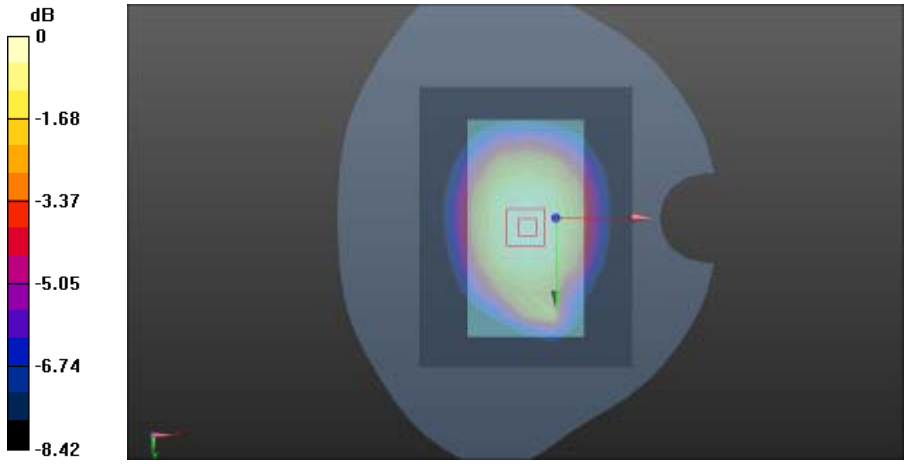
Communication System: UID 10058 - DAA, EDGE-FDD (TDMA, GMSK, TN 0-1-2-3);
Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL 850 TG/850EDGE TG M/Area Scan (9x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.475 W/kg

Flat-Section MSL 850 TG/850EDGE TG M/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.036 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.600 W/kg
SAR(1 g) = 0.467 W/kg; SAR(10 g) = 0.356 W/kg
Maximum value of SAR (measured) = 0.489 W/kg



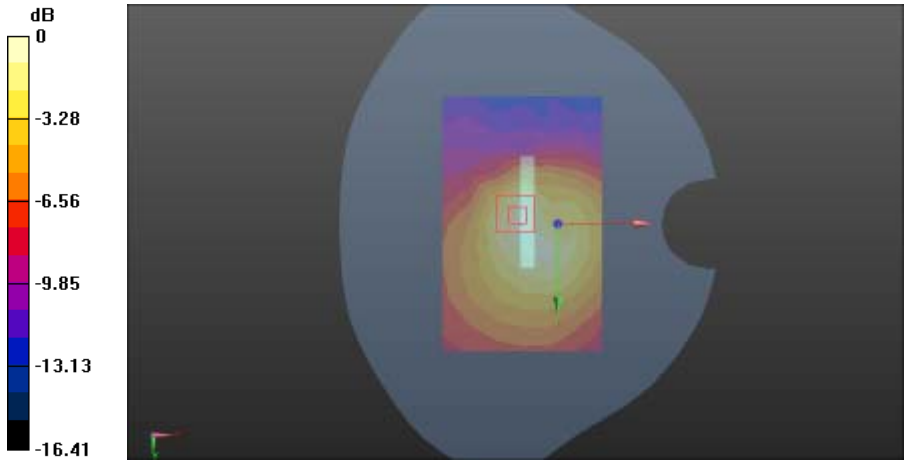
0 dB = 0.489 W/kg = -3.11 dBW/kg

FLAT	Edge2	**836.6 MHz**

Communication System: UID 10028 - DAA, GPRS-FDD (TDMA, GMSK, TN 0-1-2-3);
Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)
  hotspot/850GPRS edge2/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.0642 W/kg
  hotspot/850GPRS edge2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 7.697 V/m; Power Drift = -0.08 dB
  Peak SAR (extrapolated) = 0.114 W/kg
  SAR(1 g) = 0.064 W/kg; SAR(10 g) = 0.037 W/kg
  Maximum value of SAR (measured) = 0.0700 W/kg



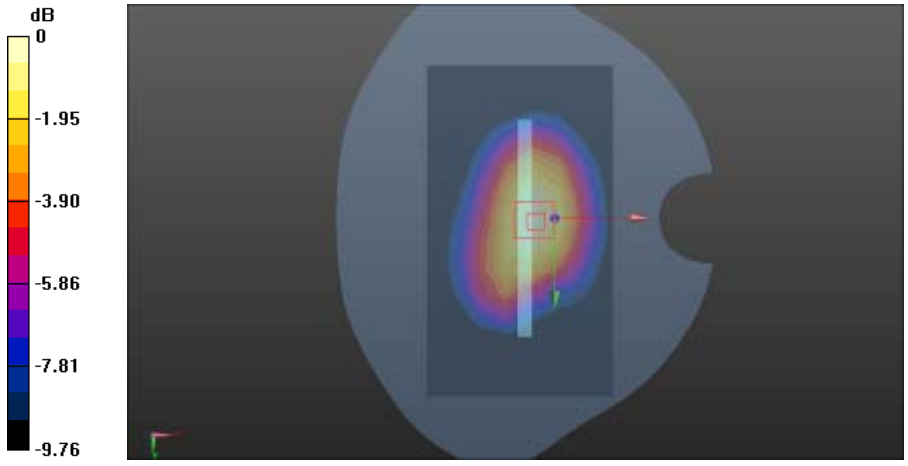
0 dB = 0.0700 W/kg = -11.55 dBW/kg

FLAT	Edge3	**836.6 MHz**

Communication System: UID 10028 - DAA, GPRS-FDD (TDMA, GMSK, TN 0-1-2-3);
Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)
  hotspot/850GPRS edge3/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.107 W/kg
  hotspot/850GPRS edge3/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 10.053 V/m; Power Drift = 0.16 dB
  Peak SAR (extrapolated) = 0.150 W/kg
  SAR(1 g) = 0.104 W/kg; SAR(10 g) = 0.071 W/kg
  Maximum value of SAR (measured) = 0.111 W/kg



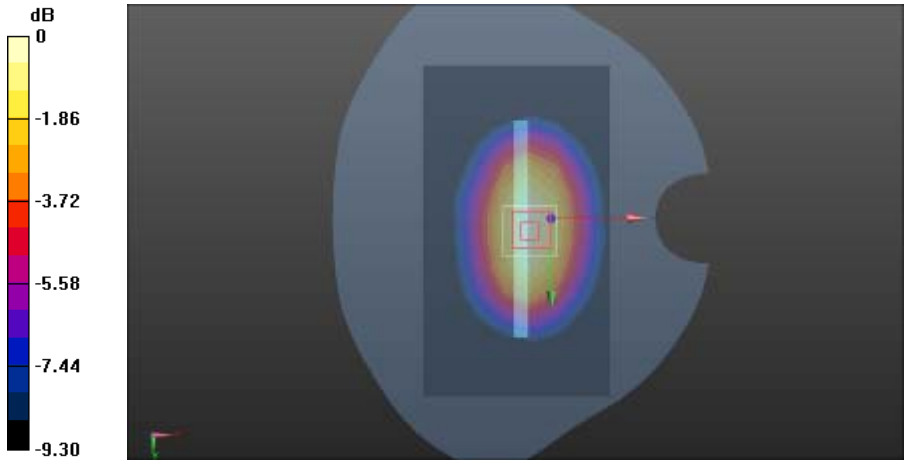
0 dB = 0.111 W/kg = -9.55 dBW/kg

FLAT	Edge4	**836.6 MHz**

Communication System: UID 10028 - DAA, GPRS-FDD (TDMA, GMSK, TN 0-1-2-3);
Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)
  hotspot/850GPRS edge4/Area Scan (8x14x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.136 W/kg
  hotspot/850GPRS edge4/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 11.445 V/m; Power Drift = -0.07 dB
  Peak SAR (extrapolated) = 0.181 W/kg
  SAR(1 g) = 0.128 W/kg; SAR(10 g) = 0.089 W/kg
  Maximum value of SAR (measured) = 0.137 W/kg



0 dB = 0.137 W/kg = -8.63 dBW/kg

GSM (1900MHz/Head)

Left Side	Cheek	**1880.0 MHz**

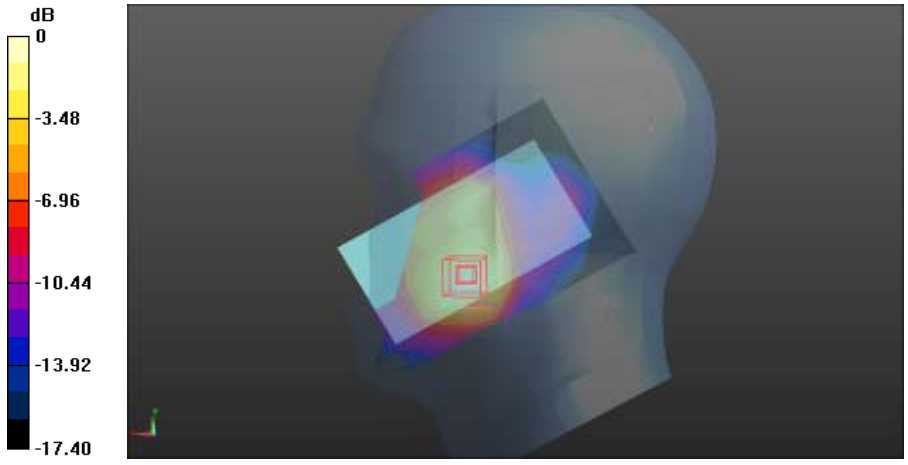
Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.526 S/m; ε_r = 40.934; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(7.87, 7.87, 7.87); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Head-Section Left HSL 1900/1900GSM touch M/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.254 W/kg

Head-Section Left HSL 1900/1900GSM touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.424 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.383 W/kg
SAR(1 g) = 0.233 W/kg; SAR(10 g) = 0.136 W/kg
Maximum value of SAR (measured) = 0.259 W/kg



0 dB = 0.259 W/kg = -5.87 dBW/kg

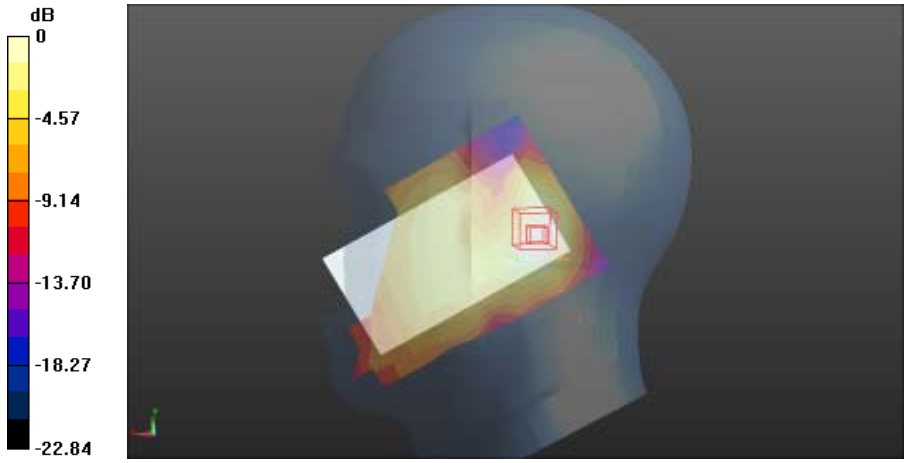
Left Side	tilt	**1880 MHz**

Communication System: UID 10021 - DAA, GSM-FDD (TDMA, GMSK); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.526 S/m; ε_r = 40.934; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(7.87, 7.87, 7.87); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

  Head-Section Left HSL 1900/1900GSM tilt M/Area Scan (8x12x1):
  Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.0765 W/kg
  Head-Section Left HSL 1900/1900GSM tilt M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 6.362 V/m; Power Drift = -0.20 dB
  Peak SAR (extrapolated) = 0.114 W/kg
  SAR(1 g) = 0.072 W/kg; SAR(10 g) = 0.043 W/kg
  Maximum value of SAR (measured) = 0.0784 W/kg



0 dB = 0.0784 W/kg = -11.06 dBW/kg

Right Side	Cheek	**1880.0 MHz**

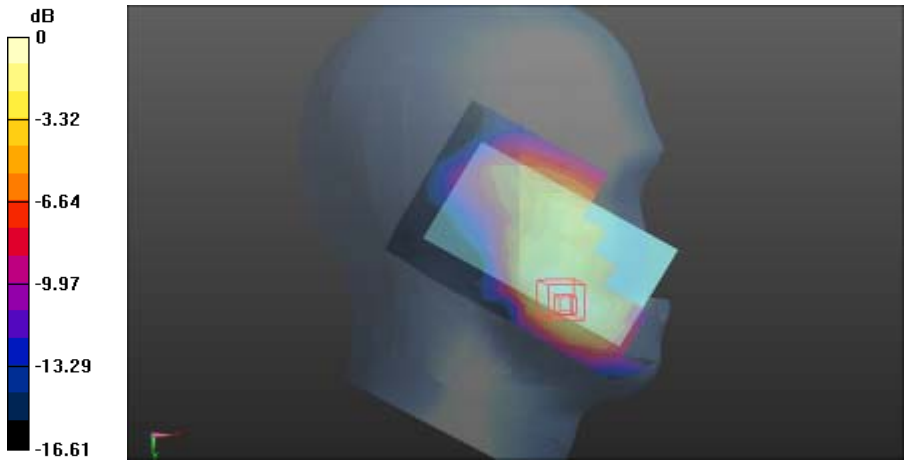
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.526 S/m; ε_r = 40.934; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(7.87, 7.87, 7.87); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Head-Section Right HSL 1900/1900GSM touch M/Area Scan (8x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.207 W/kg

Head-Section Right HSL 1900/1900GSM touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.754 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.323 W/kg
SAR(1 g) = 0.190 W/kg; SAR(10 g) = 0.108 W/kg
Maximum value of SAR (measured) = 0.209 W/kg



0 dB = 0.209 W/kg = -6.80 dBW/kg

Right Side	tilt	**1880.0 MHz**

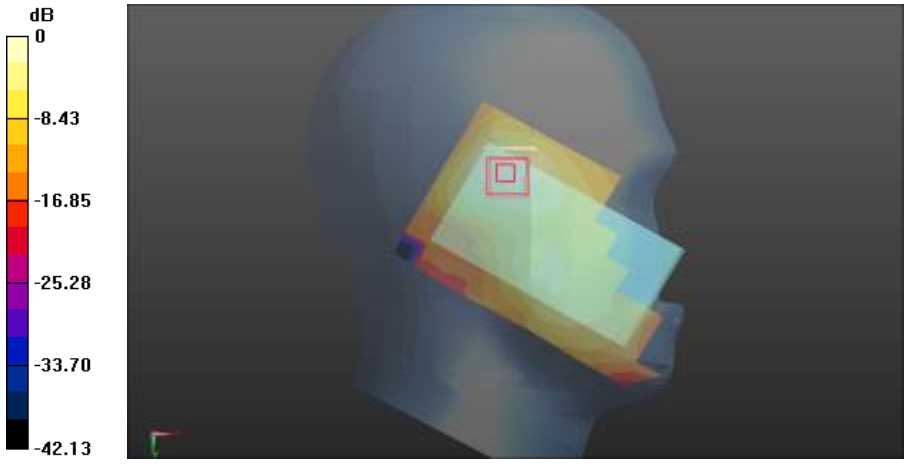
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.526 S/m; ε_r = 40.934; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(7.87, 7.87, 7.87); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Head-Section Right HSL 1900/1900GSM tilt M/Area Scan (8x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.117 W/kg

Head-Section Right HSL 1900/1900GSM tilt M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.673 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.186 W/kg
SAR(1 g) = 0.107 W/kg; SAR(10 g) = 0.059 W/kg
Maximum value of SAR (measured) = 0.119 W/kg



0 dB = 0.119 W/kg = -9.24 dBW/kg

GSM with headset (1900MHz/Flat)

FLAT	TP	**1880 MHz**

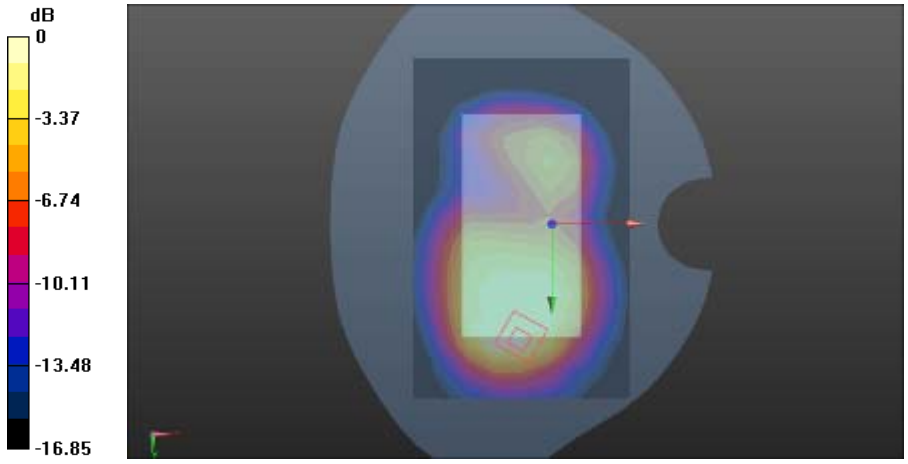
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.611 S/m; ε_r = 52.016; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Flat-Section MSL 1900 TP/1900GSM TP M/Area Scan (9x14x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.319 W/kg

Flat-Section MSL 1900 TP/1900GSM TP M/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.927 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.532 W/kg
SAR(1 g) = 0.313 W/kg; SAR(10 g) = 0.174 W/kg
Maximum value of SAR (measured) = 0.351 W/kg



0 dB = 0.351 W/kg = -4.55 dBW/kg

FLAT	TG	**1880 MHz**

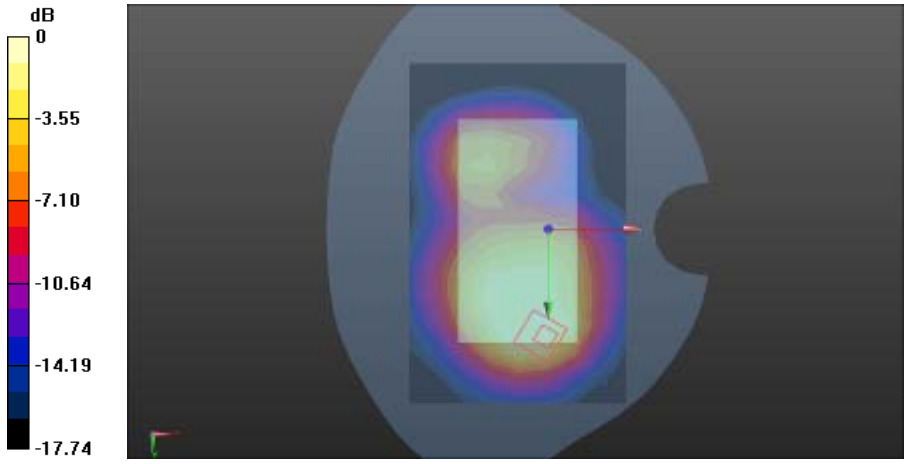
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.611 S/m; ε_r = 52.016; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Flat-Section MSL 1900 TG/1900GSM TG M/Area Scan (9x14x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.352 W/kg

Flat-Section MSL 1900 TG/1900GSM TG M/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.239 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.707 W/kg
SAR(1 g) = 0.372 W/kg; SAR(10 g) = 0.197 W/kg
Maximum value of SAR (measured) = 0.414 W/kg



0 dB = 0.414 W/kg = -3.83 dBW/kg

GSM (1900MHz with GPRS/Flat)

FLAT	TP	**1880 MHz**

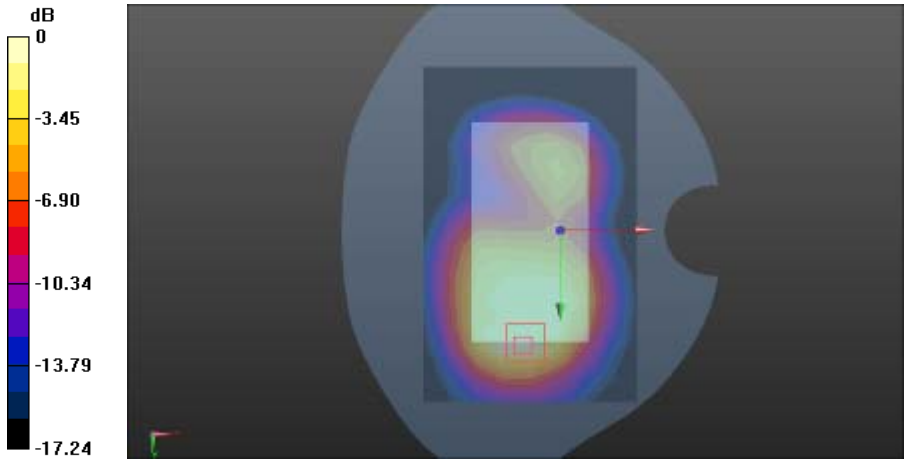
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.611 S/m; ε_r = 52.016; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Flat-Section MSL 1900 TP/1900GPRS TP M/Area Scan (9x14x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.565 W/kg

Flat-Section MSL 1900 TP/1900GPRS TP M/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.098 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.959 W/kg
SAR(1 g) = 0.543 W/kg; SAR(10 g) = 0.299 W/kg
Maximum value of SAR (measured) = 0.609 W/kg



0 dB = 0.609 W/kg = -2.15 dBW/kg

FLAT	TG	**1880 MHz**

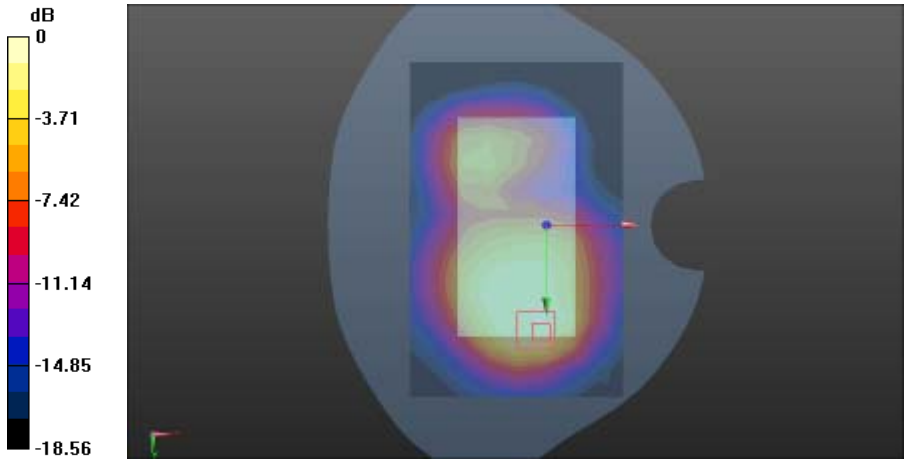
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.611 S/m; ε_r = 52.016; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

  Flat-Section MSL 1900 TG/1900GPRS TG M/Area Scan (9x14x1):
  Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.656 W/kg

  Flat-Section MSL 1900 TG/1900GPRS TG M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 11.417 V/m; Power Drift = -0.14 dB
  Peak SAR (extrapolated) = 1.37 W/kg
  SAR(1 g) = 0.702 W/kg; SAR(10 g) = 0.370 W/kg
  Maximum value of SAR (measured) = 0.791 W/kg



0 dB = 0.791 W/kg = -1.02 dBW/kg

GSM (1900MHz with EDGE/Flat)

FLAT	TP	**1880 MHz**

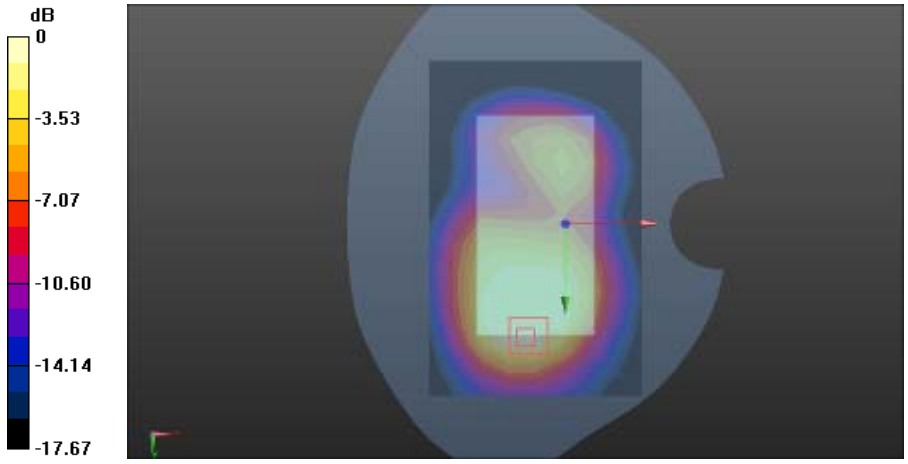
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.611 S/m; ε_r = 52.016; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Flat-Section MSL 1900 TP/1900EDGE TP M/Area Scan (9x14x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.497 W/kg

Flat-Section MSL 1900 TP/1900EDGE TP M/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.806 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.880 W/kg
SAR(1 g) = 0.496 W/kg; SAR(10 g) = 0.272 W/kg
Maximum value of SAR (measured) = 0.556 W/kg



0 dB = 0.556 W/kg = -2.55 dBW/kg

FLAT	TG	**1850.2 MHz**

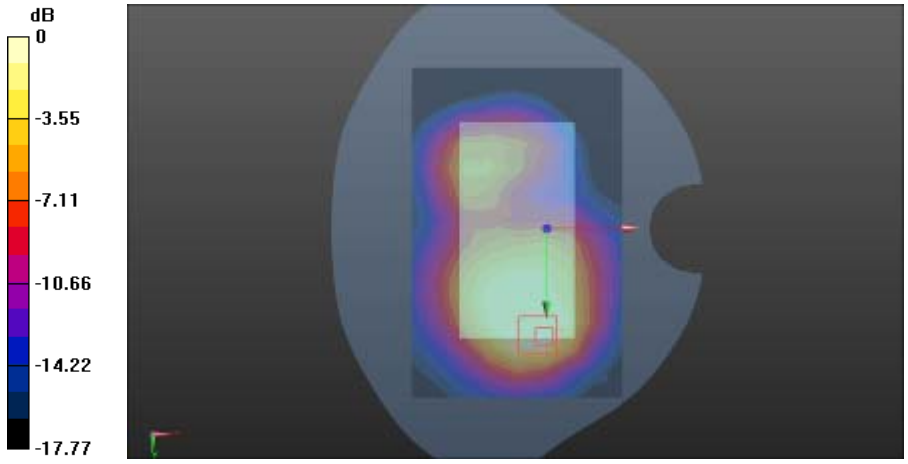
Communication System: UID 0, Generic GSM (0); Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.566 S/m; ε_r = 52.096; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Flat-Section MSL 1900 TG/1800EDGE TG L/Area Scan (9x14x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.765 W/kg

Flat-Section MSL 1900 TG/1800EDGE TG L/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.555 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 0.813 W/kg; SAR(10 g) = 0.433 W/kg
Maximum value of SAR (measured) = 0.904 W/kg



0 dB = 0.904 W/kg = -0.44 dBW/kg

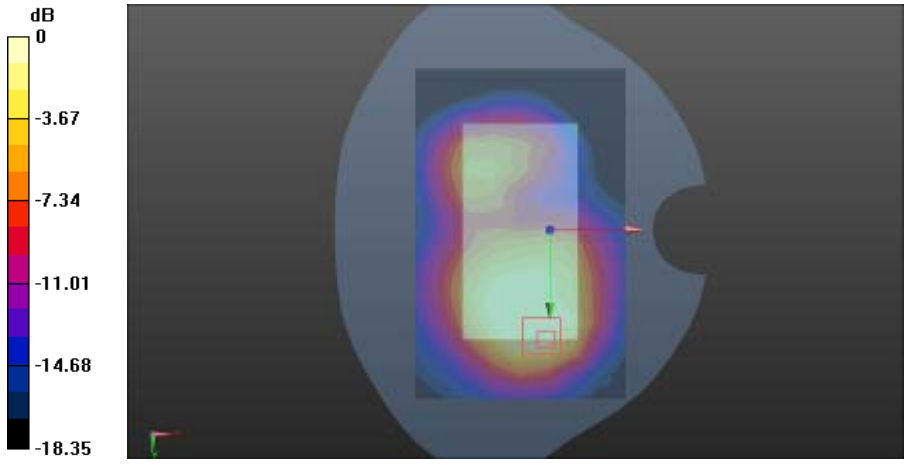
FLAT	TG	**1850.2 MHz**

Communication System: UID 0, Generic GSM (0); Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.566 S/m; ε_r = 52.096; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

  Flat-Section MSL 1900 TG/1800EDGE TG L 2/Area Scan (9x14x1):
  Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.740 W/kg
  Flat-Section MSL 1900 TG/1800EDGE TG L 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 10.019 V/m; Power Drift = -0.06 dB
  Peak SAR (extrapolated) = 1.59 W/kg
  SAR(1 g) = 0.813 W/kg; SAR(10 g) = 0.431 W/kg
  Maximum value of SAR (measured) = 0.911 W/kg



0 dB = 0.911 W/kg = -0.40 dBW/kg

FLAT	TG	**1880 MHz**

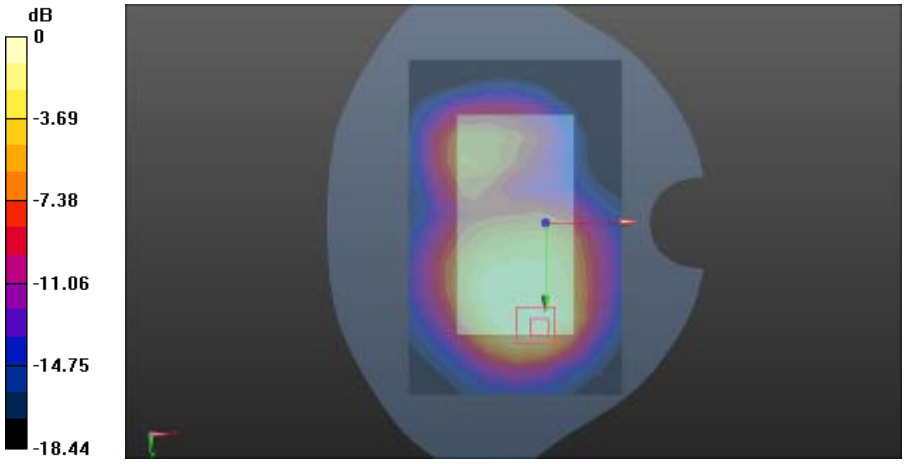
Communication System: UID 0, Generic GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.611 S/m; ε_r = 52.016; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Flat-Section MSL 1900 TG/1900EDGE TG M/Area Scan (9x14x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.753 W/kg

Flat-Section MSL 1900 TG/1900EDGE TG M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.890 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.771 W/kg; SAR(10 g) = 0.404 W/kg
Maximum value of SAR (measured) = 0.861 W/kg



0 dB = 0.861 W/kg = -0.65 dBW/kg

FLAT	TG	**1909.8 MHz**

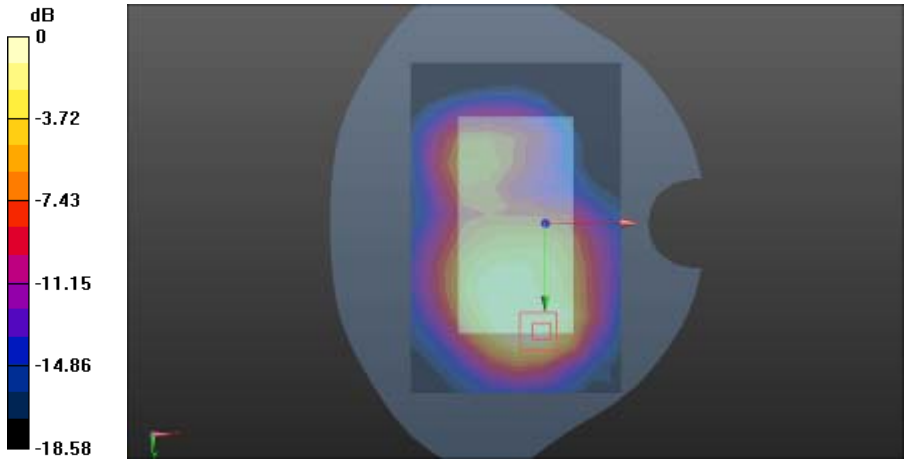
Communication System: UID 0, Generic GSM (0); Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used (extrapolated): f = 1909.8 MHz; σ = 1.643 S/m; ε_r = 52.201; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

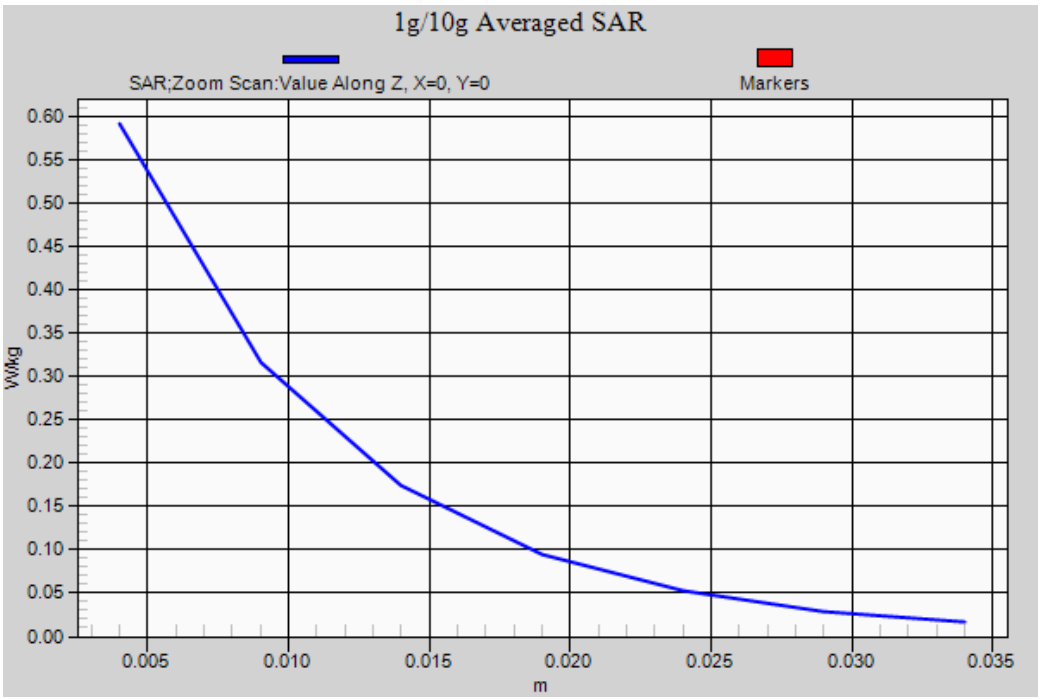
- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Flat-Section MSL 1900 TG/1800EDGE TG H/Area Scan (9x14x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.815 W/kg

Flat-Section MSL 1900 TG/1800EDGE TG H/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.986 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 0.854 W/kg; SAR(10 g) = 0.436 W/kg
Maximum value of SAR (measured) = 0.960 W/kg



0 dB = 0.960 W/kg = -0.18 dBW/kg



Z-Scan at power reference point

FLAT	TG	**1909.8 MHz**

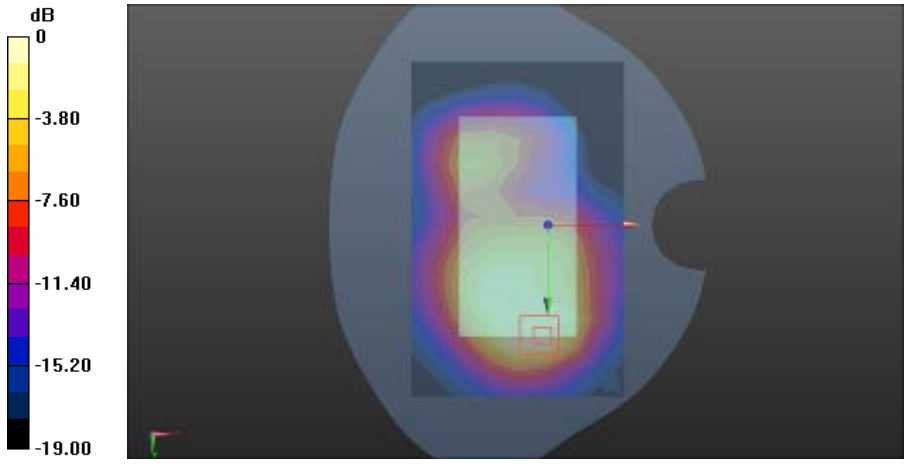
Communication System: UID 0, Generic GSM (0); Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used (extrapolated): f = 1909.8 MHz; σ = 1.643 S/m; ε_r = 52.201; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

  Flat-Section MSL 1900 TG/1800EDGE TG H 2/Area Scan (9x14x1):
  Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.751 W/kg

  Flat-Section MSL 1900 TG/1800EDGE TG H 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 11.674 V/m; Power Drift = -0.13 dB
  Peak SAR (extrapolated) = 1.61 W/kg
  SAR(1 g) = 0.811 W/kg; SAR(10 g) = 0.414 W/kg
  Maximum value of SAR (measured) = 0.913 W/kg



0 dB = 0.913 W/kg = -0.40 dBW/kg

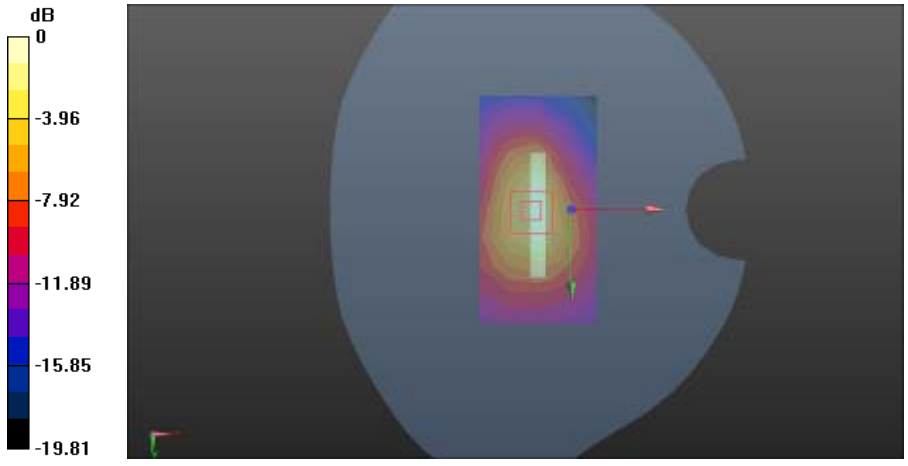
FLAT	Edge2	**1909.8 MHz**

Communication System: UID 0, Generic GSM (0); Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1909.8 MHz; σ = 1.643 S/m; εr = 52.201;; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

  Flat-Section MSL 1900 hotspot/1900 EDGE edge2 H/Area Scan (5x9x1):
  Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.805 W/kg
  Flat-Section MSL 1900 hotspot/1900 EDGE edge2 H/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 22.861 V/m; Power Drift = -0.12 dB
  Peak SAR (extrapolated) = 1.38 W/kg
  SAR(1 g) = 0.742 W/kg; SAR(10 g) = 0.373 W/kg
  Maximum value of SAR (measured) = 0.829 W/kg



0 dB = 0.829 W/kg = -0.81 dBW/kg

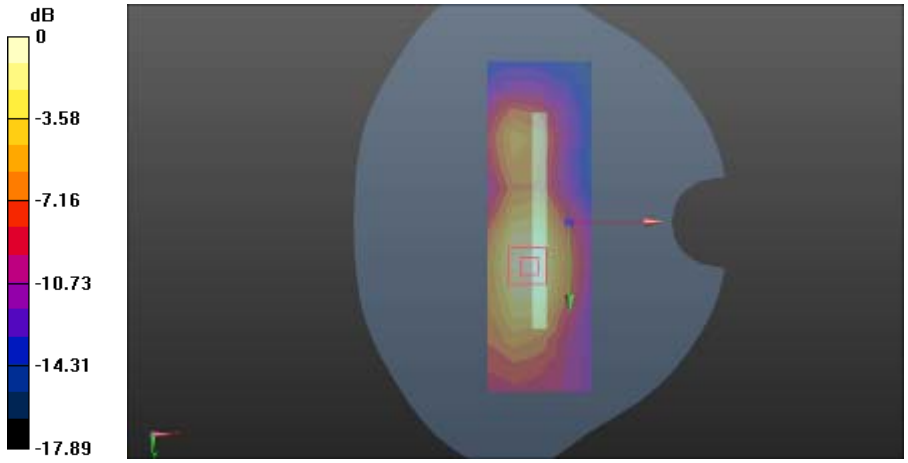
FLAT	Edge3	**1909.8 MHz**

Communication System: UID 0, Generic GSM (0); Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1909.8 MHz; σ = 1.643 S/m; εr = 52.201;; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

  Flat-Section MSL 1900 hotspot/1900 EDGE edge3 H/Area Scan (5x14x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.180 W/kg
  Flat-Section MSL 1900 hotspot/1900 EDGE edge3 H/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 8.178 V/m; Power Drift = 0.08 dB
  Peak SAR (extrapolated) = 0.327 W/kg
  SAR(1 g) = 0.188 W/kg; SAR(10 g) = 0.106 W/kg
  Maximum value of SAR (measured) = 0.206 W/kg



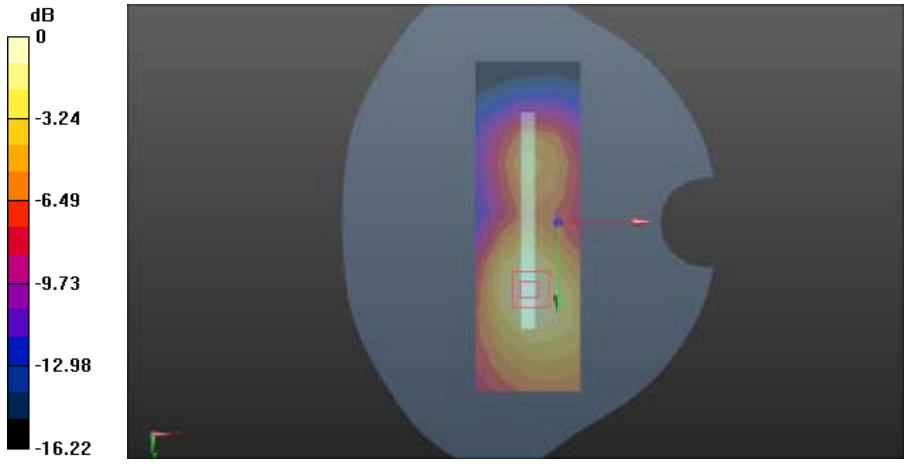
0 dB = 0.206 W/kg = -6.86 dBW/kg

FLAT	Edge4	**1909.8MHz**

Communication System: UID 0, Generic GSM (0); Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1909.8 MHz; σ = 1.643 S/m; εr = 52.201;; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)
  Flat-Section MSL 1900 hotspot/1900 EDGE edge4 H/Area Scan (5x14x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.140 W/kg
  Flat-Section MSL 1900 hotspot/1900 EDGE edge4 H/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 5.459 V/m; Power Drift = 0.02 dB
  Peak SAR (extrapolated) = 0.220 W/kg
  SAR(1 g) = 0.133 W/kg; SAR(10 g) = 0.079 W/kg
  Maximum value of SAR (measured) = 0.144 W/kg



0 dB = 0.144 W/kg = -8.42 dBW/kg

WCDMA BAND2 (Head)

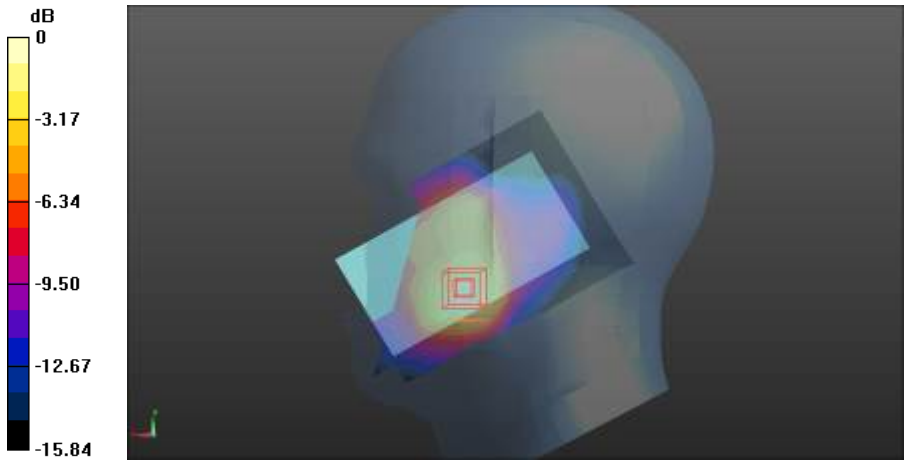
Left Side	Cheek	**1880 MHz**

Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.526 S/m; ε_r = 40.934; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(7.87, 7.87, 7.87); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

  Head-Section Left HSL Band 2/WCDMA Band 2 touch M/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.413 W/kg
  Head-Section Left HSL Band 2/WCDMA Band 2 touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 6.128 V/m; Power Drift = 0.12 dB
  Peak SAR (extrapolated) = 0.659 W/kg
  SAR(1 g) = 0.407 W/kg; SAR(10 g) = 0.239 W/kg
  Maximum value of SAR (measured) = 0.449 W/kg



0 dB = 0.449 W/kg = -3.48 dBW/kg

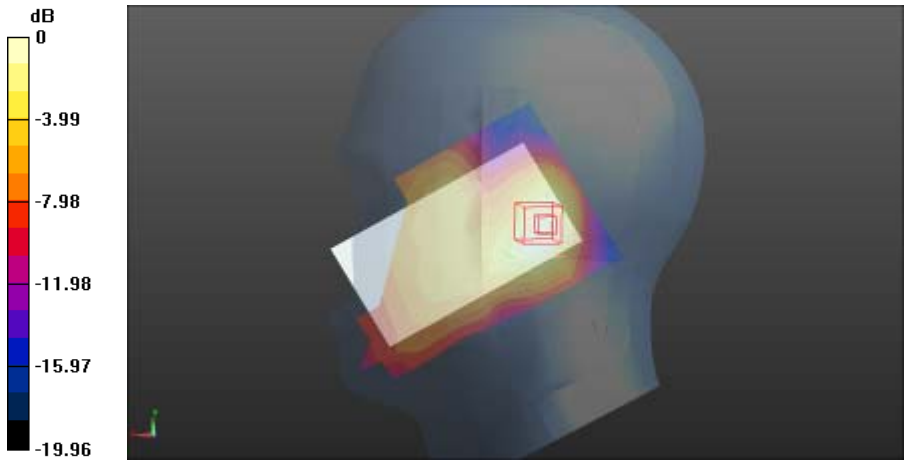
Left Side	Tilt	**1880 MHz**

Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.526 S/m; ε_r = 40.934; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(7.87, 7.87, 7.87); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

  Head-Section Left HSL Band 2/WCDMA Band 2 tilt M/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.143 W/kg
  Head-Section Left HSL Band 2/WCDMA Band 2 tilt M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 8.799 V/m; Power Drift = 0.13 dB
  Peak SAR (extrapolated) = 0.210 W/kg
  SAR(1 g) = 0.134 W/kg; SAR(10 g) = 0.080 W/kg



0 dB = 0.143 W/kg = -8.45 dBW/kg

Right Side	Cheek	**1880 MHz**

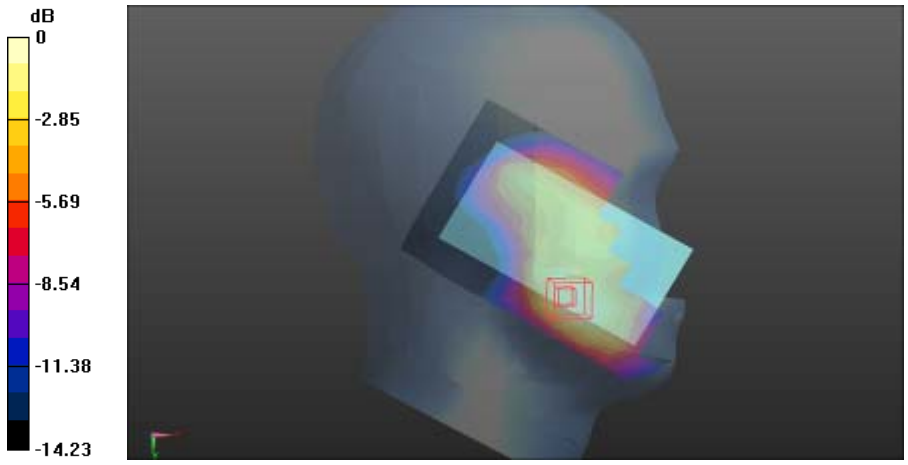
Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.526 S/m; ε_r = 40.934; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(7.87, 7.87, 7.87); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Head-Section Right HSL Band 2/WCDMA Band 2 touch M/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.257 W/kg

Head-Section Right HSL Band 2/WCDMA Band 2 touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.827 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.445 W/kg
SAR(1 g) = 0.270 W/kg; SAR(10 g) = 0.162 W/kg
Maximum value of SAR (measured) = 0.299 W/kg



0 dB = 0.299 W/kg = -5.24 dBW/kg

Right Side	Tile	**1880 MHz**

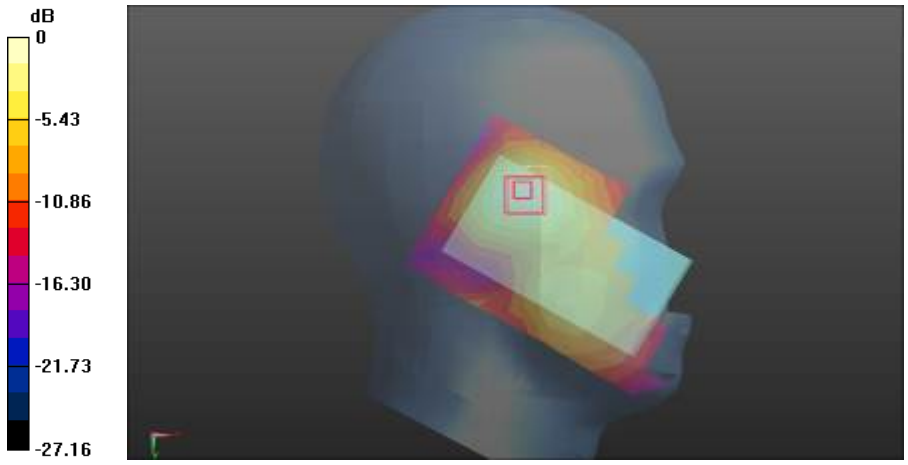
Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.526 S/m; ε_r = 40.934; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(7.87, 7.87, 7.87); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Head-Section Right HSL Band 2/WCDMA Band 2 tilt M/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.186 W/kg

Head-Section Right HSL Band 2/WCDMA Band 2 tilt M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.801 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.290 W/kg
SAR(1 g) = 0.180 W/kg; SAR(10 g) = 0.105 W/kg
Maximum value of SAR (measured) = 0.198 W/kg



0 dB = 0.198 W/kg = -7.03 dBW/kg

WCDMA BAND2 (Flat)

FLAT	TP	**1880 MHz**

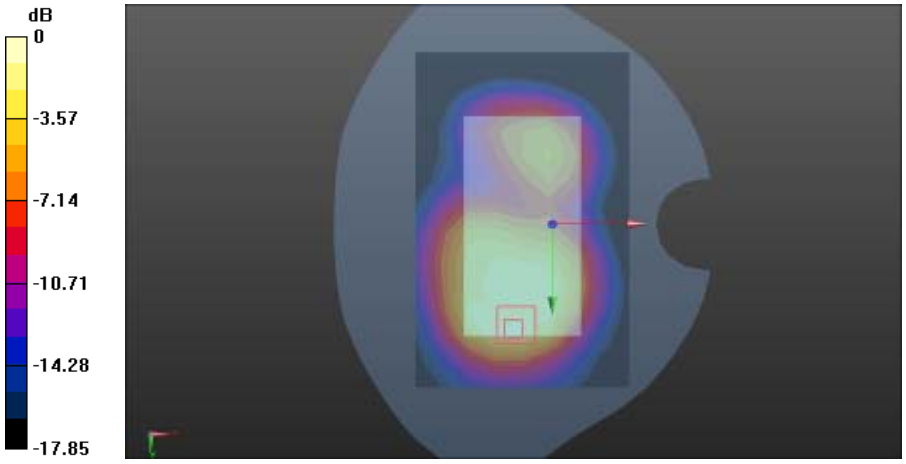
Communication System: UID 0, wcdma II (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.58 S/m; ε_r = 52.594; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Flat-Section MSL Band 2 TP/WCDMA Band 2 TP M/Area Scan (9x14x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.422 W/kg

Flat-Section MSL Band 2 TP/WCDMA Band 2 TP M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.776 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.745 W/kg
SAR(1 g) = 0.437 W/kg; SAR(10 g) = 0.245 W/kg
Maximum value of SAR (measured) = 0.490 W/kg



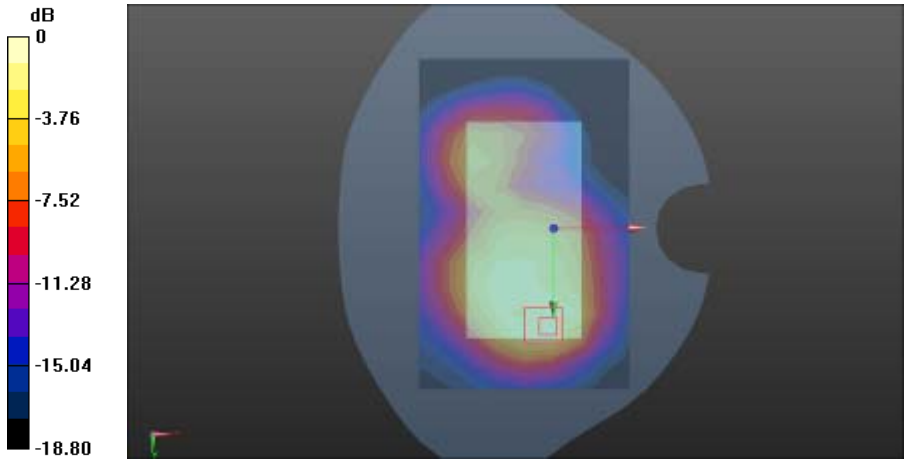
0 dB = 0.490 W/kg = -3.10 dBW/kg

FLAT	TG	**1880 MHz**

Communication System: UID 0, wcdma II (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.58 S/m; ε_r = 52.594; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)
  Flat-Section MSL Band 2 TG 2/WCDMA Band 2 TG M/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.461 W/kg
  Flat-Section MSL Band 2 TG 2/WCDMA Band 2 TG M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 12.307 V/m; Power Drift = -0.11 dB
  Peak SAR (extrapolated) = 0.974 W/kg
  SAR(1 g) = 0.518 W/kg; SAR(10 g) = 0.272 W/kg
  Maximum value of SAR (measured) = 0.577 W/kg



0 dB = 0.577 W/kg = -2.39 dBW/kg

FLAT	Edge2	**1880 MHz**

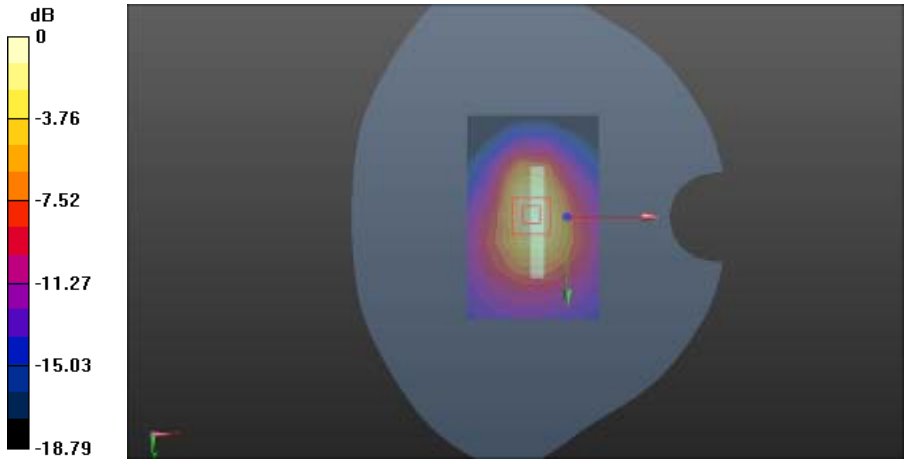
Communication System: UID 0, wcdma II (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.611 S/m; ε_r = 52.016; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

  Flat-Section MSL Band 2 hotspot/WCDMA Band 2 edge2 M/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.571 W/kg

  Flat-Section MSL Band 2 hotspot/WCDMA Band 2 edge2 M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 22.305 V/m; Power Drift = -0.19 dB
  Peak SAR (extrapolated) = 1.22 W/kg
  SAR(1 g) = 0.685 W/kg; SAR(10 g) = 0.356 W/kg
  Maximum value of SAR (measured) = 0.778 W/kg



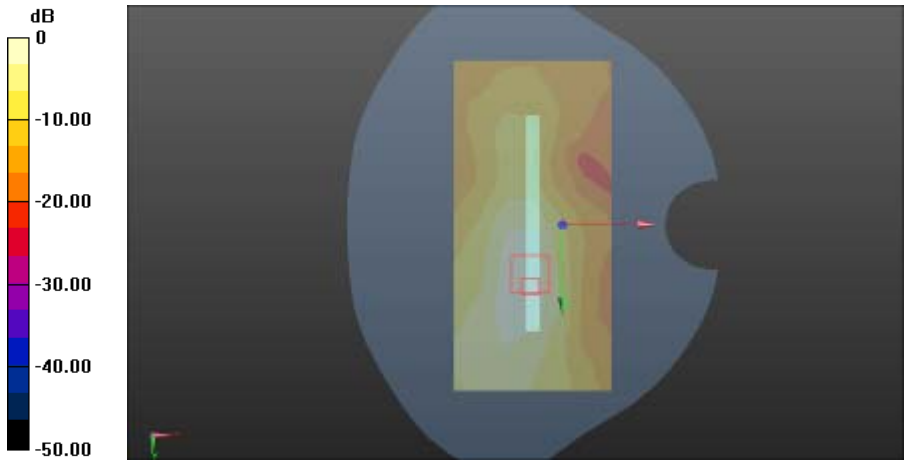
0 dB = 0.778 W/kg = -1.09 dBW/kg

FLAT	Edge3	**1880 MHz**

Communication System: UID 0, wcdma II (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.611 S/m; ε_r = 52.016; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)
  Flat-Section MSL Band 2 hotspot/WCDMA Band 2 edge3 M/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.0978 W/kg
  Flat-Section MSL Band 2 hotspot/WCDMA Band 2 edge3 M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 6.018 V/m; Power Drift = 0.06 dB
  Peak SAR (extrapolated) = 0.390 W/kg
  SAR(1 g) = 0.115 W/kg; SAR(10 g) = 0.049 W/kg
  Maximum value of SAR (measured) = 0.124 W/kg



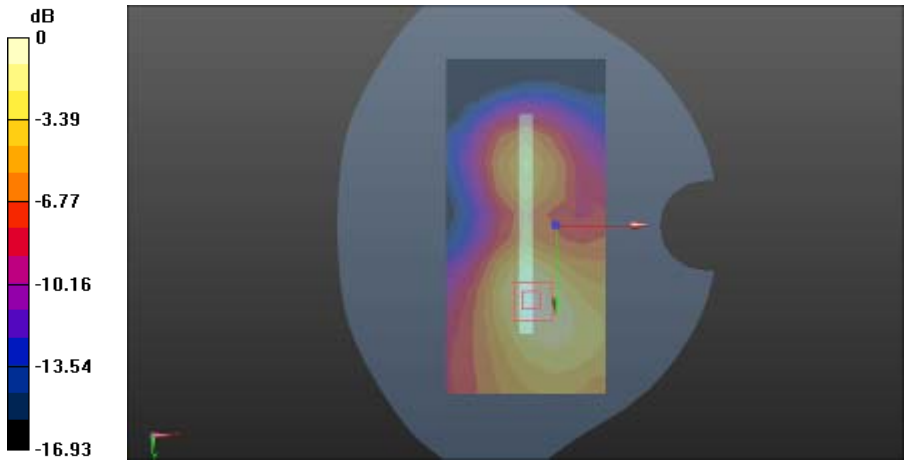
0 dB = 0.124 W/kg = -9.07 dBW/kg

FLAT	Edge4	**1880 MHz**

Communication System: UID 0, wcdma II (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.611 S/m; ε_r = 52.016; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.61, 4.61, 4.61); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1659; Type: QD000P40CD; Serial: TP:1659
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)
  Flat-Section MSL Band 2 hotspot/WCDMA Band 2 edge4 M/Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.106 W/kg
  Flat-Section MSL Band 2 hotspot/WCDMA Band 2 edge4 M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 4.431 V/m; Power Drift = -0.05 dB
  Peak SAR (extrapolated) = 0.179 W/kg
  SAR(1 g) = 0.107 W/kg; SAR(10 g) = 0.063 W/kg
  Maximum value of SAR (measured) = 0.117 W/kg



0 dB = 0.117 W/kg = -9.32 dBW/kg

WCDMA BAND5 (Head)

Left Side	Cheek	**836.6 MHz**

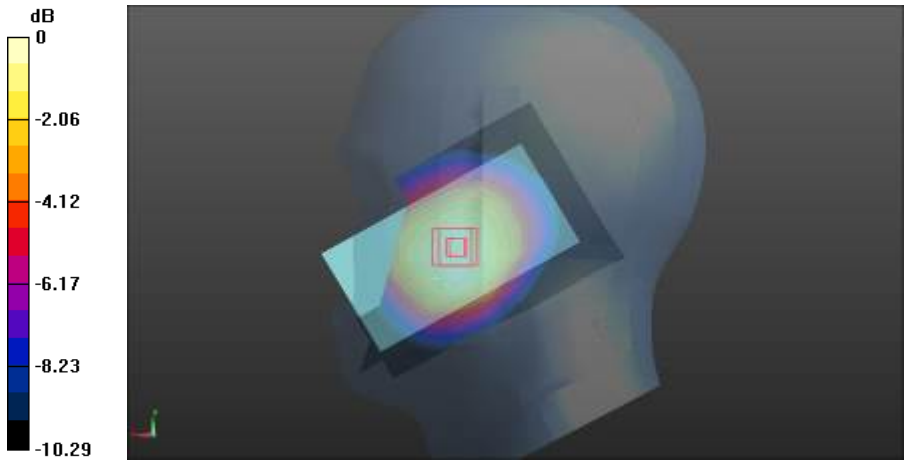
Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.98 S/m; ε_r = 42.097; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.08, 9.08, 9.08); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Head-Section Left HSL Band 5/WCDMA Band 5 touch M/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.135 W/kg

Head-Section Left HSL Band 5/WCDMA Band 5 touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.868 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.163 W/kg
SAR(1 g) = 0.129 W/kg; SAR(10 g) = 0.097 W/kg



0 dB = 0.135 W/kg = -8.70 dBW/kg

Left Side	Tilt	**836.6 MHz**

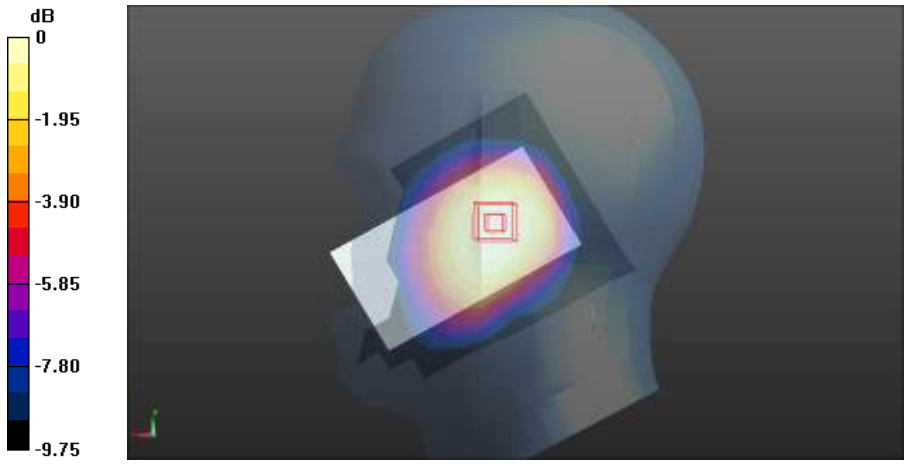
Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.98 S/m; ε_r = 42.097; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.08, 9.08, 9.08); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

  Head-Section Left HSL Band 5/WCDMA Band 5 tilt M/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.105 W/kg
  Head-Section Left HSL Band 5/WCDMA Band 5 tilt M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 7.996 V/m; Power Drift = 0.07 dB
  Peak SAR (extrapolated) = 0.129 W/kg
  SAR(1 g) = 0.102 W/kg; SAR(10 g) = 0.076 W/kg

  Maximum value of SAR (measured) = 0.107 W/kg



0 dB = 0.107 W/kg = -9.71 dBW/kg

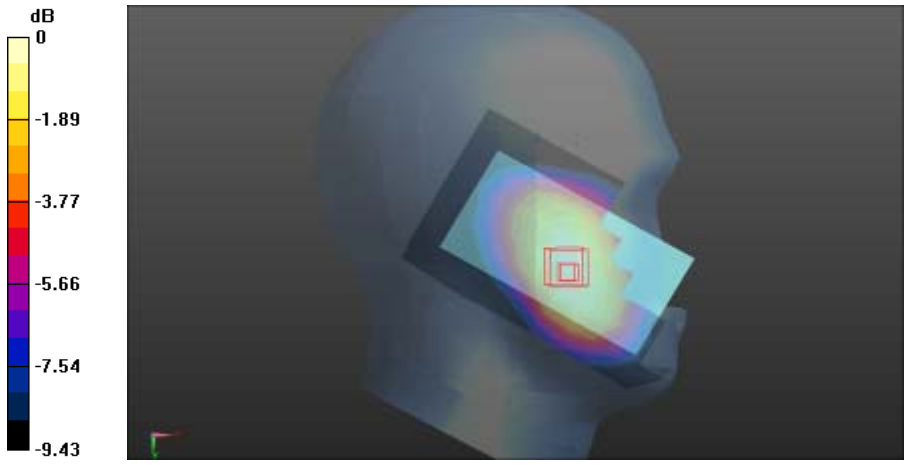
Right Side	Cheek	**836.6 MHz**

Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.98 S/m; ε_r = 42.097; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.08, 9.08, 9.08); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

  Head-Section Right HSL Band 5/WCDMA Band 5 touch M/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.135 W/kg
  Head-Section Right HSL Band 5/WCDMA Band 5 touch M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 4.516 V/m; Power Drift = -0.07 dB
  Peak SAR (extrapolated) = 0.167 W/kg
  SAR(1 g) = 0.126 W/kg; SAR(10 g) = 0.092 W/kg
  Maximum value of SAR (measured) = 0.133 W/kg



0 dB = 0.133 W/kg = -8.76 dBW/kg

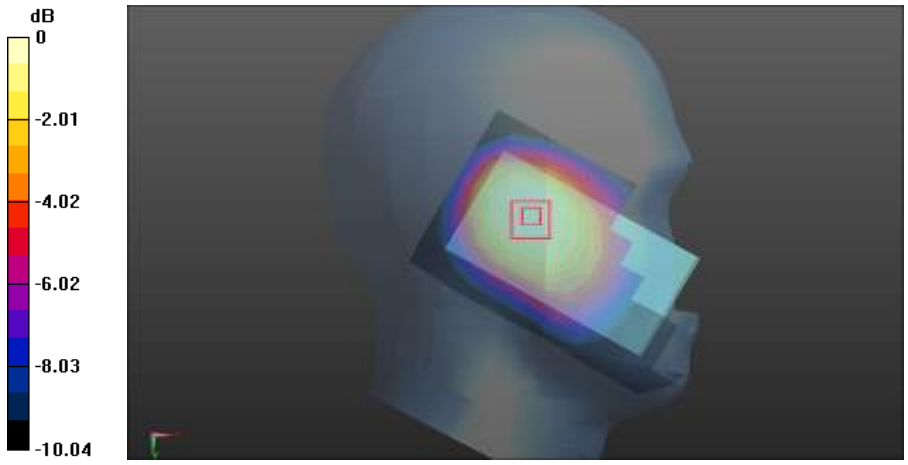
Right Side	Tile	**836.6 MHz**

Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.98 S/m; ε_r = 42.097; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.08, 9.08, 9.08); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1560; Type: SAM; Serial: 1560
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

  Head-Section Right HSL Band 5/WCDMA Band 5 tilt M/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.135 W/kg
  Head-Section Right HSL Band 5/WCDMA Band 5 tilt M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 9.188 V/m; Power Drift = 0.07 dB
  Peak SAR (extrapolated) = 0.165 W/kg
  SAR(1 g) = 0.125 W/kg; SAR(10 g) = 0.092 W/kg
  Maximum value of SAR (measured) = 0.133 W/kg



0 dB = 0.133 W/kg = -8.76 dBW/kg

WCDMA BAND5 (Flat)

FLAT	TP	**836.6 MHz**

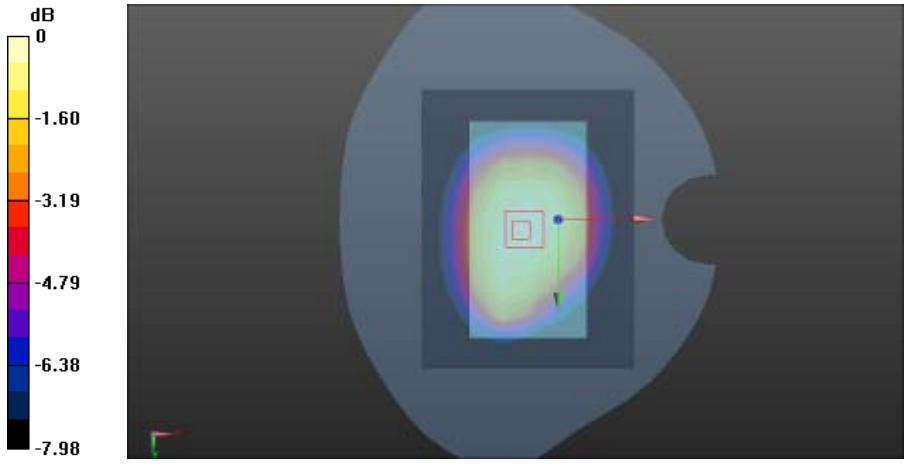
Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = -4.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL Band 5 TP/WCDMA Band 5 TP M/Area Scan (9x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.194 W/kg

Flat-Section MSL Band 5 TP/WCDMA Band 5 TP M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.169 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.246 W/kg
SAR(1 g) = 0.193 W/kg; SAR(10 g) = 0.149 W/kg
Maximum value of SAR (measured) = 0.202 W/kg



0 dB = 0.202 W/kg = -6.95 dBW/kg

FLAT	TG	**836.6 MHz**

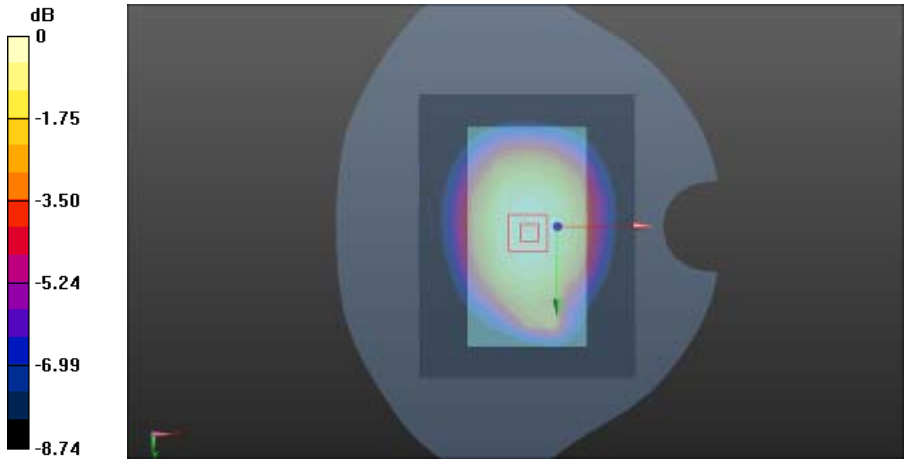
Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL Band 5 TG/WCDMA Band 5 TG M/Area Scan (9x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.250 W/kg

Flat-Section MSL Band 5 TG/WCDMA Band 5 TG M/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.126 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.306 W/kg
SAR(1 g) = 0.241 W/kg; SAR(10 g) = 0.184 W/kg
Maximum value of SAR (measured) = 0.252 W/kg



0 dB = 0.252 W/kg = -5.99 dBW/kg

FLAT	Edge2	**836.6 MHz**

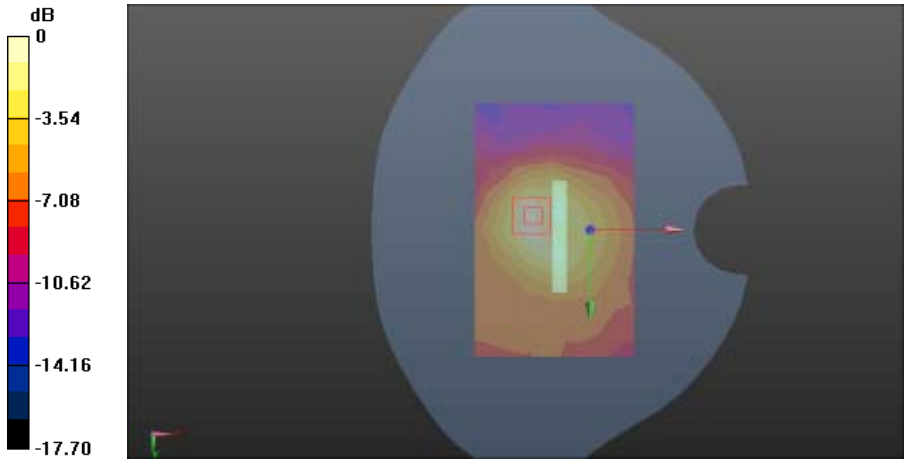
Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL Band 5 hot/WCDMA Band 5 edge 2/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0393 W/kg

Flat-Section MSL Band 5 hot/WCDMA Band 5 edge 2/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.969 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.0700 W/kg
SAR(1 g) = 0.038 W/kg; SAR(10 g) = 0.021 W/kg
Maximum value of SAR (measured) = 0.0427 W/kg



0 dB = 0.0427 W/kg = -13.70 dBW/kg

FLAT	Edge3	**836.6 MHz**

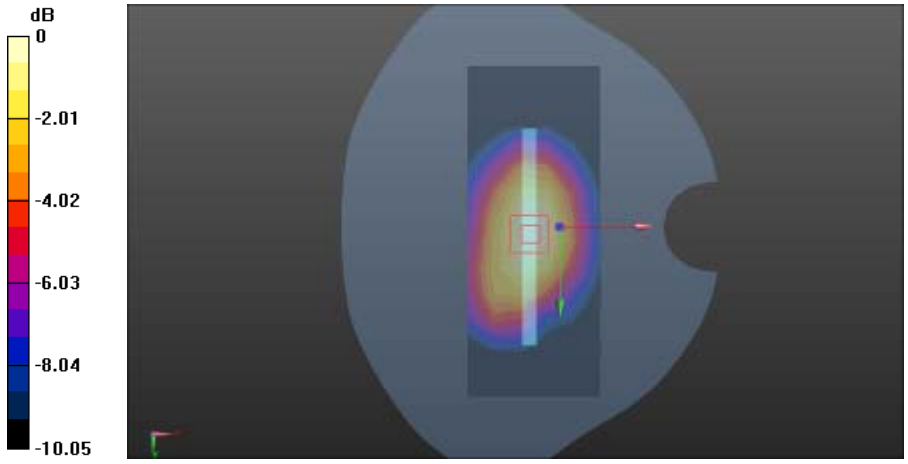
Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL Band 5 hot/WCDMA Band 5 edge 3/Area Scan (6x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.0678 W/kg

Flat-Section MSL Band 5 hot/WCDMA Band 5 edge 3/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.648 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.0990 W/kg
SAR(1 g) = 0.069 W/kg; SAR(10 g) = 0.047 W/kg
Maximum value of SAR (measured) = 0.0736 W/kg



0 dB = 0.0736 W/kg = -11.33 dBW/kg

FLAT	Edge4	**836.6 MHz**

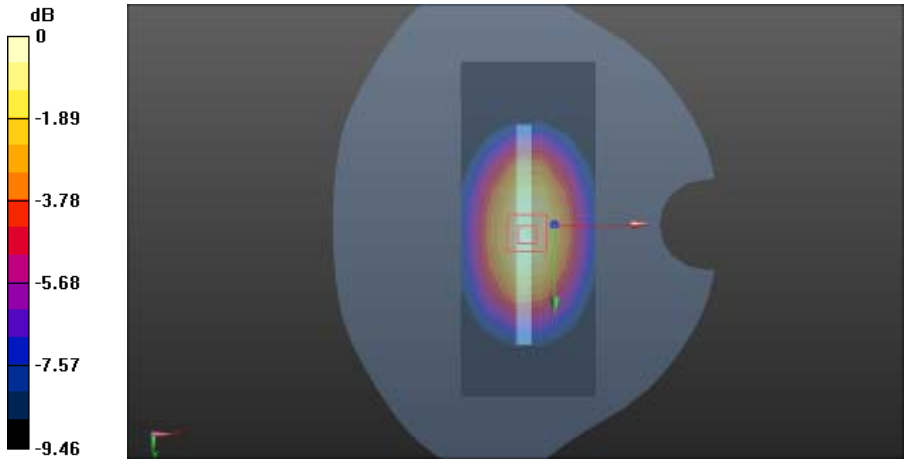
Communication System: UID 10011 - CAA, UMTS-FDD (WCDMA); Frequency: 836.6 MHz
Medium parameters used (extrapolated): f = 836.6 MHz; σ = 0.979 S/m; ε_r = 53.843; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE1528-2003)

DASY Configuration:

- Probe: EX3DV4 - SN3708; ConvF(9.07, 9.07, 9.07); Calibrated: 10/22/2013;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn546; Calibrated: 8/13/2013
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Flat-Section MSL Band 5 hot/WCDMA Band 5 edge 4/Area Scan (6x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.342 W/kg

Flat-Section MSL Band 5 hot/WCDMA Band 5 edge 4/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.769 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.518 W/kg
SAR(1 g) = 0.365 W/kg; SAR(10 g) = 0.252 W/kg
Maximum value of SAR (measured) = 0.389 W/kg



0 dB = 0.389 W/kg = -4.10 dBW/kg

Wi-Fi(Head)

Left Side	Cheek	**2462MHz**

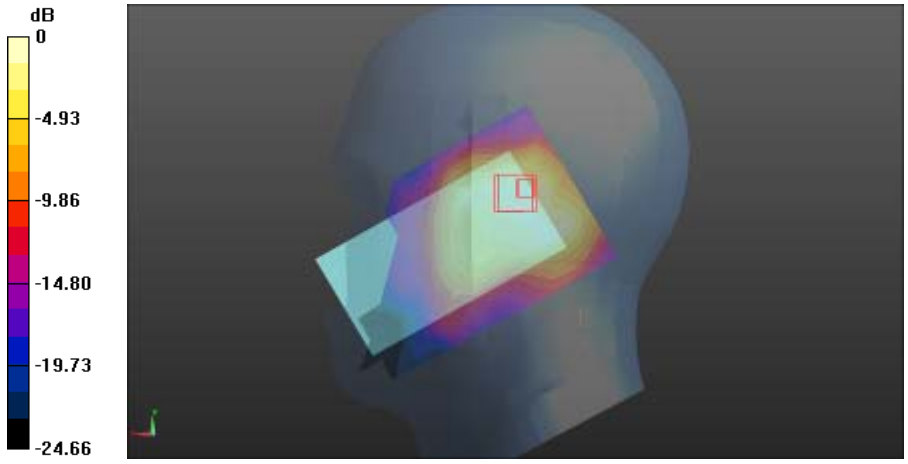
Communication System: UID 10012 - CAA, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2462 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.791 S/m; ε_r = 39.17; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.38, 4.38, 4.38); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1660; Type: QD000P40CD; Serial: TP:1660
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Head-Section Left HSL WIFI/WIFI touch H/Area Scan (8x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.145 W/kg

Head-Section Left HSL WIFI/WIFI touch H/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.769 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.242 W/kg
SAR(1 g) = 0.135 W/kg; SAR(10 g) = 0.073 W/kg
Maximum value of SAR (measured) = 0.147 W/kg



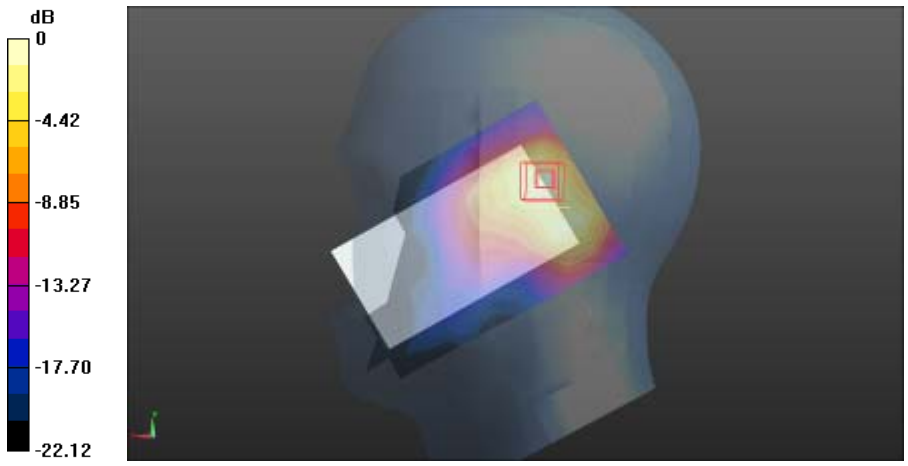
0 dB = 0.147 W/kg = -8.33 dBW/kg

Left Side	Tilt	**2462MHz**

Communication System: UID 10012 - CAA, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2462 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.791 S/m; ε_r = 39.17; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.38, 4.38, 4.38); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1660; Type: QD000P40CD; Serial: TP:1660
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)
  Head-Section Left HSL WIFI/WIFI tilt H/Area Scan (8x12x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.125 W/kg
  Head-Section Left HSL WIFI/WIFI tilt H/Zoom Scan (7x7x7)/Cube 0:
  Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 7.557 V/m; Power Drift = -0.12 dB
  Peak SAR (extrapolated) = 0.235 W/kg
  SAR(1 g) = 0.131 W/kg; SAR(10 g) = 0.068 W/kg
  Maximum value of SAR (measured) = 0.147 W/kg



0 dB = 0.147 W/kg = -8.33 dBW/kg

Right Side	Cheek	**2462MHz**

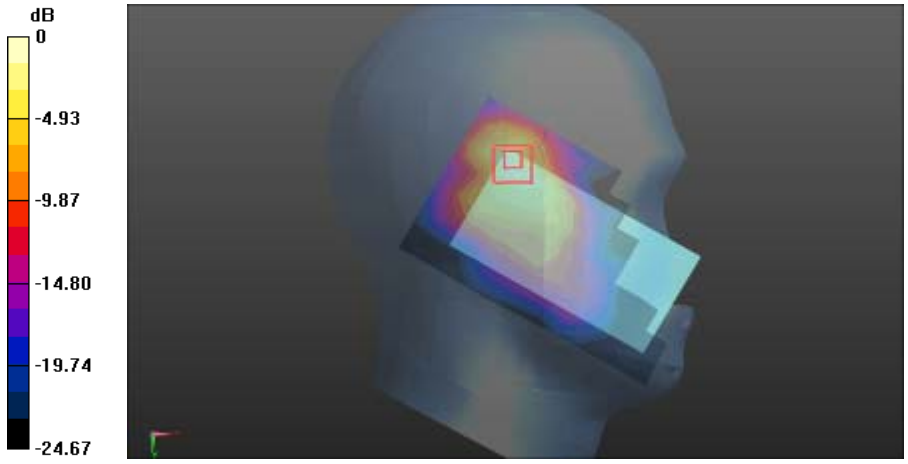
Communication System: UID 10012 - CAA, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2462 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.791 S/m; ε_r = 39.17; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.38, 4.38, 4.38); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1660; Type: QD000P40CD; Serial: TP:1660
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

  Head-Section Right HSL WIFI/WIFI touch H/Area Scan (8x12x1):
  Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.285 W/kg

  Head-Section Right HSL WIFI/WIFI touch H/Zoom Scan (7x7x7)/Cube 0:
  Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 7.724 V/m; Power Drift = 0.21 dB
  Peak SAR (extrapolated) = 0.758 W/kg
  SAR(1 g) = 0.319 W/kg; SAR(10 g) = 0.147 W/kg
  Maximum value of SAR (measured) = 0.361 W/kg



0 dB = 0.361 W/kg = -4.42 dBW/kg

Right Side	Tilt	**2462MHz**

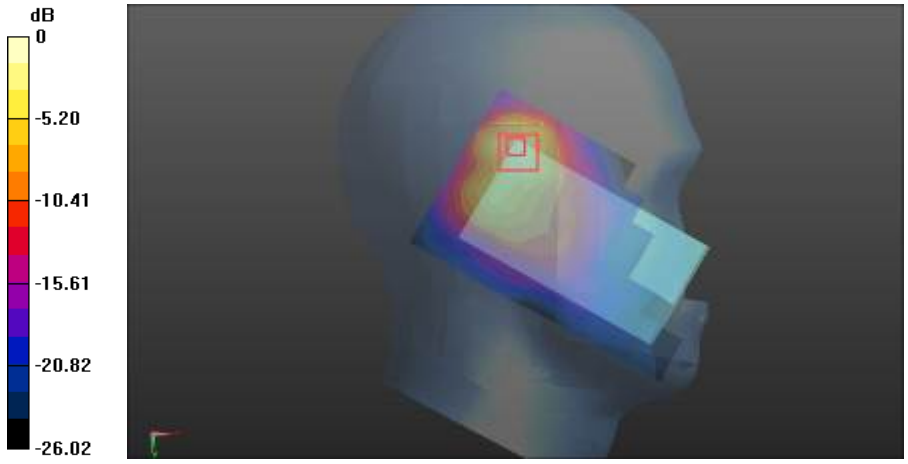
Communication System: UID 10012 - CAA, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2462 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.791 S/m; ε_r = 39.17; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.38, 4.38, 4.38); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1660; Type: QD000P40CD; Serial: TP:1660
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Head-Section Right HSL WIFI/WIFI tilt H/Area Scan (8x12x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.224 W/kg

Head-Section Right HSL WIFI/WIFI tilt H/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.034 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.626 W/kg
SAR(1 g) = 0.266 W/kg; SAR(10 g) = 0.115 W/kg
Maximum value of SAR (measured) = 0.297 W/kg



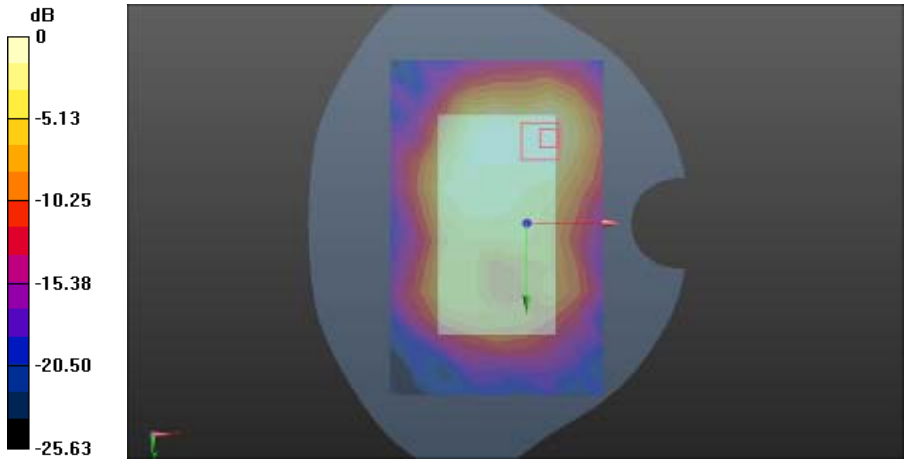
0 dB = 0.297 W/kg = -5.27 dBW/kg

FLAT	TP	**2462MHz**

Communication System: UID 10012 - CAA, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2462 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.968 S/m; ε_r = 51.852; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.07, 4.07, 4.07); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1660; Type: QD000P40CD; Serial: TP:1660
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)
  Flat-Section MSL WIFI TP/WIFI TP H/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.122 W/kg
  Flat-Section MSL WIFI TP/WIFI TP H/Zoom Scan (7x7x7)/Cube 0:
  Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 5.027 V/m; Power Drift = -0.05 dB
  Peak SAR (extrapolated) = 0.232 W/kg
  SAR(1 g) = 0.108 W/kg; SAR(10 g) = 0.057 W/kg
  Maximum value of SAR (measured) = 0.117 W/kg



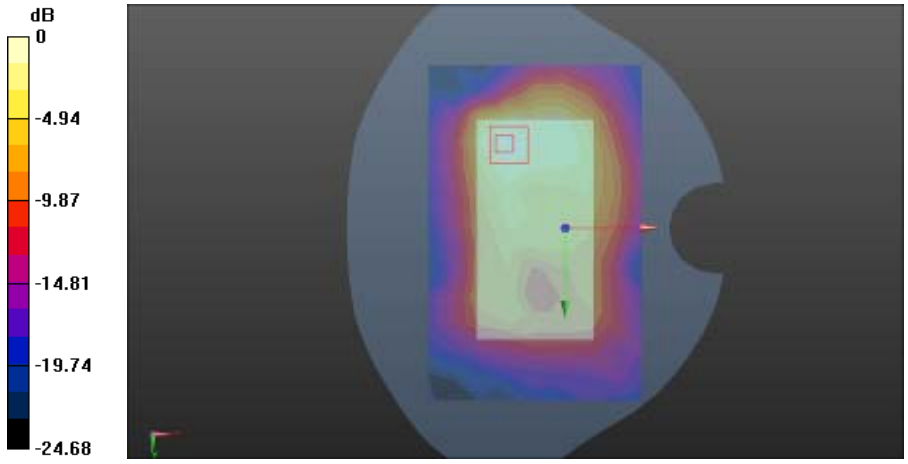
0 dB = 0.117 W/kg = -9.32 dBW/kg

FLAT	TG	**2462MHz**

Communication System: UID 10012 - CAA, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2462 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.968 S/m; ε_r = 51.852; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.07, 4.07, 4.07); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1660; Type: QD000P40CD; Serial: TP:1660
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)
  Flat-Section MSLWIFI TG/WIF TG H/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.148 W/kg
  Flat-Section MSLWIFI TG/WIF TG H/Zoom Scan (7x7x7)/Cube 0:
  Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 4.968 V/m; Power Drift = 0.06 dB
  Peak SAR (extrapolated) = 0.322 W/kg
  SAR(1 g) = 0.141 W/kg; SAR(10 g) = 0.069 W/kg
  Maximum value of SAR (measured) = 0.154 W/kg



0 dB = 0.154 W/kg = -8.12 dBW/kg

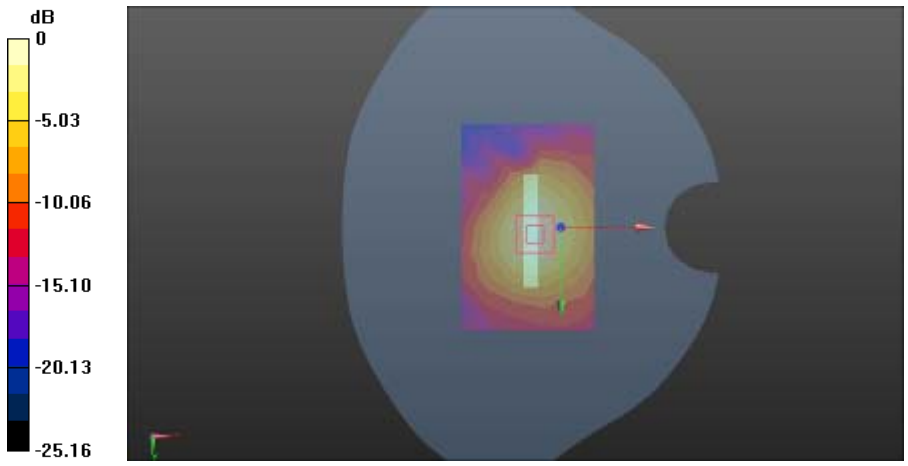
FLAT	Edge1	**2462 MHz**

Communication System: UID 10012 - CAA, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2462 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.968 S/m; ε_r = 51.852; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.07, 4.07, 4.07); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1660; Type: QD000P40CD; Serial: TP:1660
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

  Flat-Section MSLWIFI HOT/WIF H edge 1/Area Scan (6x9x1):
  Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.0752 W/kg
  Flat-Section MSLWIFI HOT/WIF H edge 1/Zoom Scan (7x7x7)/Cube 0:
  Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 6.307 V/m; Power Drift = -0.05 dB
  Peak SAR (extrapolated) = 0.150 W/kg
  SAR(1 g) = 0.074 W/kg; SAR(10 g) = 0.037 W/kg
  Maximum value of SAR (measured) = 0.0798 W/kg



0 dB = 0.0798 W/kg = -10.98 dBW/kg

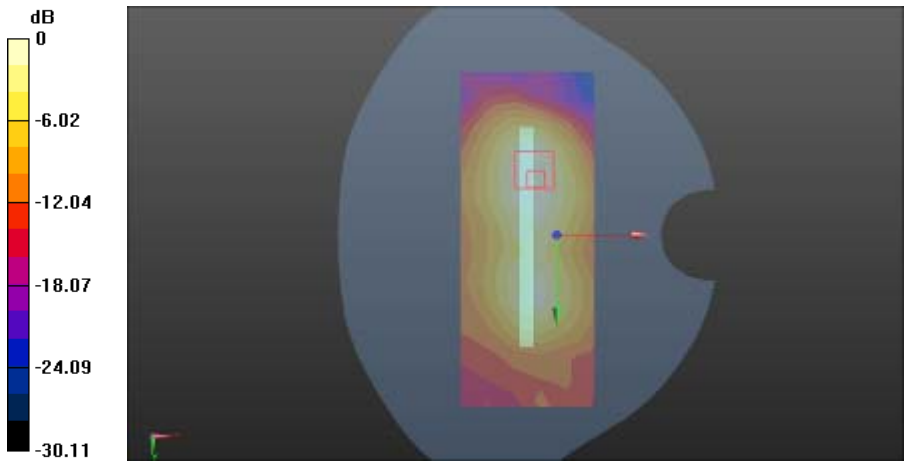
FLAT	Edge4	**2462 MHz**

Communication System: UID 10012 - CAA, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps);
Frequency: 2462 MHz;Duty Cycle: 1:1.53815
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.968 S/m; ε_r = 51.852; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3127; ConvF(4.07, 4.07, 4.07); Calibrated: 2013/8/21;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn725; Calibrated: 2013/10/16
- Phantom: SAM 1660; Type: QD000P40CD; Serial: TP:1660
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

  Flat-Section MSLWIFI HOT/WIF H edge 4/Area Scan (6x14x1):
  Measurement grid: dx=15mm, dy=15mm
  Maximum value of SAR (measured) = 0.0599 W/kg
  Flat-Section MSLWIFI HOT/WIF H edge 4/Zoom Scan (7x7x7)/Cube 0:
  Measurement grid: dx=5mm, dy=5mm, dz=5mm
  Reference Value = 4.037 V/m; Power Drift = -0.10 dB
  Peak SAR (extrapolated) = 0.129 W/kg
  SAR(1 g) = 0.059 W/kg; SAR(10 g) = 0.031 W/kg
  Maximum value of SAR (measured) = 0.0639 W/kg



0 dB = 0.0639 W/kg = -11.94 dBW/kg

APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S)

ES3DV3 – SN:3127

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

S Schweizerischer Kalibrierdienst
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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: SRTC (PTT)

Certificate No: ES3-3127_Aug13

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3127

Calibration procedure(s): QA CAL-01.v9, QA CAL-12.v8, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: August 21, 2013

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	04-Apr-13 (No. 217-01733)	Apr-14
Power sensor E4412A	MY41498087	04-Apr-13 (No. 217-01733)	Apr-14
Reference 3 dB Attenuator	SN: S5054 (3c)	04-Apr-13 (No. 217-01737)	Apr-14
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-13 (No. 217-01735)	Apr-14
Reference 30 dB Attenuator	SN: S5129 (30b)	04-Apr-13 (No. 217-01738)	Apr-14
Reference Probe ES3DV2	SN: 3013	28-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	31-Jan-13 (No. DAE4-660_Jan13)	Jan-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-15
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 21, 2013

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: ES3-3127_Aug13 Page 1 of 11

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

S C S Schweizerischer Kalibrierdienst
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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
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
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 affect 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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *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:3127

Manufactured: July 11, 2006
Calibrated: August 21, 2013

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

ES3DV3– SN:3127 August 21, 2013

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3127

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.30	1.27	1.22	± 10.1 %
DCP (mV)[B]	100.8	99.1	100.7	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	159.5	±1.9 %
		Y	0.0	0.0	1.0		151.6	
		Z	0.0	0.0	1.0		156.8	
10012-CAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	X	3.48	71.8	20.4	1.87	127.7	±0.7 %
		Y	2.99	68.6	18.8		124.8	
		Z	3.48	71.7	20.3		125.6	
10032-CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	X	16.63	99.3	22.9	1.16	110.0	±1.7 %
		Y	46.36	99.5	20.7		148.9	
		Z	66.77	99.8	19.8		149.9	
10100-CAB	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	X	6.76	68.5	20.3	5.67	142.2	±1.2 %
		Y	6.71	68.4	20.4		137.1	
		Z	6.76	68.5	20.3		140.0	
10108-CAB	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	X	6.68	68.2	20.3	5.80	140.3	±1.4 %
		Y	6.64	68.2	20.4		136.0	
		Z	6.62	68.0	20.2		137.6	
10154-CAB	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	X	6.33	67.5	20.0	5.75	137.4	±1.2 %
		Y	6.26	67.4	20.1		133.1	
		Z	6.26	67.4	19.9		133.7	
10169-CAB	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	X	5.13	66.8	19.8	5.73	119.7	±0.9 %
		Y	5.09	66.7	19.9		116.9	
		Z	5.09	66.6	19.8		116.9	
10175-CAB	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	X	5.18	67.1	20.0	5.72	117.5	±1.2 %
		Y	5.12	66.9	20.0		116.9	
		Z	5.05	66.7	19.7		116.9	
10297-AAA	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	X	6.64	68.0	20.2	5.81	138.2	±1.2 %
		Y	6.70	68.3	20.5		136.9	
		Z	6.60	68.0	20.2		137.5	

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 Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Certificate No: ES3-3127_Aug13 Page 4 of 11

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3127

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	6.62	6.62	6.62	0.17	2.02	± 13.4 %
750	41.9	0.89	6.22	6.22	6.22	0.80	1.15	± 12.0 %
900	41.5	0.97	5.87	5.87	5.87	0.26	2.13	± 12.0 %
1810	40.0	1.40	5.01	5.01	5.01	0.69	1.29	± 12.0 %
2000	40.0	1.40	4.96	4.96	4.96	0.59	1.36	± 12.0 %
2450	39.2	1.80	4.38	4.38	4.38	0.80	1.24	± 12.0 %
2600	39.0	1.96	4.21	4.21	4.21	0.80	1.28	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3127

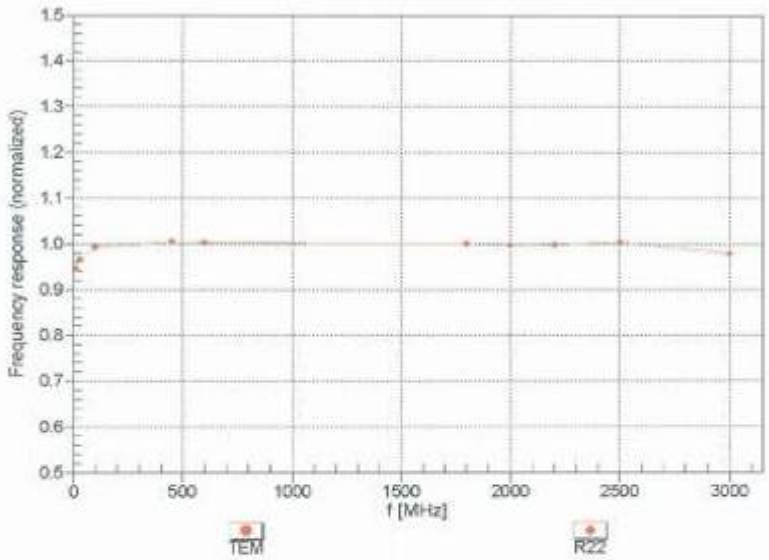
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [G]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	6.84	6.84	6.84	0.11	1.70	± 13.4 %
750	55.5	0.96	5.82	5.82	5.82	0.33	1.86	± 12.0 %
900	55.0	1.05	5.70	5.70	5.70	0.57	1.39	± 12.0 %
1810	53.3	1.52	4.61	4.61	4.61	0.39	1.81	± 12.0 %
2000	53.3	1.52	4.57	4.57	4.57	0.56	1.53	± 12.0 %
2450	52.7	1.95	4.07	4.07	4.07	0.80	1.13	± 12.0 %
2600	52.5	2.16	3.89	3.89	3.89	0.80	0.98	± 12.0 %

[G] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ES3DV3– SN:3127 August 21, 2013

Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



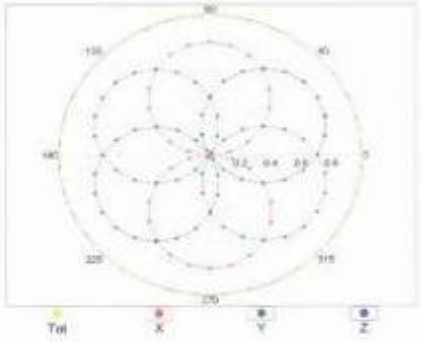
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

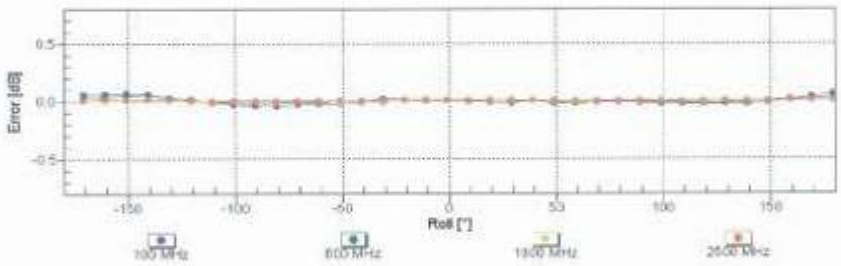
ES3DV3- SN:3127 August 21, 2013

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

f=1800 MHz,R22



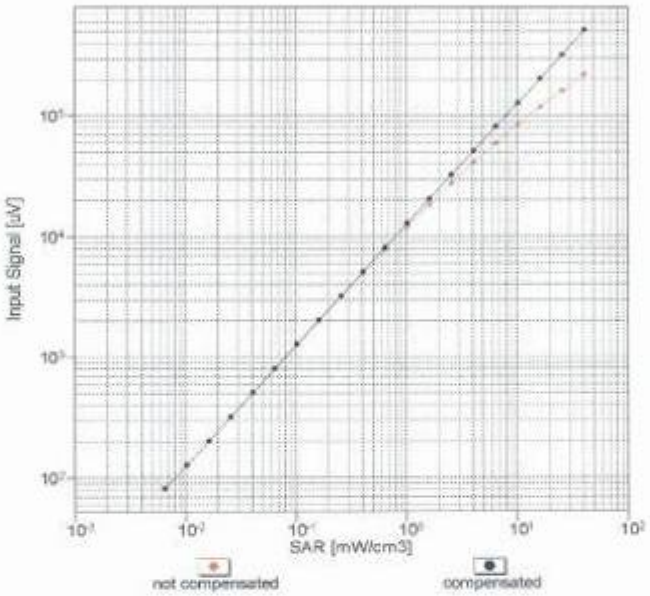


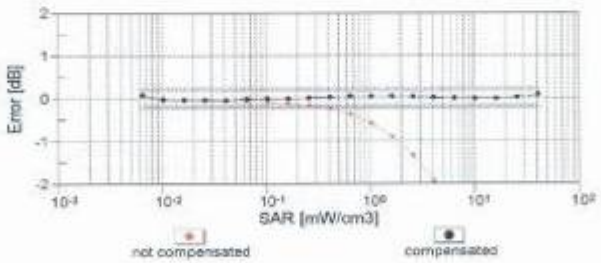
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Certificate No: ES3-3127_Aug13 Page 8 of 11

ES3DV3– SN:3127 August 21, 2013

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)





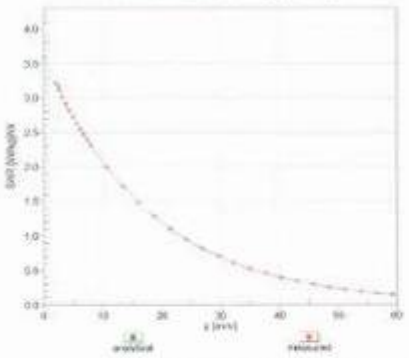
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: ES3-3127_Aug13 Page 9 of 11

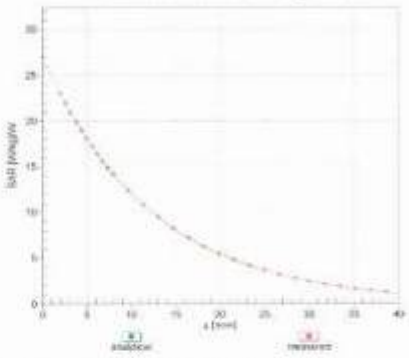
ES3DV3– SN:3127 August 21, 2013

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

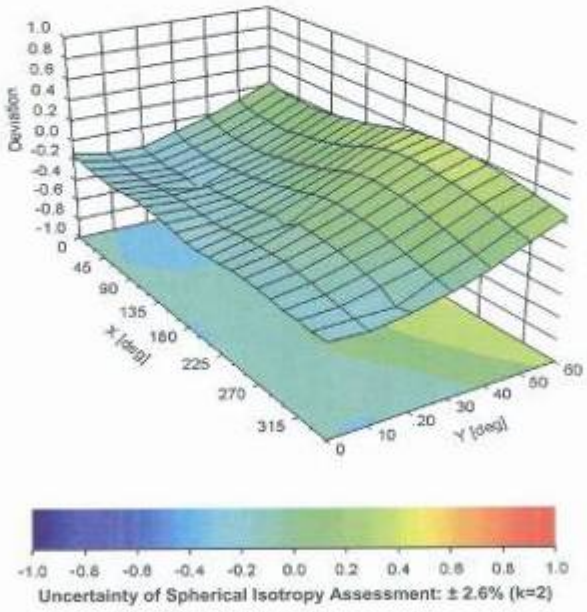


f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

Certificate No: ES3-3127_Aug13 Page 10 of 11

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3127

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-20.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

EX3DV4 – SN:3708

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

S Schweizerischer Kalibrierdienst
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Accreditation No.: SCS 108

Client: SRTC (PTT)

Certificate No: EX3-3708_Oct13

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3708

Calibration procedure(s): QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: October 22, 2013

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	04-Apr-13 (No. 217-01733)	Apr-14
Power sensor E4412A	MY41498087	04-Apr-13 (No. 217-01733)	Apr-14
Reference 3 dB Attenuator	SN: S5054 (3c)	04-Apr-13 (No. 217-01737)	Apr-14
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-13 (No. 217-01735)	Apr-14
Reference 30 dB Attenuator	SN: S5129 (30b)	04-Apr-13 (No. 217-01738)	Apr-14
Reference Probe ES3DV2	SN: 3013	28-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	4-Sep-13 (No. DAE4-660_Sep13)	Sep-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-15
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 23, 2013

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: EX3-3708_Oct13 Page 1 of 11

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

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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
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
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
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
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 affect 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 with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR*: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z*: *A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *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.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Certificate No: EX3-3708_Oct13 Page 2 of 11

Probe EX3DV4

SN:3708

Manufactured: July 21, 2009
Calibrated: October 22, 2013

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

EX3DV4- SN:3708 October 22, 2013

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.19	0.35	0.44	± 10.1 %
DCP (mV)[B]	105.2	99.0	105.1	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	158.0	±3.8 %
		Y	0.0	0.0	1.0		177.5	
		Z	0.0	0.0	1.0		144.5	
10011-CAA	UMTS-FDD (WCDMA)	X	3.93	72.1	21.9	2.91	120.3	±1.2 %
		Y	3.09	64.4	16.5		139.7	
		Z	3.78	70.0	20.0		113.5	
10021-DAA	GSM-FDD (TDMA, GMSK)	X	1.13	61.4	11.3	9.39	61.2	±1.9 %
		Y	1.65	61.0	11.2		72.5	
		Z	2.53	67.9	14.5		111.9	
10028-DAA	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	X	21.01	99.6	21.5	3.55	116.9	±2.2 %
		Y	1.24	65.5	11.2		135.6	
		Z	37.27	99.5	21.1		112.4	
10058-DAA	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	X	4.47	76.5	24.9	6.52	147.4	±1.4 %
		Y	4.06	70.1	20.4		133.6	
		Z	5.21	76.7	24.0		114.0	
10062-CAA	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	X	9.94	67.8	21.0	8.68	113.4	±2.7 %
		Y	10.10	68.1	20.9		133.0	
		Z	9.76	68.0	21.2		105.2	
10081-CAA	CDMA2000 (1xRTT, RC3)	X	4.05	68.2	20.2	3.97	114.6	±0.9 %
		Y	3.68	64.0	16.8		134.3	
		Z	4.05	67.4	19.3		110.2	
10097-CAA	UMTS-FDD (HSDPA)	X	4.82	68.3	19.9	3.98	127.3	±0.9 %
		Y	4.49	65.3	17.3		149.4	
		Z	4.85	68.1	19.3		121.5	
10098-CAA	UMTS-FDD (HSUPA, Subtest 2)	X	4.80	68.3	19.8	3.98	127.8	±0.9 %
		Y	4.50	65.4	17.4		149.2	
		Z	4.90	68.4	19.5		123.0	
10403-AAA	CDMA2000 (1xEV-DO, Rev. 0)	X	6.17	75.3	22.4	3.76	120.1	±1.2 %
		Y	4.52	67.1	17.5		140.2	
		Z	5.92	73.3	21.0		116.0	

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 Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
900	41.5	0.97	9.08	9.08	9.08	0.23	1.20	± 12.0 %
1810	40.0	1.40	7.87	7.87	7.87	0.69	0.63	± 12.0 %
2000	40.0	1.40	7.86	7.86	7.86	0.76	0.57	± 12.0 %
2450	39.2	1.80	7.10	7.10	7.10	0.40	0.77	± 12.0 %
5200	36.0	4.66	5.52	5.52	5.52	0.30	1.80	± 13.1 %
5300	35.9	4.76	5.17	5.17	5.17	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.86	4.86	4.86	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.55	4.55	4.55	0.45	1.80	± 13.1 %
5800	35.3	5.27	4.81	4.81	4.81	0.40	1.80	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

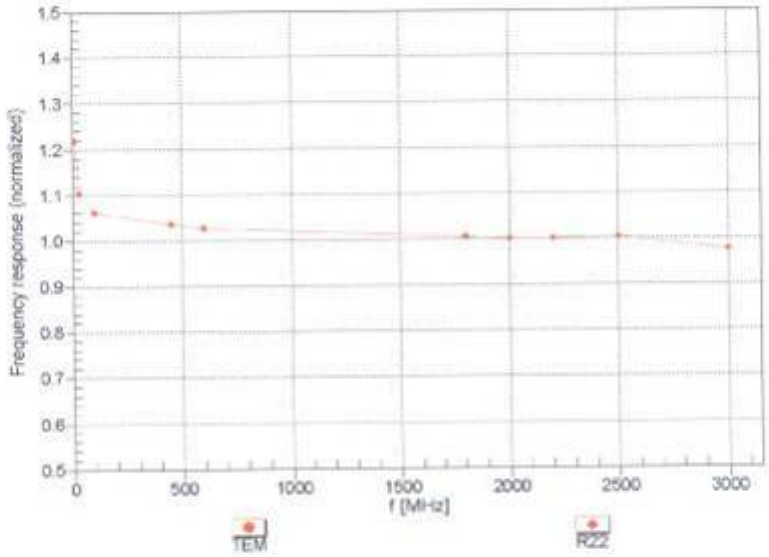
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
900	55.0	1.05	9.07	9.07	9.07	0.80	0.59	± 12.0 %
1810	53.3	1.52	7.69	7.69	7.69	0.42	0.92	± 12.0 %
2000	53.3	1.52	7.63	7.63	7.63	0.48	0.82	± 12.0 %
2450	52.7	1.95	7.12	7.12	7.12	0.72	0.65	± 12.0 %
5200	49.0	5.30	4.49	4.49	4.49	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.33	4.33	4.33	0.45	1.90	± 13.1 %
5500	48.6	5.65	3.94	3.94	3.94	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.70	3.70	3.70	0.55	1.90	± 13.1 %
5800	48.2	6.00	4.25	4.25	4.25	0.45	1.90	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

EX3DV4- SN:3708 October 22, 2013

Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)

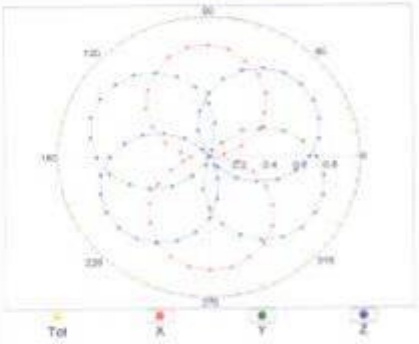


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

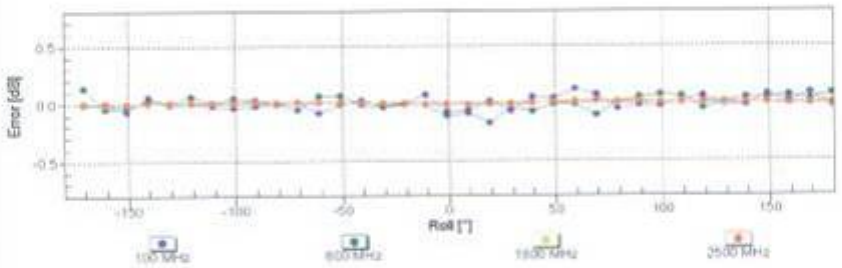
EX3DV4- SN:3708 October 22, 2013

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



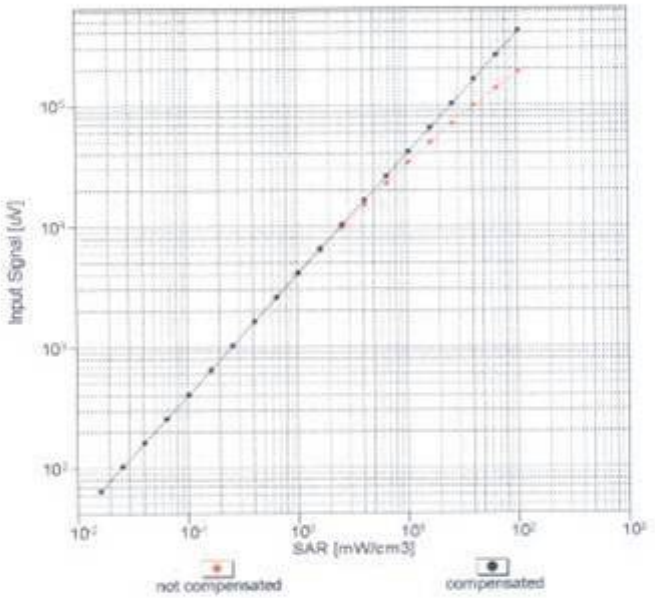
f=1800 MHz,R22

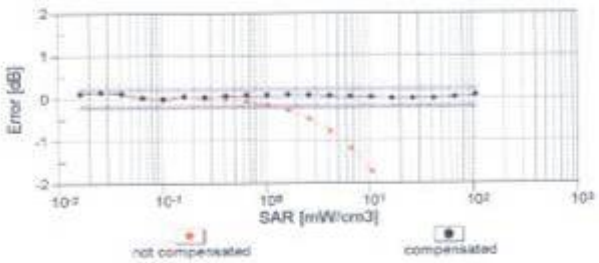


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4– SN:3708 October 22, 2013

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)



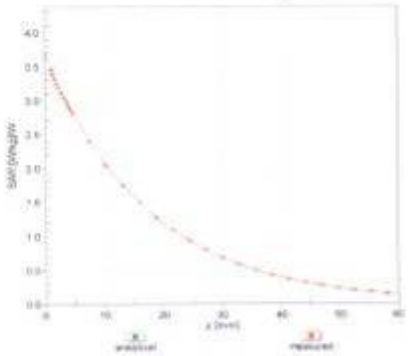


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

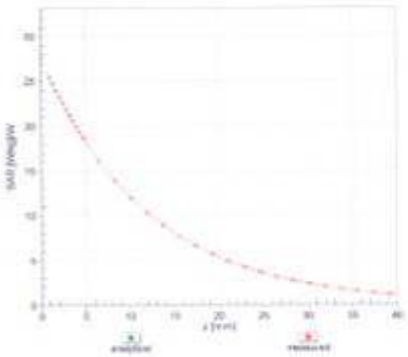
EX3DV4– SN:3708 October 22, 2013

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

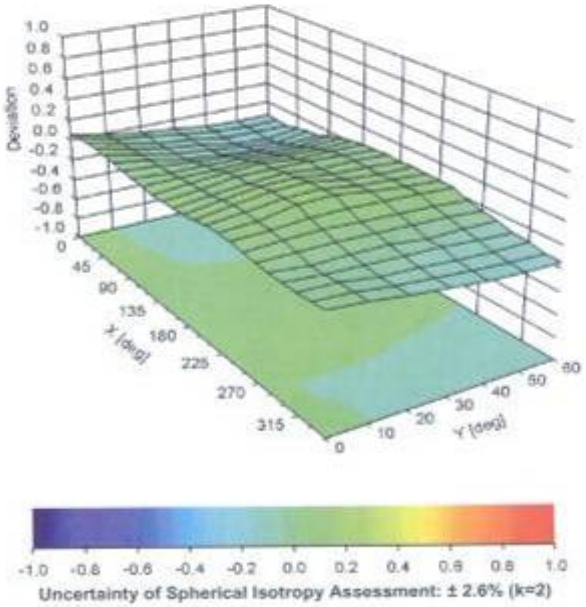


f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3708

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-0.9
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

APPENDIX D: RELEVANT PAGES FROM DAE REPORT(S)

DAE4 – SN:546

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com

IMPORTANT NOTICE

USAGE OF THE DAE 4

The DAE unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE. Special attention shall be given to the following points:

Battery Exchange: The battery cover of the DAE4 unit is closed using a screw, over tightening the screw may cause the threads inside the DAE to wear out.

Shipping of the DAE: Before shipping the DAE to SPEAG for calibration, remove the batteries and pack the DAE in an antistatic bag. This antistatic bag shall then be packed into a larger box or container which protects the DAE from impacts during transportation. The package shall be marked to indicate that a fragile instrument is inside.

E-Stop Failures: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, the customer shall always mount the probe to the DAE carefully and keep the DAE unit in a non-dusty environment if not used for measurements.

Repair: Minor repairs are performed at no extra cost during the annual calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect.

DASY Configuration Files: Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MOhm is given in the corresponding configuration file.

Important Note:
Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer.

Important Note:
Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the annual calibration procedure.

Important Note:
To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE.

Schmid & Partner Engineering

TN_BR040315AD DAE4.doc 11.12.2009

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

Client SRTC (PTT)

Certificate No: DAE4-546_Aug13

CALIBRATION CERTIFICATE

Object: DAE4 - SD 000 D04 BJ - SN: 546

Calibration procedure(s): QA CAL-06.v26
Calibration procedure for the data acquisition electronics (DAE)

Calibration date: August 13, 2013

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
Keithley Multimeter Type 2001	SN: 0810278	02-Oct-12 (No:12728)	Oct-13
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	07-Jan-13 (in house check)	In house check: Jan-14
Calibrator Box V2.1	SE UMS 006 AA 1002	07-Jan-13 (in house check)	In house check: Jan-14

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	

Issued: August 13, 2013

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: DAE4-546_Aug13 Page 1 of 5

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
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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

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity*: Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

Certificate No: DAE4-546_Aug13 Page 2 of 5

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	405.328 ± 0.02% (k=2)	404.086 ± 0.02% (k=2)	404.194 ± 0.02% (k=2)
Low Range	3.96769 ± 1.50% (k=2)	3.95711 ± 1.50% (k=2)	3.97853 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	240.0 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199990.29	-7.32	-0.00
Channel X	+ Input	19999.70	-1.11	-0.01
Channel X	- Input	-19995.30	5.53	-0.03
Channel Y	+ Input	199995.55	-1.80	-0.00
Channel Y	+ Input	19998.41	-2.41	-0.01
Channel Y	- Input	-20000.36	0.57	-0.00
Channel Z	+ Input	199994.26	-3.48	-0.00
Channel Z	+ Input	19997.97	-2.83	-0.01
Channel Z	- Input	-20000.68	0.28	-0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.85	-0.09	-0.00
Channel X	+ Input	201.93	0.64	0.32
Channel X	- Input	-198.79	-0.22	0.11
Channel Y	+ Input	2000.76	-0.22	-0.01
Channel Y	+ Input	201.38	0.03	0.01
Channel Y	- Input	-199.43	-0.79	0.40
Channel Z	+ Input	2000.70	-0.32	-0.02
Channel Z	+ Input	200.28	-0.98	-0.49
Channel Z	- Input	-199.76	-1.10	0.55

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	1.78	-0.47
	- 200	1.25	-0.47
Channel Y	200	-0.34	-0.32
	- 200	-0.87	-1.34
Channel Z	200	1.69	1.71
	- 200	-4.92	-4.44

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-2.82	-3.89
Channel Y	200	8.88	-	-0.80
Channel Z	200	4.65	7.29	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15841	16095
Channel Y	16161	15583
Channel Z	15907	16498

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.58	-0.74	1.64	0.39
Channel Y	-0.12	-1.00	0.71	0.38
Channel Z	-0.95	-1.81	-0.10	0.34

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+8	+14
Supply (- Vcc)	-0.01	-8	-9

DAE4 – SN:725

Schmid & Partner Engineering AG
s p e a g
Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com

IMPORTANT NOTICE

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The DAE unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE. Special attention shall be given to the following points:

Battery Exchange: The battery cover of the DAE4 unit is closed using a screw, over tightening the screw may cause the threads inside the DAE to wear out.

Shipping of the DAE: Before shipping the DAE to SPEAG for calibration, remove the batteries and pack the DAE in an antistatic bag. This antistatic bag shall then be packed into a larger box or container which protects the DAE from impacts during transportation. The package shall be marked to indicate that a fragile instrument is inside.

E-Stop Failures: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, the customer shall always mount the probe to the DAE carefully and keep the DAE unit in a non-dusty environment if not used for measurements.

Repair: Minor repairs are performed at no extra cost during the annual calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect.

DASY Configuration Files: Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MOhm is given in the corresponding configuration file.

Important Note:
Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer.

Important Note:
Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the annual calibration procedure.

Important Note:
To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE.

Schmid & Partner Engineering

TN_BR040315AD DAE4.doc 11.12.2009

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

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Accreditation No.: SCS 108

Client SRTC (PTT) Certificate No: DAE4-725_Oct13

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BM - SN: 725
Calibration procedure(s)	QA CAL-06.v26 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	October 16, 2013

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
Keithley Multimeter Type 2001	SN: 0810278	01-Oct-13 (No:13976)	Oct-14
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	07-Jan-13 (in house check)	In house check: Jan-14
Calibrator Box V2.1	SE UMS 006 AA 1002	07-Jan-13 (in house check)	In house check: Jan-14

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	

Issued: October 16, 2013

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Certificate No: DAE4-725_Oct13 Page 1 of 5

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Accreditation No.: SCS 108

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.107 ± 0.02% (k=2)	404.862 ± 0.02% (k=2)	404.426 ± 0.02% (k=2)
Low Range	3.93439 ± 1.50% (k=2)	3.99085 ± 1.50% (k=2)	3.96524 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	235.0 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199996.65	0.05	0.00
Channel X	+ Input	20003.59	3.75	0.02
Channel X	- Input	-19997.82	4.23	-0.02
Channel Y	+ Input	199994.93	-1.46	-0.00
Channel Y	+ Input	20002.73	2.97	0.01
Channel Y	- Input	-19998.49	3.54	-0.02
Channel Z	+ Input	199994.66	-2.16	-0.00
Channel Z	+ Input	20002.40	2.70	0.01
Channel Z	- Input	-20001.28	0.81	-0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	1999.29	-0.66	-0.03
Channel X	+ Input	200.69	0.47	0.23
Channel X	- Input	-199.26	0.32	-0.16
Channel Y	+ Input	1999.88	0.10	0.01
Channel Y	+ Input	199.71	-0.36	-0.18
Channel Y	- Input	-200.66	-1.10	0.55
Channel Z	+ Input	1999.26	-0.38	-0.02
Channel Z	+ Input	201.34	1.21	0.61
Channel Z	- Input	-200.66	-0.96	0.48

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	11.22	8.82
	- 200	-6.67	-9.07
Channel Y	200	-10.26	-10.66
	- 200	9.67	9.25
Channel Z	200	-3.08	-3.40
	- 200	2.52	2.46

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-1.84	-3.15
Channel Y	200	8.55	-	-0.38
Channel Z	200	5.04	4.95	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16153	13986
Channel Y	16197	15238
Channel Z	16104	14928

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	1.14	0.26	2.74	0.41
Channel Y	-0.99	-2.06	0.58	0.53
Channel Z	0.03	-0.95	0.90	0.41

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

APPENDIX E: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)

D835V2 – SN:4d023

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Accreditation No.: SCS 108

Client SRTC (PTT)

Certificate No: D835V2-4d023_Oct13

CALIBRATION CERTIFICATE

Object: D835V2 - SN: 4d023

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: October 22, 2013

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 EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-15
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Israa El-Naouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 22, 2013

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Certificate No: D835V2-4d023_Oct13 Page 1 of 8

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
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
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.2 ± 6 %	0.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.47 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.15 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.5 ± 6 %	1.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.39 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.28 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.14 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.8 Ω - 2.6 jΩ
Return Loss	- 28.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.5 Ω - 3.8 jΩ
Return Loss	- 27.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.390 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 17, 2004

DASY5 Validation Report for Head TSL

Date: 18.10.2013

Test Laboratory: SPEAG, Zurich, Switzerland

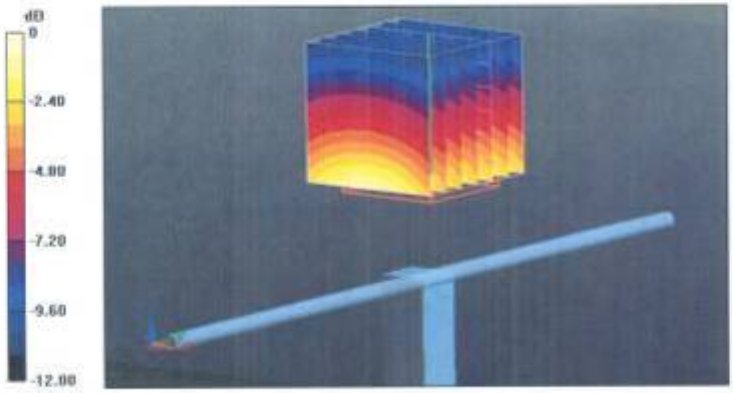
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d023

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.93 S/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

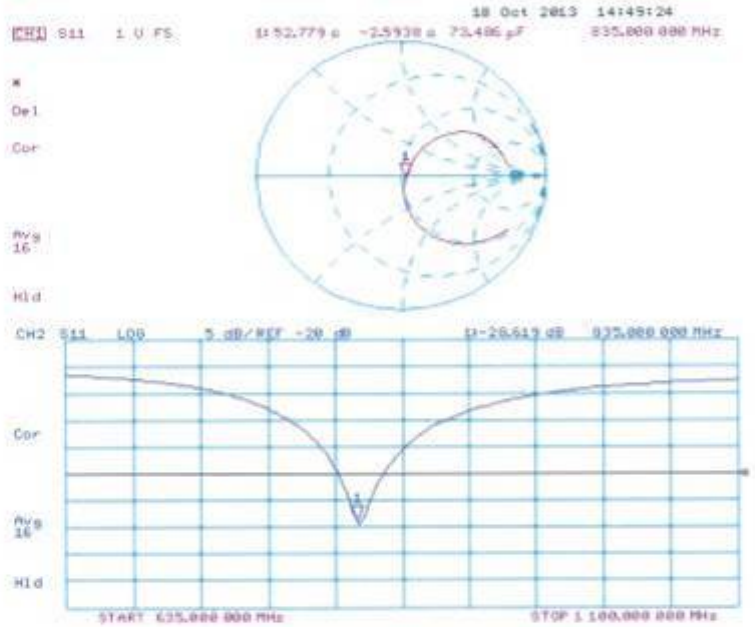
- Probe: ES3DV3 - SN3205; ConvF(6.05, 6.05, 6.05); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.083 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.67 W/kg
SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 2.84 W/kg



0 dB = 2.84 W/kg = 4.53 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.10.2013

Test Laboratory: SPEAG, Zurich, Switzerland

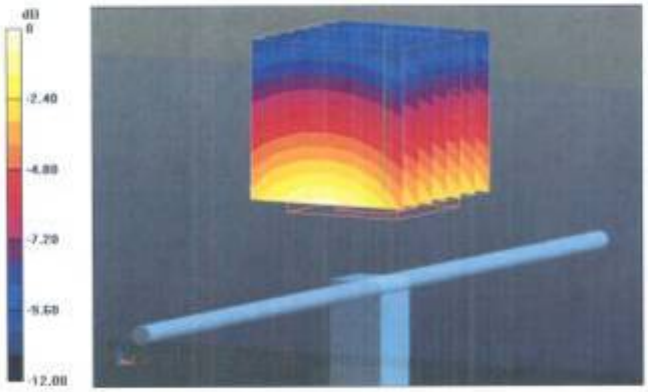
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d023

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.005 S/m; ε_r = 54.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

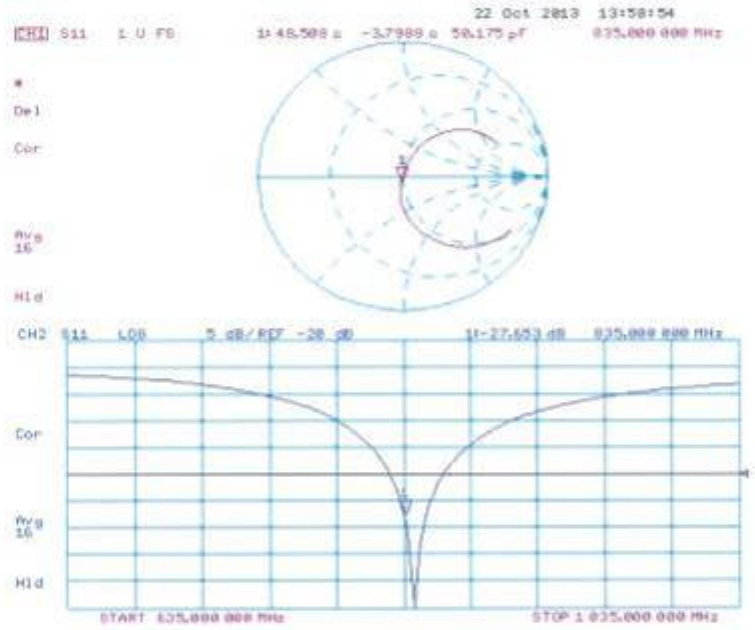
- Probe: ES3DV3 - SN3205; ConvF(6.04, 6.04, 6.04); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.083 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 3.52 W/kg
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 2.79 W/kg



0 dB = 2.79 W/kg = 4.46 dBW/kg

Impedance Measurement Plot for Body TSL



D1900V2 – SN:5d113

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Accreditation No.: SCS 108

Client SRTC (PTT)

Certificate No: D1900V2-5d113_Oct13

CALIBRATION CERTIFICATE

Object: D1900V2 - SN: 5d113

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: October 16, 2013

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 EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-15
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 16, 2013

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Certificate No: D1900V2-5d113_Oct13 Page 1 of 8

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
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
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Certificate No: D1900V2-5d113_Oct13 Page 2 of 8

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.6 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.0 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.27 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.3 ± 6 %	1.49 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.37 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.6 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.8 Ω + 6.4 jΩ
Return Loss	- 23.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.8 Ω + 6.7 jΩ
Return Loss	- 22.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 24, 2009

DASY5 Validation Report for Head TSL

Date: 16.10.2013

Test Laboratory: SPEAG, Zurich, Switzerland

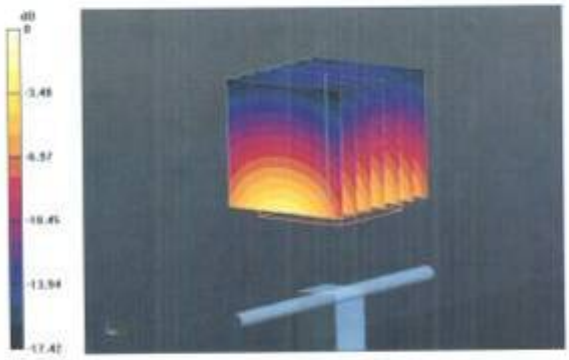
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d113

Communication System: UID 0 - CW ; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.37 S/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

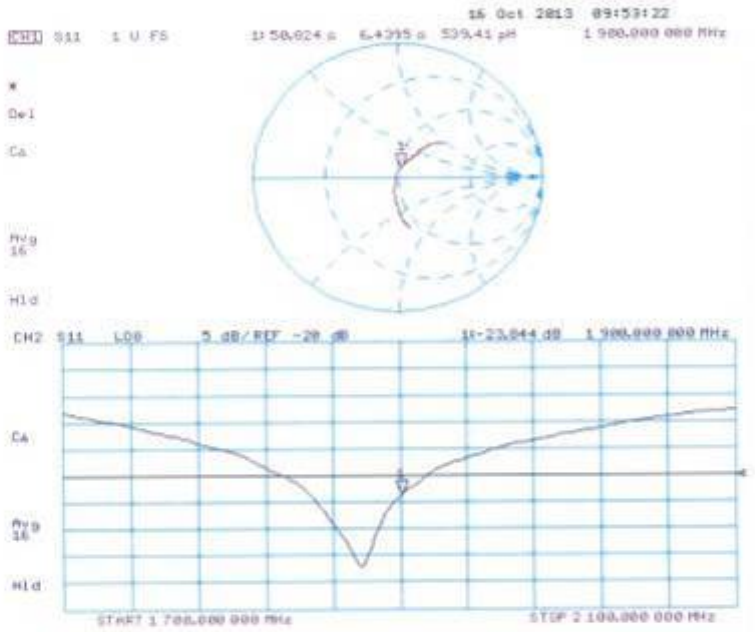
- Probe: ES3DV3 - SN3205; ConvF(4.98, 4.98, 4.98); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.850 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 18.1 W/kg
SAR(1 g) = 10 W/kg; SAR(10 g) = 5.27 W/kg
Maximum value of SAR (measured) = 12.6 W/kg



0 dB = 12.6 W/kg = 11.00 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.10.2013

Test Laboratory: SPEAG, Zurich, Switzerland

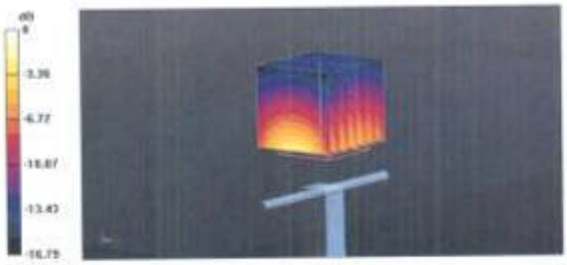
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d113

Communication System: UID 0 - CW ; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.49 S/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

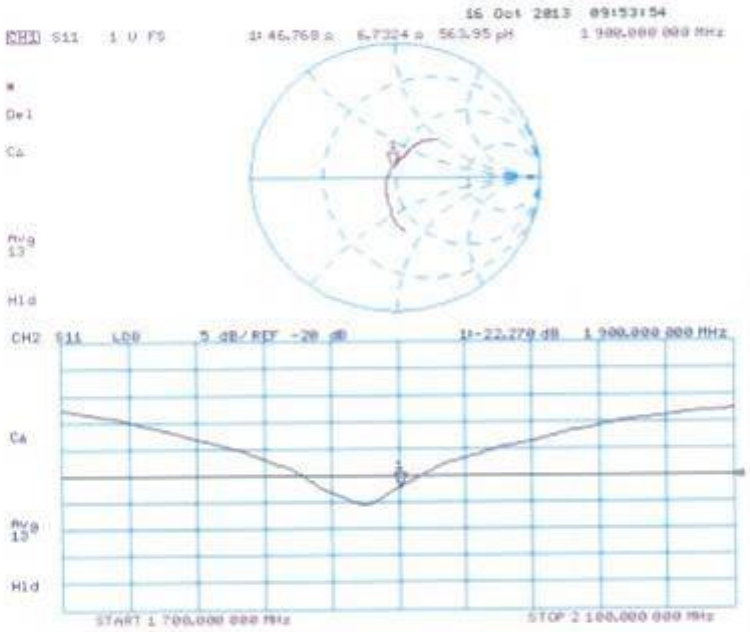
- Probe: ES3DV3 - SN3205; ConvF(4.6, 4.6, 4.6); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.823 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.37 W/kg
Maximum value of SAR (measured) = 12.8 W/kg



0 dB = 12.8 W/kg = 11.07 dBW/kg

Impedance Measurement Plot for Body TSL



D2450V2 – SN:738

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

S Schweizerischer Kalibrierdienst
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Accreditation No.: SCS 108

Client SRTC (PTT)

Certificate No: D2450V2-738_Oct13

CALIBRATION CERTIFICATE

Object D2450V2 - SN: 738

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date October 17, 2013

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 EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	28-Dec-12 (No. ES3-3205_Dec12)	Dec-13
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-15
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 17, 2013

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D2450V2-738_Oct13 Page 1 of 8

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

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C Service suisse d'étalonnage
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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
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
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
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.6 ± 6 %	1.84 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.7 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.1 ± 6 %	2.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.5 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**49.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.75 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.8 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω + 3.6 jΩ
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.8 Ω + 5.3 jΩ
Return Loss	- 25.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 26, 2003

DASY5 Validation Report for Head TSL

Date: 17.10.2013

Test Laboratory: SPEAG, Zurich, Switzerland

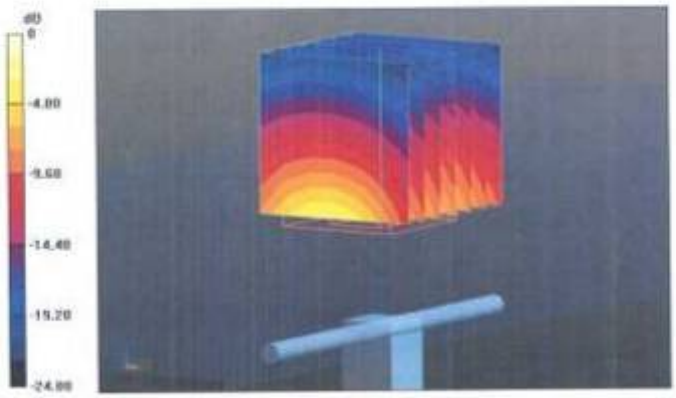
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 738

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.84 S/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

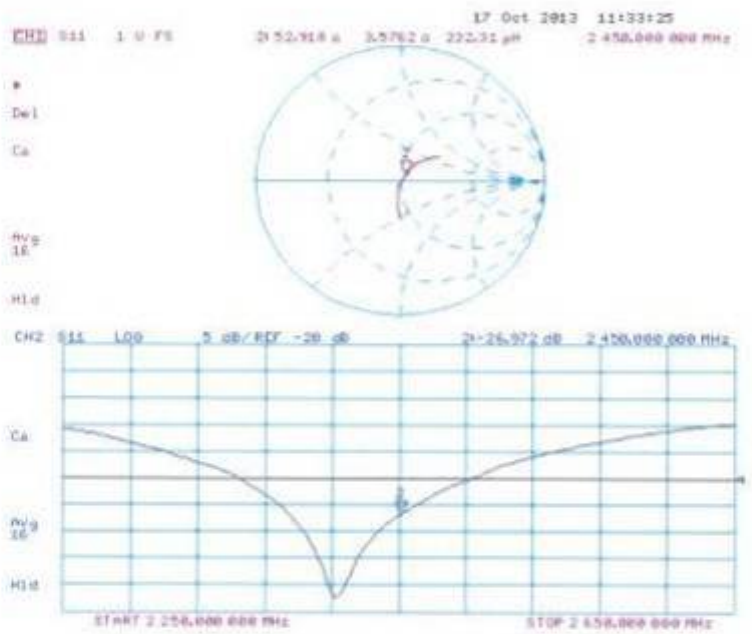
- Probe: ES3DV3 - SN3205; ConvF(4.52, 4.52, 4.52); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.333 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.2 W/kg
Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 12.28 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 17.10.2013

Test Laboratory: SPEAG, Zurich, Switzerland

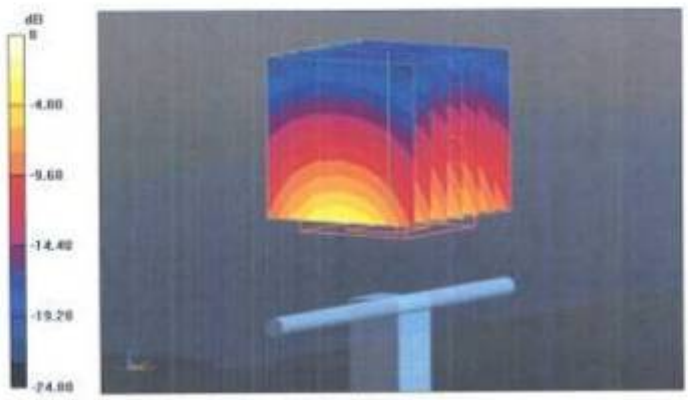
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 738

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2 S/m; ε_r = 52.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

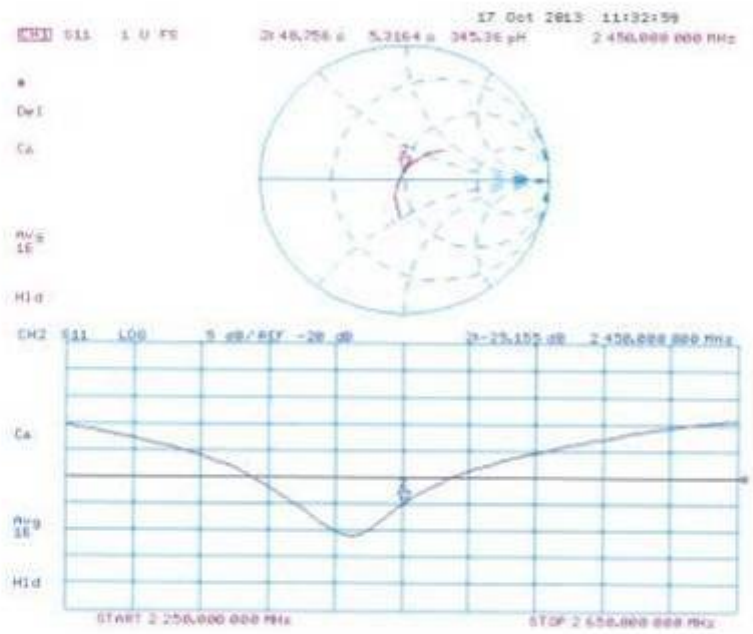
- Probe: ES3DV3 - SN3205; ConvF(4.42, 4.42, 4.42); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.129 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.2 W/kg
SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.75 W/kg
Maximum value of SAR (measured) = 16.3 W/kg



0 dB = 16.3 W/kg = 12.12 dBW/kg

Impedance Measurement Plot for Body TSL



APPENDIX F: Test Setup

Appendix Test Setup