SAR TEST REPORT

For

C1021ECL,1021EC

Model Number: C1021EC, Ring 201, C1021ECL,C1021

FCC ID: T38C1021ECL

Report Number : WT 138001643

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Test report declaration

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Manufacturer	:	Cellon Communications Technology(Shenzhen)Co., Ltd.
Address	:	13/F, Skyworth Building C Gaoxin S. Ave. 1st, High-Tech industrial Park NanShan, ShenZhen
EUT Description	:	C1021ECL,1021EC
Model No.	:	C1021EC, Ring 201, C1021ECL,C1021
Trade mark	:	Ring, enspire, Claro
Serial Number	:	861047003725123 861047003725131
FCC ID	:	T38C1021ECL

Test Standards:

IEEE 1528-2003

FCC OET Bulletin 65

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the compliance of the applicable standards stated above.
Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results.
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	(Lin Bin)		

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1. GENERAL INFORMATION

1.1. Report information

This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.

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1.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Service for Conformity Assessment (CNAS) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is CNAS L0579.

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number are 97379(open area test site) and 274801(semi anechoic chamber).

The Laboratory is registered to perform emission tests with Industry Canada (IC), and the registration number is IC4174.

TUV Rhineland accredits the Laboratory for conformance to IEC and EN standards, the registration number is E2024086Z02.

2. DESCRIPTION OF THE DEVICE UNDER TEST (DUT)

2.1. DUT Description

Frequency Bands	GSM850/PCS1900MHz
Modulation Mode	GSM:GMSK
Power Class	GSM900:4,DCS1800:1
Antenna type	Fixed Internal Antenna
Battery Model	BTR1031
Battery Specification	3.7V 1.48Wh
Hardware Version	P1
Software Version	TBD

2.2. RF output power Tune up limit

Maximum Tune up Burst Average power		
Mode	**GSM 850**	**GSM 1900**
GSM (GMSK, 1 Tx slot)	**33**	**31.0**

2.3. Applied Standards

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2003
- FCC OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 447498 D01 v05
- FCC KDB 648474 D04v01
- FCC KDB 248227 D01 v01r02
- FCC KDB 941225 D01 v02
- FCC KDB 941225 D03 v01
- FCC KDB 941225 D06 v01
- FCC KDB 865664 D01 v01

2.4. SAR Limit

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

3. TEST CONDITIONS

3.1. Temperature and Humidity

Ambient temperature (°C):	21-22
Ambient humidity (RH %):	59-60

3.2. Introduction of SAR

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for general public group.

SAR Definition:

$$SAR = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dv}\right) \qquad SAR = C\frac{\delta T}{\delta t} \qquad SAR = \frac{\sigma \mid E \mid^2}{\rho}$$

In the first equation, the SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density ρ).

In the second equation, C is the specific head capacity, δT is the temperature rise and δt is the exposure duration.

The last equation relates to the electrical field, where σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the rms electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

SAR is expressed in units of Watts per kilogram (W/kg)

3.3. Test Configuration

GSM Test Configuration

The tests for GSM850 and GSM1900, a communication link is set up with a System Simulator by air link. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 128, 190 and 251 respectively in the case of GSM850, to 512, 700 and

885 respectively in the case of GSM1900. The tests in the band of GSM850 and GSM1900 are performed in the mode of GPRS/EGPRS function. Since the GPRS class is 10 for this EUT, it has at most 2 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. The EGPRS class is 10 for this EUT, it has at most 2 timeslots in uplink, and at most 4 timeslots in downlink, the maximum total timeslot is 5. The device output power was set to maximum power level for all tests. Using CMU200 the power control level is set to " 5" for GSM850, set to " 0" for GSM1900.

WCDMA Test Configuration

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

	Mode	Rel99
	Subtest	---
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c / β_d	8/15

For WWAN SAR testing, the device was controlled by using a base station emulator. Communication between the device and the emulator was established by air link. The distance between the EUT and the antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT.

4. DESCRIPTION OF THE TEST EQUIPMENTS

4.1. Measurement System and Components

No.	Equipment	Model No.	Manufacturer	Serial No.	Last Calibration Data	Period
1	SAR test system	TX60L	SPEAG	SB6810	---	---
2	SAR Probe	ES3DV3	SPEAG	SB6810/02	2012.10.24	1year
3	System Validation Dipole,900MHz	D900V2	SPEAG	SB6810/04	2012.10.16	2year
4	System Validation Dipole,1800MHz	D1800V2	SPEAG	SB6810/05	2012.10.12	2year
5	System Validation Dipole,2450MHz	D2450V2	SPEAG	SB6810/04	2012.10.18	2year
6	Dielectric Probe Kit	85070E	SPEAG	SB6810/12	---	---
7	Dual-directional coupler,0.10-2.0GHz	778D	Agilent	SB6810/07	---	---
8	Dual-directional coupler,2.00-18GHz	772D	Agilent	SB6810/08		
9	Coaxial attenuator	8491A	Agilent	SB6810/09	---	---
10	Power Amplifier	ZHL42W	Agilent	SB6810/10	---	---
11	Signal Generator	SMR20	R&S	SB3438	2013.01.17	1year
12	Power Meter	NRVD	R&S	SB3437	2013.01.20	1year
13	Call Tester	CMU 200	R&S	SB3441	2013.03.31	1year

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.

4.2. 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., butyl diglycol)
Calibration	Calibration certificate in Appendix C
Frequency	10MHz to 4GHz (dosimetry); Linearity: ±0.2dB (30MHz to 4GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis)
	± 0.3 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 μW/g to > 100mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm
	Tip length: 20 mm
	Body diameter: 12 mm
	Tip diameter: 3.9 mm
	Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz
	Compliance tests of mobile phones
	Fast automatic scanning in arbitrary phantoms

4.3. 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 SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6mm).

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.

SAM Twin Phantom

4.4. Tissue-equivalent Liquids

Tissue-equivalent liquids that are used for testing at frequencies of GSM900MHz and DCS 1800MHz, which are made mainly of sugar, salt and water solution. All tests were carried out using tissue-equivalent liquids 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-equivalent liquid was 15.0±0.5 cm measured from the ear reference point (ERP) during system checking and device measurements.

Tissue-equivalent liquid Recipes

The following recipe(s) were used for Head Tissue-equivalent liquid(s):

Ingredient (% by weight)	Frequency Band	
	800-900	1800-1900
Tissue Type	Head	Head
1,2-propanediol	64.81	-
2-ethanol	-	44.92
de-ionized water	34.4	54.9
salt(NaCl)	0.79	0.18

Tissue-equivalent liquids used in the Measurements

Head Tissue-equivalent liquid measurements:

f/MHz	Date Tested	Dielectric Parameters	Target	Delta(%)	Tolerance (%)	Temp (ºC)
835	2013.06.02	ε_r =40.8	41.5	1.68	±5	22
		σ =0.93	0.90	3.33		
1900	2013.06.02	ε_r =40.5	40.0	1.25	±5	22
		σ =1.46	1.40	4.28		

Body Tissue-equivalent liquid measurements:

f/MHz	Date Tested	Dielectric Parameters	Target	Delta(%)	Tolerance (%)	Temp (ºC)
835	2013.06.02	ε_r =54.6	55.2	1.08	±5	21
		σ =0.95	0.97	2.06		
1900	2013.06.02	ε_r =51.3	53.3	3.75	±5	22
		σ =1.49	1.52	1.97		

System Checking

The manufacturer calibrates the probes annually. Dielectric parameters of the Tissue-equivalent liquids 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 tissue-equivalent liquid, using the dipole validation kit. A power level of 250mW 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.

System checking, head Tissue-equivalent liquid:

f/MHz	Date Tested	SAR(W/kg), 1g	Target	Delta(%)	Tolerance (%)	Temp (ºC)
900	2013.06.02	12.16	11.2	8.5	±10	21
1800	2013.06.02	36.12	38.9	7.2	±10	22

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

4.5. 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.

The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

Device holder supplied by SPEAG

4.6. Test Position

Against Phantom Head

The Mobile phone shall be tested in the " cheek" and " tilted" position on left and right sides of the phantom.

Define of the " cheek" position:

a) Position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M, RE and LE) and align the center of the ear piece with the line RE-LE.

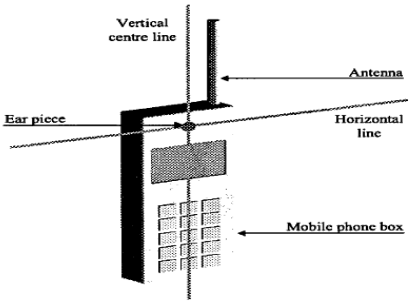
b) Translate the mobile phone box towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

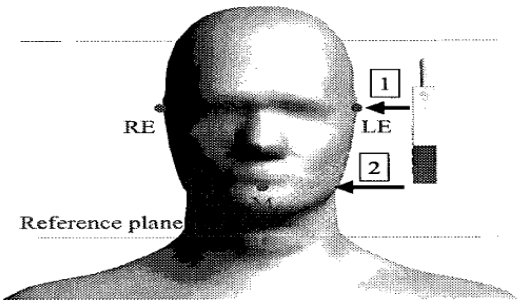
Define of the " tilted" position:

a) Position the device in the " cheek" position described above.

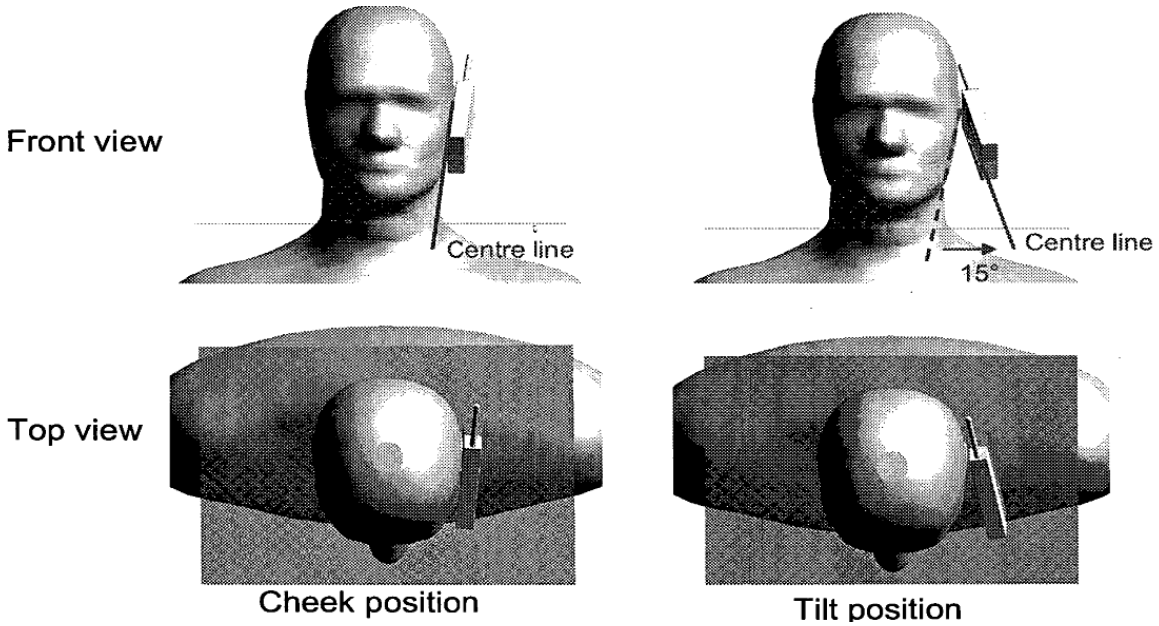
b) While maintaining the device the reference planes described above and

pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.





Define of the reference lines and points,
on the phone and on the phantom and initial position



" Cheek" and " tilted" position of the mobile phone on the left side

Body Worm Configuration

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. The distance between of the device and the phantom was kept 15mm.

4.7. Scan Procedures

First, area scans were used for determination of the field distribution. Next, a zoom scan, a minimum of 5x5x7 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.

4.8. SAR Averaging Methods

The DASY5 software includes all numerical procedures necessary to evaluate the spatial peak SAR values. The base for the evaluation is a " cube" measurement in a volume of (30mm)3 (7x7x7 points). The maximum SAR value was averaged over the 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.

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.

5. MEASUREMENT UNCERTAINTY

5.1. Uncertainty for Sar Test

Uncertainty Component	Tol. (%)	Prob Dist.	Div	ci (10g)	ci.ui(%) (10g)	vi
Measurement System						
Probe Calibration	±5.9	N	1	1	±5.9	∞
Axial Isotropy	±4.7	R	$\sqrt{3}$	0.7	±1.9	∞
Hemispherical Isotropy	±9.6	R	$\sqrt{3}$	0.7	±3.9	∞
Boundary Effect	±1.0	R	$\sqrt{3}$	1	±0.6	∞
Linearity	±4.7	R	$\sqrt{3}$	1	±2.7	∞
System Detection Limits	±1.0	R	$\sqrt{3}$	1	±0.6	∞
Readout Electronics	±0.3	N	1	1	±0.3	∞
Response Time	±0.8	R	$\sqrt{3}$	1	±0.5	∞
Integration Time	±2.6	R	$\sqrt{3}$	1	±1.5	∞
RF Ambient Conditions - Noise	±3.0	R	$\sqrt{3}$	1	±1.7	∞
RF Ambient Conditions - Reflections	±3.0	R	$\sqrt{3}$	1	±1.7	∞
Probe Positioner Mechanical Tolerance	±0.4	R	$\sqrt{3}$	1	±0.2	∞
Probe Positioning with respect to Phantom Shell	±2.9	R	$\sqrt{3}$	1	±1.7	∞
Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	±1.0	R	$\sqrt{3}$	1	±0.6	∞
Test Sample Related						
Test Sample Positioning	±2.9	N	1	1	±2.9	145
Device Holder Uncertainty	±3.6	N	1	1	±3.6	5
Output Power Variation - SAR drift measurement	±5.0	R	$\sqrt{3}$	1	±2.9	∞
Phantom and Tissue Parameters						
Phantom Uncertainty (shape and thickness tolerances)	±4.0	R	$\sqrt{3}$	1	±2.3	∞
Conductivity Target - tolerance	±5.0	R	$\sqrt{3}$	0.43	±1.2	∞
Conductivity - measurement uncertainty	±2.5	N	1	0.43	±1.1	∞
Permittivity Target - tolerance	±5.0	R	$\sqrt{3}$	0.49	±1.4	∞
Permittivity - measurement uncertainty	±2.5	N	1	0.49	±1.2	5
Combined Standard Uncertainty					**±10.7**	**387**
Expanded STD Uncertainty					**±21.4**	

5.2. Uncertainty for System Validation

Uncertainty Component	Uncert. value	Prob. Dist.	Div.	(ci) (10g)	Std. Unc. (10g)	(vi) veff
Probe Calibration	±6.55 %	N	1	1	±6.55 %	1
Axial Isotropy	±4.7 %	R	$\sqrt{3}$	1	±2.7 %	1
Hemispherical Isotropy	±9.6 %	R	$\sqrt{3}$	0	±0 %	1
Boundary E_ects	±1.0 %	R	$\sqrt{3}$	1	±0.6 %	1
Linearity	±4.7 %	R	$\sqrt{3}$	1	±2.7 %	1
System Detection Limits	±1.0 %	R	$\sqrt{3}$	1	±0.6 %	1
Modulation Response	±0 %	R	$\sqrt{3}$	1	±0 %	1
Readout Electronics	±0.3 %	N	1	1	±0.3 %	1
Response Time	±0 %	R	$\sqrt{3}$	1	±0 %	1
Integration Time	±0 %	R	$\sqrt{3}$	1	±0 %	1
RF Ambient Noise	±1.0 %	R	$\sqrt{3}$	1	±0.6 %	1
RF Ambient Re ections	±1.0 %	R	$\sqrt{3}$	1	±0.6 %	1
Probe Positioner	±0.8 %	R	$\sqrt{3}$	1	±0.5 %	1
Probe Positioning	±6.7 %	R	$\sqrt{3}$	1	±3.9 %	1
Max. SAR Eval.	±2.0 %	R	$\sqrt{3}$	1	±1.2 %	1
Dipole Related						
Deviation of exp. dipole	±5.5 %	R	$\sqrt{3}$	1	±3.2 %	1
Dipole Axis to Liquid Dist.	±2.0 %	R	$\sqrt{3}$	1	±1.2 %	1
Input power & SAR drift	±3.4 %	R	$\sqrt{3}$	1	±2.0 %	1
Phantom and Setup						
Phantom Uncertainty	±4.0 %	R	$\sqrt{3}$	1	±2.3 %	1
SAR correction	±1.9 %	R	$\sqrt{3}$	0.84	±0.9 %	1
Liquid Conductivity (meas.)	±2.5 %	N	1	0.71	±1.8 %	1
Liquid Permittivity (meas.)	±2.5 %	N	1	0.26	±0.7 %	1
Temp. unc. -Conductivity	±1.7 %	R	$\sqrt{3}$	0.71	±0.7 %	1
Temp. unc. -Permittivity	±0.3 %	R	$\sqrt{3}$	0.26	±0.0 %	∞
Combined Std. Uncertainty					±10.1 %	
Expanded STD Uncertainty					±20.1 %	

6. CONDUCTED TEST RESULTS

GSM Conducted Power Measurement Results

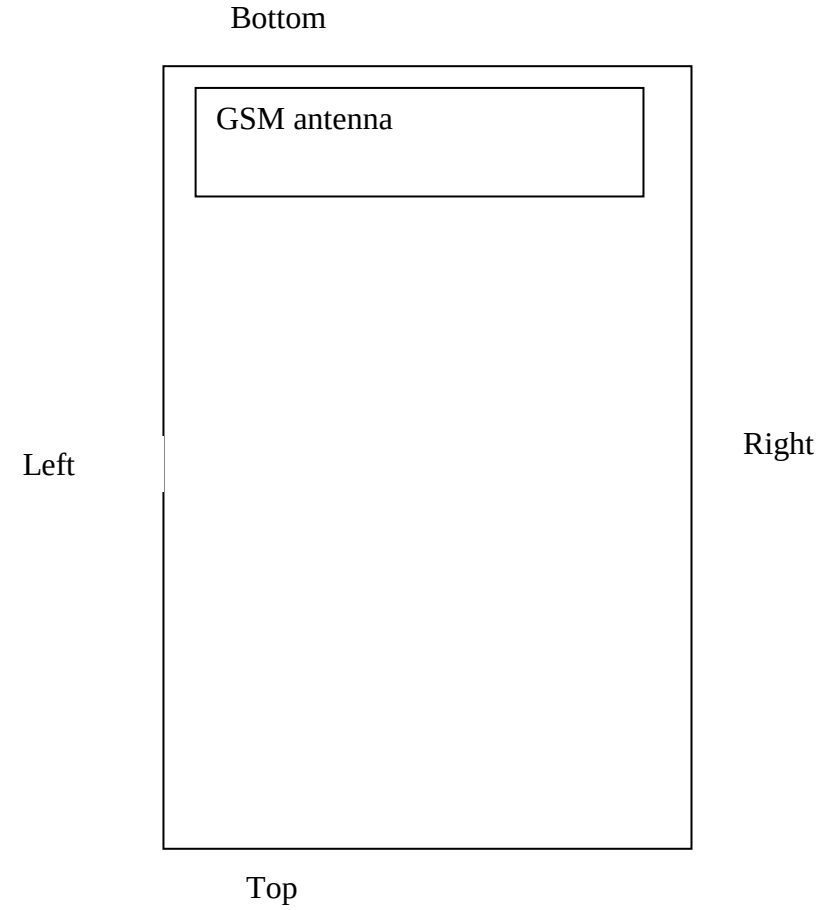
Band: GSM850	Burst Average Power (dBm)		
Channel	**128**	**190**	**251**
Frequency (MHz)	**824.2**	**836.6**	**848.8**
GSM (GMSK, 1 Tx slot)	32.1	31.6	31.6

Band: GSM1900	Burst Average Power (dBm)		
Channel	**512**	**661**	**810**
Frequency (MHz)	**1850.2**	**1880.0**	**1909.8**
GSM (GMSK, 1 Tx slot)	29.3	29.5	29.0

Remark:
1. The EUT do not support GPRS or DTM function.
2. For Head SAR testing, GSM should be evaluated, therefore the EUT was set in GSM Voice for GSM850 and GSM1900 due to its highest frame-average power.
3. For Body worn mode SAR testing, GSM should be evaluated, therefore the EUT was set in GSM Voice for GSM850 and GSM1900 due to its highest frame-average power.
4 The frame-averaged power is linearly calculated from the maximum burst averaged power over 8 time slots.
The calculation method is shown as below:
Frame-averaged power = Maximum burst averaged power (1 Tx slot) - 9 dB
Frame-averaged power = Maximum burst averaged power (2 Tx slots) - 6 dB
Frame-averaged power = Maximum burst averaged power (3 Tx slots) - 4.26 dB
Frame-averaged power = Maximum burst averaged power (4 Tx slots) - 3 dB
5 The product does not support WIFI, Hotspot mode test is not applicable.

7. EXPOSURE POSITIONS CONSIDERATION

Back view



Remark:
1 According to KDB 447498 D01v05, for handsets the test separation distance is typically according to the smallest test separation distance required for the group of body-worn accessories with similar operating and exposure characteristics. Which is 0mm for head SAR, 15mm for body-worn SAR for the DUT.
2 Hotspot mode is not supported. Hotspot mode test distance and test side is not considered.

8. SAR TEST RESULTS

Remark:

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 mid channel or highest output channel reported SAR ≤0.8W/kg, other channels SAR testing are not necessary

3. For Hotspot SAR testing, WIFI is not supported by EUT, Hotspot SAR testing is not applicable.

8.1. GSM 850 SAR results

Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
GSM850	GSM Voice	Left Cheek	190	836.6	31.6	33	1.380	0.526	0.726
GSM850	GSM Voice	Left Tilted	190	836.6	31.6	33	1.380	0.241	0.333
GSM850	GSM Voice	Right Cheek	128	824.2	32.1	33	1.230	0.387	0.476
GSM850	GSM Voice	Right Cheek	190	836.6	31.6	33	1.380	0.567	0.783
GSM850	GSM Voice	Right Cheek	251	848.8	31.6	33	1.230	0.759	1.048
GSM850	GSM Voice	Right Tilted	190	836.6	31.6	33	1.380	0.262	0.362
GSM850	GSM Voice	Face up	190	836.6	31.6	33	1.380	0.241	0.333
GSM850	GSM Voice	Face down	128	824.2	32.1	33	1.230	0.571	0.702
GSM850	GSM Voice	Face down	190	836.6	31.6	33	1.380	0.680	0.939
GSM850	GSM Voice	Face down	251	848.8	31.6	33	1.380	0.722	0.997

8.2. GSM 1900 SAR results

Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
GSM1900	GSM Voice	Left Cheek	512	1850.2	29.3	31	1.479	0.637	0.942
GSM1900	GSM Voice	Left Cheek	700	1880.0	29.5	31	1.413	0.412	0.582
GSM1900	GSM Voice	Left Cheek	885	1909.8	29.0	31	1.585	0.557	0.883
GSM1900	GSM Voice	Left Tilted	700	1880.0	29.5	31	1.413	0.308	0.435
GSM1900	GSM Voice	Right Cheek	700	1880.0	29.5	31	1.413	0.271	0.383
GSM1900	GSM Voice	Right Tilted	700	1880.0	29.5	31	1.413	0.261	0.369
GSM1900	GSM Voice	Face up	700	1880.0	29.5	31	1.413	0.155	0.219
GSM1900	GSM Voice	Face down	512	1850.2	29.3	31	1.479	0.551	0.815
GSM1900	GSM Voice	Face down	700	1880.0	29.5	31	1.413	0.579	0.818
GSM1900	GSM Voice	Face down	885	1909.8	29.0	31	1.585	0.445	0.705

8.3. Repeated SAR results

Remark:

1 According to KDB 865664 D01v01, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.

2 KDB 865664 D01v01, if the deviation among the repeated measurement is ≤20% and the measured SAR<1.45W/kg, only one repeated measurement is required.

3 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.

Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)	Ratio
GSM850	GSM Voice	Left Cheek	251	848.8	31.6	33	1.230	0.759	1.048	1

Repeated SAR not required.

9. SIMULTANEOUS TRANSMISSION SAR ANALYSIS

Remark:

Not applicable to this EUT.

APPENDIX A: SYSTEM CHECKING SCANS

SystemPerformanceCheck-D900

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:1d077

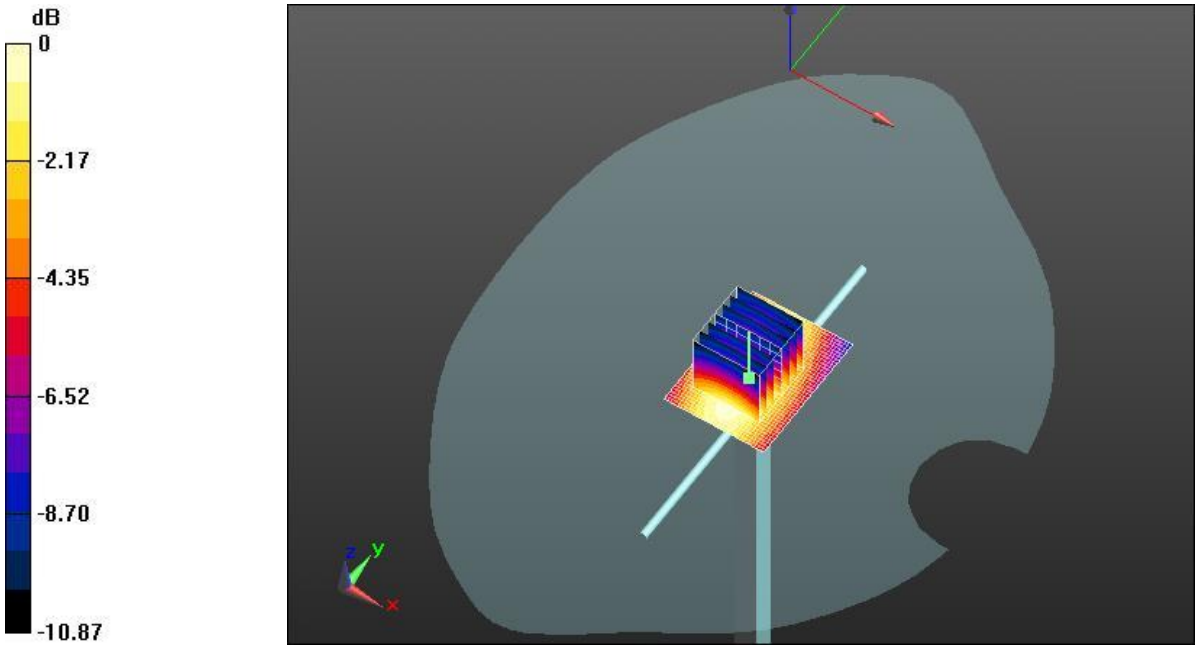
Communication System: CW; Communication System Band: Not Specified; Frequency: 900 MHz;Communication System PAR: 0 dB
Medium parameters used: f = 900 MHz; σ = 0.95 mho/m; ε_r = 40.75; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(6.14, 6.14, 6.14); Calibrated: 2012.10.24.
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2012.09.28.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

Configuration/d=15mm, Pin=250mW, dist=3.4mm (ES-Probe)/Area Scan (31x41x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 57. 153V/m; Power Drift = -0.0011 dB
Fast SAR: SAR(1 g) = 2.94 mW/g; SAR(10 g) = 1.85 mW/g
Maximum value of SAR (interpolated) = 3. 136 mW/g

Configuration/d=15mm, Pin=250mW, dist=3.4mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57. 164V/m; Power Drift = -0.0011 dB
Peak SAR (extrapolated) = 4.0215
SAR(1 g) = 3.04 mW/g; SAR(10 g) = 1.94 mW/g
Maximum value of SAR (measured) = 3.291 mW/g



0 dB = 3.291mW/g = 9.99 dB mW/g

SystemPerformanceCheck-D1800

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d171

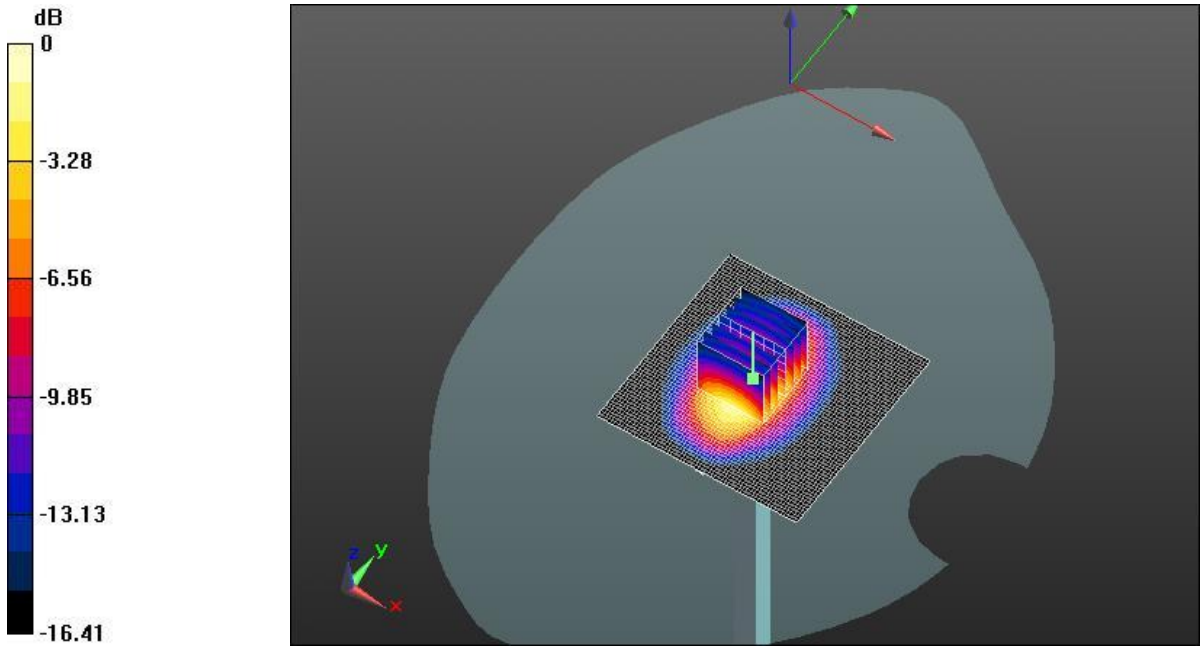
Communication System: CW; Communication System Band: Not Specified; Frequency: 1800 MHz;Communication System PAR: 0 dB
Medium parameters used: f = 1800 MHz; σ = 1.4 mho/m; ε_r = 40.17; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(5.31, 5.31, 5.31); Calibrated: 2012.10.12.
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2012.09.28.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (0); SEMCAD X Version 14.6.4 (4989)

Configuration/d=10mm, Pin=250mW, dist=3.4mm (ES-Probe)/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Reference Value = 86. 036V/m; Power Drift = -0.004 dB
Fast SAR: SAR(1 g) = 8.92 mW/g; SAR(10 g) = 4.23 mW/g
Maximum value of SAR (interpolated) = 10.041mW/g

Configuration/d=10mm, Pin=250mW, dist=3.4mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86. 354V/m; Power Drift = -0.004dB
Peak SAR (extrapolated) = 16.3661
SAR(1 g) = 9.03 mW/g; SAR(10 g) = 4.69 mW/g
Maximum value of SAR (measured) = 10.225 mW/g



0 dB = 11.510mW/g = 21.22 dB mW/g

APPENDIX B: MEASUREMENT SCANS

GSM850 GSM Right Head Tilted-Mid

DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz);
Frequency: 836.6 MHz;Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 55.858; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

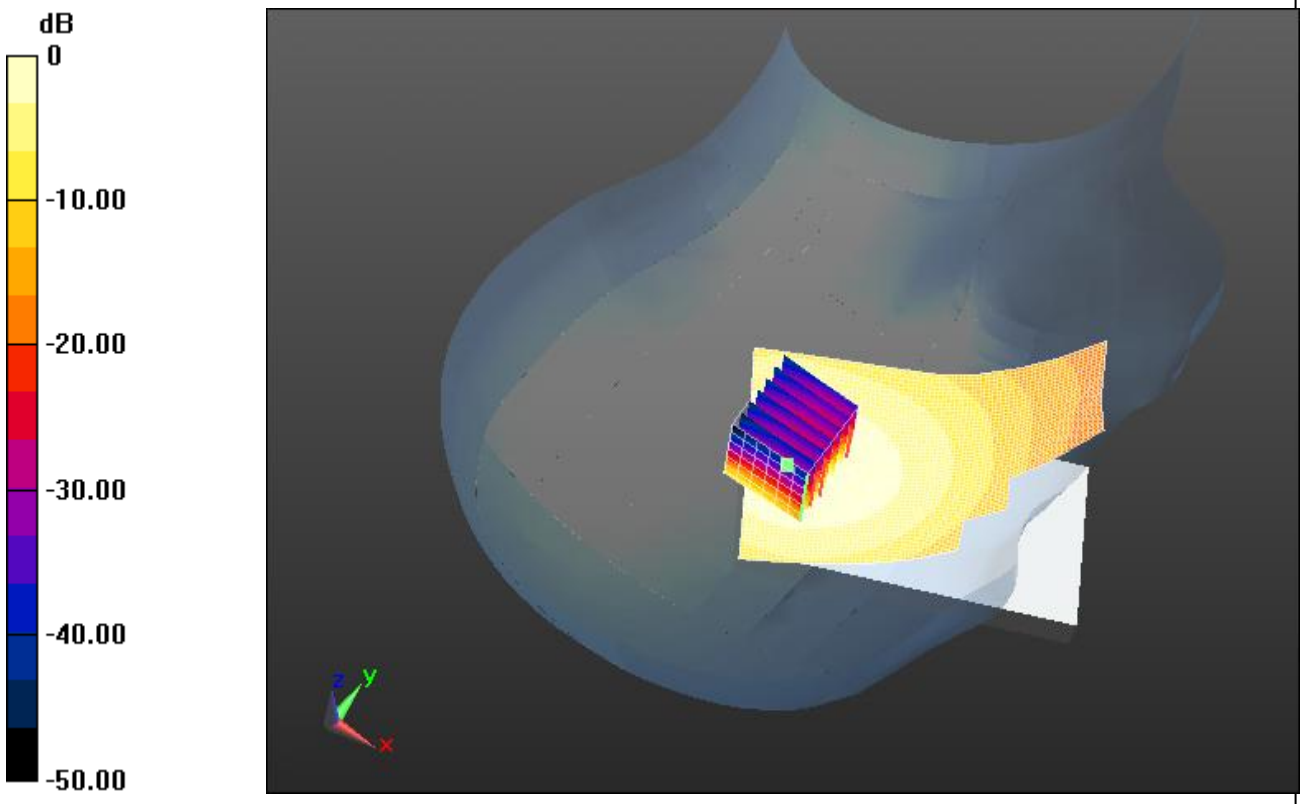
- Probe: ES3DV3 - SN3203; ConvF(6.09, 6.09, 6.09); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

GSM 850_Right_Tilted/Mid/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 13.955 V/m; Power Drift = -0.11 dB
Fast SAR: SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.180 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.284 W/kg

GSM 850_Right_Tilted/Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.955 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.355 mW/g
SAR(1 g) = 0.262 mW/g; SAR(10 g) = 0.184 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.278 W/kg



0 dB = 0.284 W/kg = -10.94 dB W/kg

GSM850 GSM Right Head Cheek-Low

DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz);
Frequency: 824.2 MHz;Communication System PAR: 9.191 dB
Medium parameters used (extrapolated): f = 824.2 MHz; σ = 0.999 mho/m; ε_r = 55.967; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(6.09, 6.09, 6.09); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

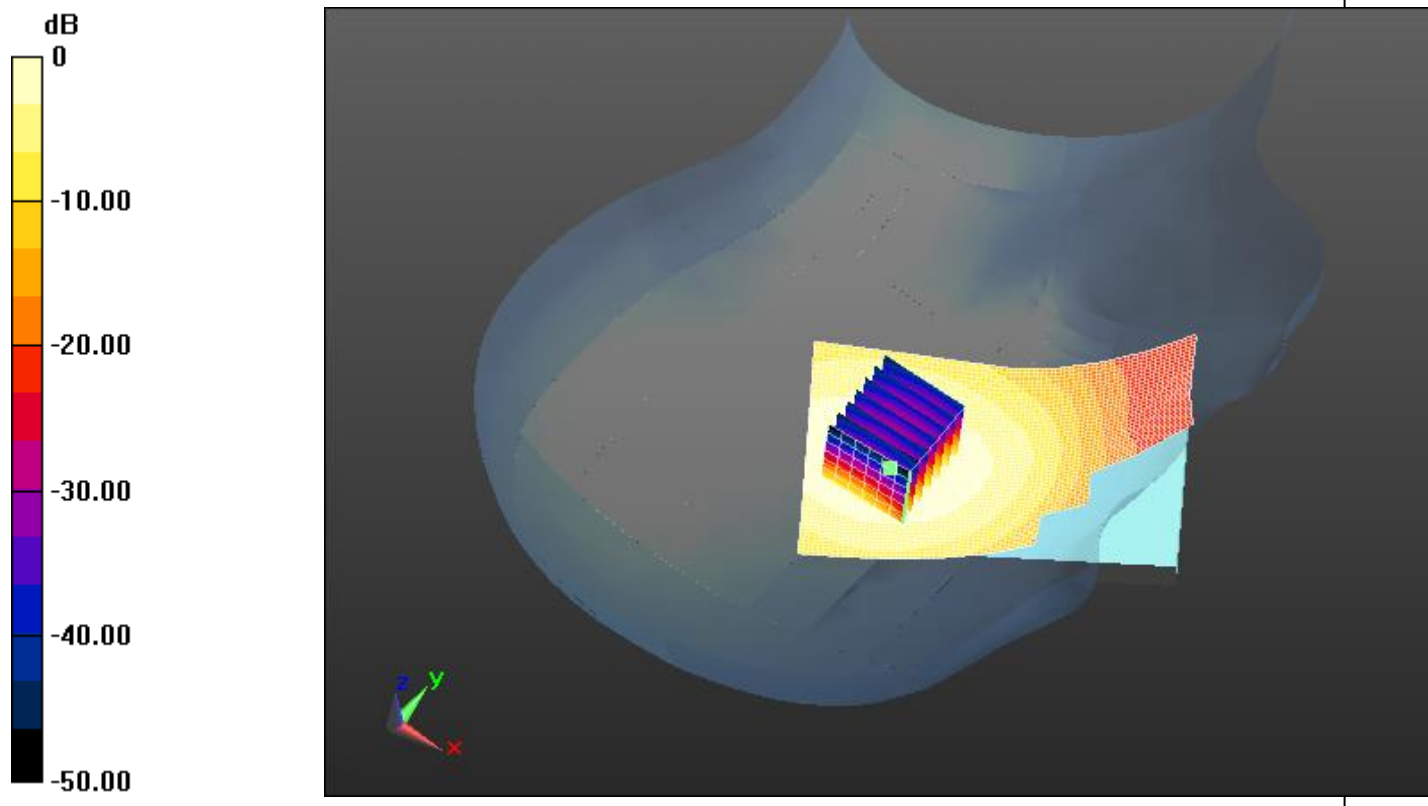
GSM 850_Right Cheek/Low/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm,

dy=1.500 mm
Reference Value = 16.705 V/m; Power Drift = -0.07 dB
Fast SAR: SAR(1 g) = 0.394 mW/g; SAR(10 g) = 0.264 mW/g

Info: Extrapolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.423 W/kg

GSM 850_Right Cheek/Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.705 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.514 mW/g
SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.271 mW/g

Info: Extrapolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.410 W/kg



0 dB = 0.423 W/kg = -7.47 dB W/kg

GSM850 GSM Right Head Cheek-Mid

DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 836.6 MHz;Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 55.858; ρ = 1000 kg/m^3

Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

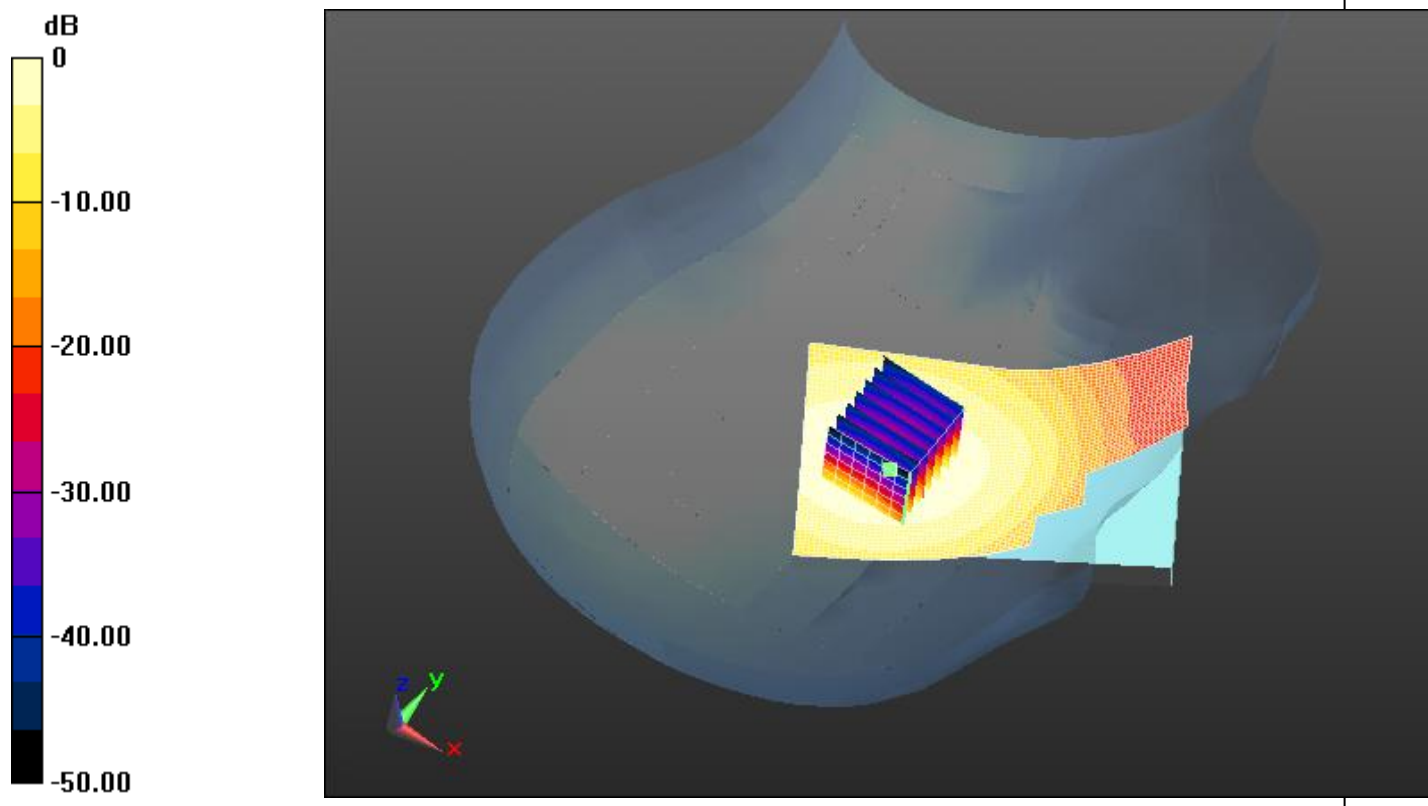
- Probe: ES3DV3 - SN3203; ConvF(6.09, 6.09, 6.09); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

GSM 850_Right Cheek/Mid/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 19.723 V/m; Power Drift = -0.05 dB
Fast SAR: SAR(1 g) = 0.574 mW/g; SAR(10 g) = 0.383 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.617 W/kg

GSM 850_Right Cheek/Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.723 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.755 mW/g
SAR(1 g) = 0.567 mW/g; SAR(10 g) = 0.396 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.607 W/kg



0 dB = 0.617 W/kg = -4.19 dB W/kg

GSM850 GSM Right Head Cheek-High

DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz);
Frequency: 848.8 MHz;Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 848.8 MHz; σ = 1.019 mho/m; ε_r = 55.75; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(6.09, 6.09, 6.09); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

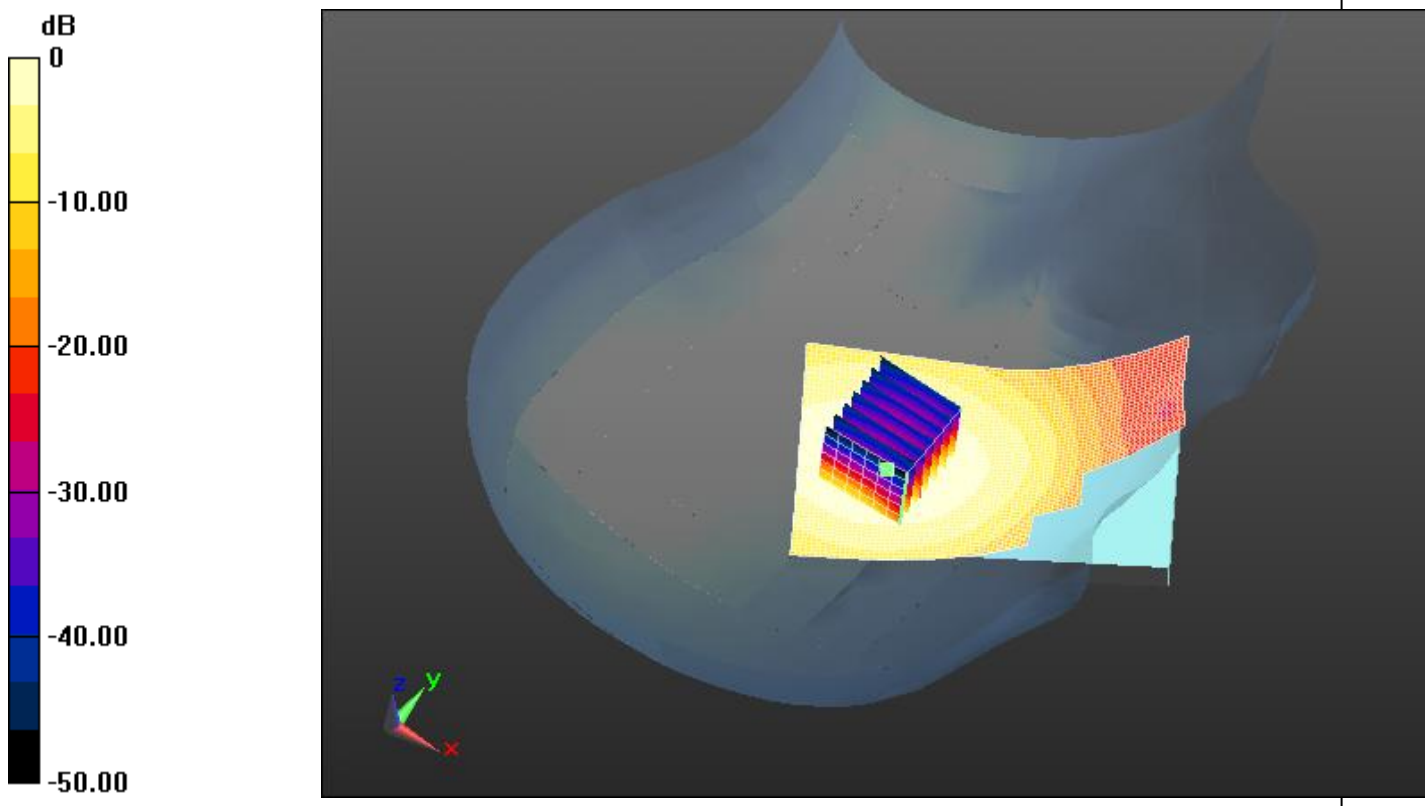
GSM 850_Right Cheek/High/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 22.743 V/m; Power Drift = -0.14 dB
Fast SAR: SAR(1 g) = 0.774 mW/g; SAR(10 g) = 0.517 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.831 W/kg

GSM 850_Right Cheek/High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.743 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 1.009 mW/g
SAR(1 g) = 0.759 mW/g; SAR(10 g) = 0.530 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.812 W/kg



0 dB = 0.831 W/kg = -1.60 dB W/kg

GSM850 GSM Left Head Tilted-Mid

DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 836.6 MHz;Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 55.858; ρ = 1000 kg/m^3

Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(6.09, 6.09, 6.09); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

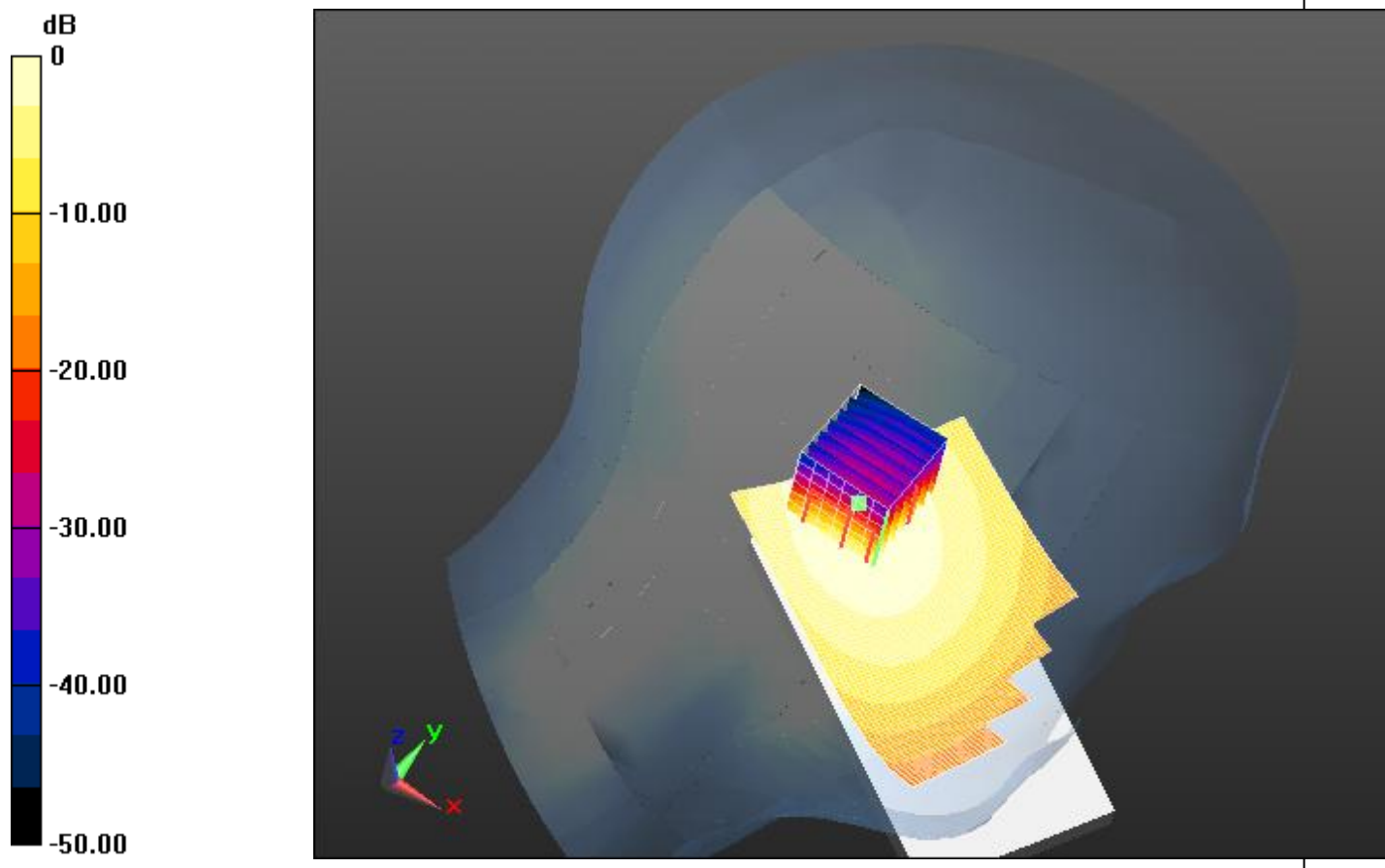
GSM 850_Left_Tilted 2/Mid/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 15.971 V/m; Power Drift = -0.05 dB
Fast SAR: SAR(1 g) = 0.243 mW/g; SAR(10 g) = 0.163 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.260 W/kg

GSM 850_Left_Tilted 2/Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.971 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.364 mW/g
SAR(1 g) = 0.241 mW/g; SAR(10 g) = 0.165 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.257 W/kg



0 dB = 0.260 W/kg = -11.69 dB W/kg

GSM850 GSM Left Head Cheek-Mid

DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz);
Frequency: 836.6 MHz;Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 55.858; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

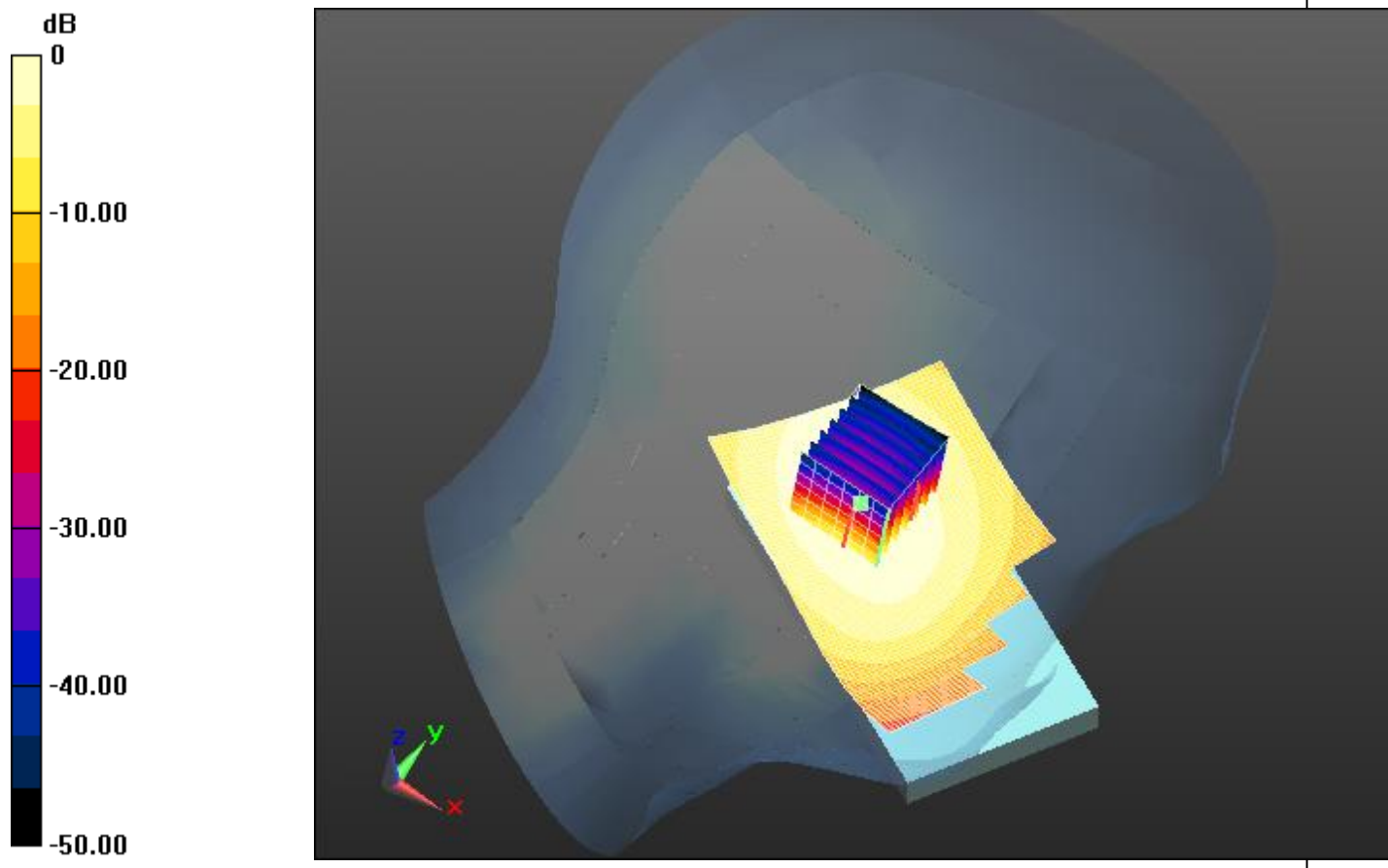
- Probe: ES3DV3 - SN3203; ConvF(6.09, 6.09, 6.09); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

GSM 850_Left Cheek 2/Mid/Area Scan (51x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 15.971 V/m; Power Drift = -0.05 dB
Fast SAR: SAR(1 g) = 0.525 mW/g; SAR(10 g) = 0.353 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.562 W/kg

GSM 850_Left Cheek 2/Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.971 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.724 mW/g
SAR(1 g) = 0.526 mW/g; SAR(10 g) = 0.364 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.562 W/kg



0 dB = 0.562 W/kg = -5.00 dB W/kg

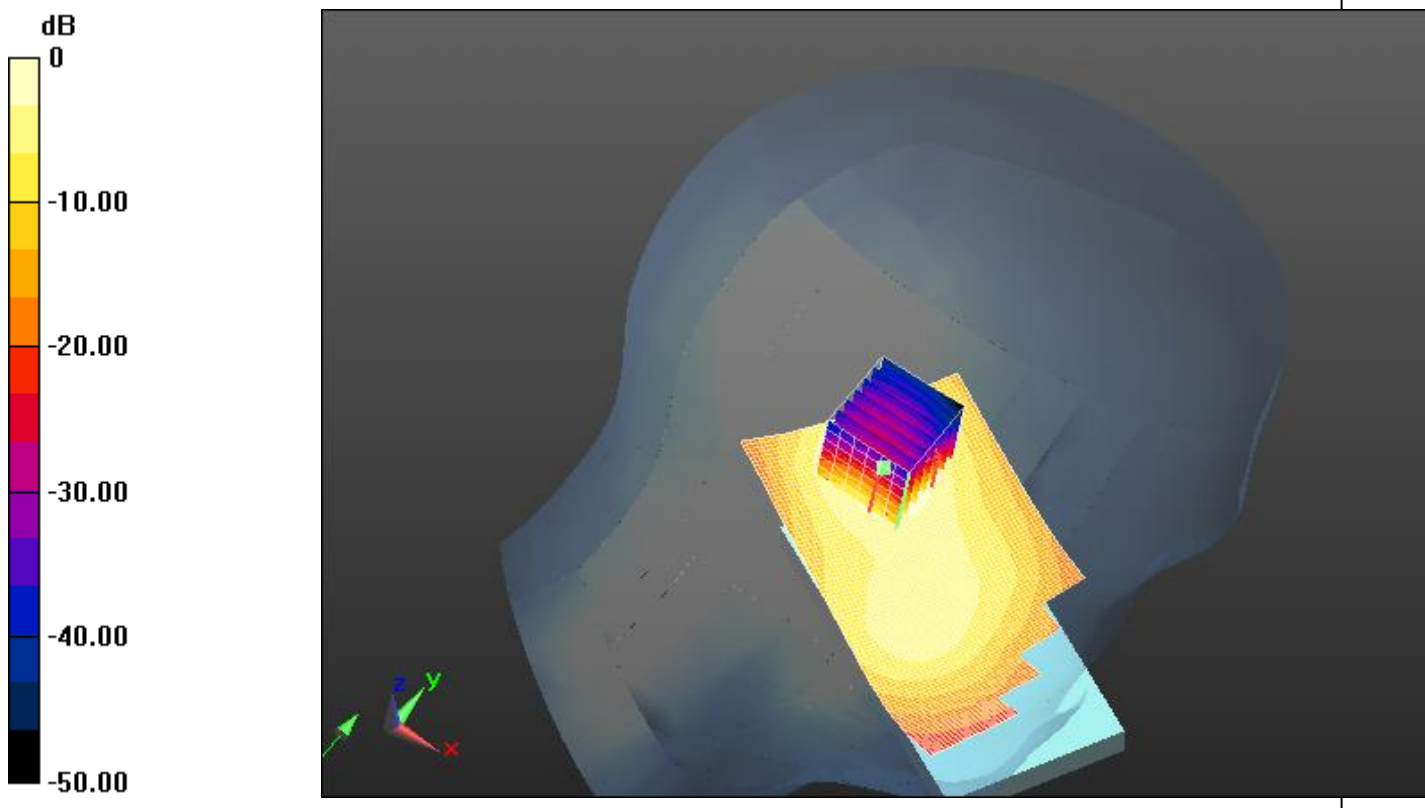
GSM1900 Left Head Cheek-Low

DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1850.2 MHz;Communication System PAR: 9.191 dB
Medium parameters used: f = 1850.2 MHz; σ = 1.53 mho/m; ε_r = 51.24; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(4.69, 4.69, 4.69); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

1900_Left GSM Head/1900 GSM Cheek-Low/Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 21.405 V/m; Power Drift = -0.05 dB
Fast SAR: SAR(1 g) = 0.623 mW/g; SAR(10 g) = 0.336 mW/g
Maximum value of SAR (interpolated) = 0.733 W/kg

1900_Left GSM Head/1900 GSM Cheek-Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 21.405 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.071 mW/g
SAR(1 g) = 0.637 mW/g; SAR(10 g) = 0.342 mW/g
Maximum value of SAR (measured) = 0.712 W/kg



0 dB = 0.733 W/kg = -2.70 dB W/kg

GSM1900 Left Head Cheek-Mid

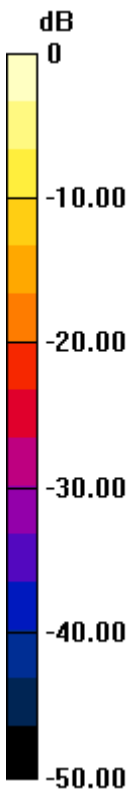
DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1880 MHz;Communication System PAR: 9.191 dB
Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51.14; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

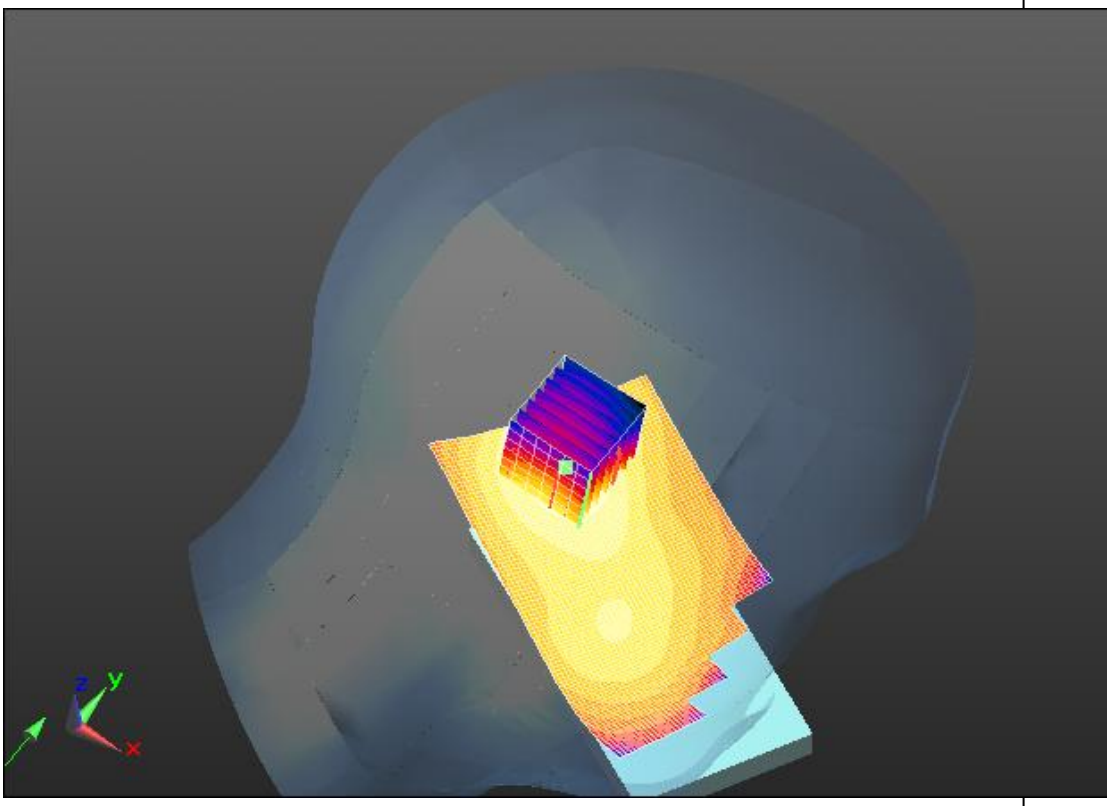
- Probe: ES3DV3 - SN3203; ConvF(4.69, 4.69, 4.69); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

1900_Left GSM Head/1900 GSM Cheek-Mid/Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 16.327 V/m; Power Drift = 0.25 dB
Fast SAR: SAR(1 g) = 0.381 mW/g; SAR(10 g) = 0.205 mW/g
Maximum value of SAR (interpolated) = 0.449 W/kg

1900_Left GSM Head/1900 GSM Cheek-Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.327 V/m; Power Drift = 0.25 dB
Peak SAR (extrapolated) = 0.734 mW/g
SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.216 mW/g
Maximum value of SAR (measured) = 0.461 W/kg





0 dB = 0.449 W/kg = -6.95 dB W/kg

GSM1900 Left Head Cheek-High

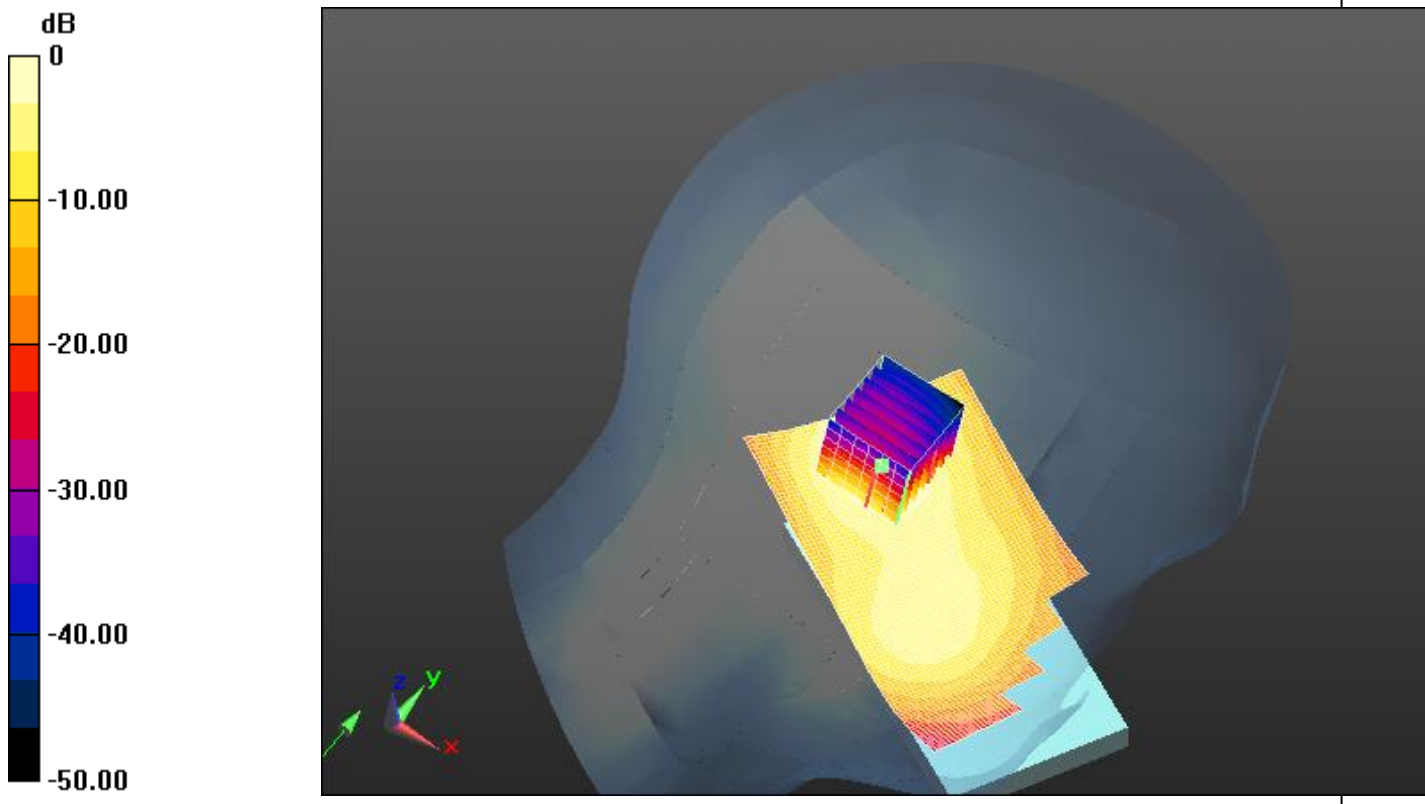
DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1909.8 MHz;Communication System PAR: 9.191 dB
Medium parameters used: f = 1909.8 MHz; σ = 1.59 mho/m; ε_r = 51.04; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(4.69, 4.69, 4.69); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated

- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

1900_Left GSM Head/1900 GSM CheekHigh/Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 19.762 V/m; Power Drift = -0.06 dB
Fast SAR: SAR(1 g) = 0.543 mW/g; SAR(10 g) = 0.294 mW/g
Maximum value of SAR (interpolated) = 0.636 W/kg

1900_Left GSM Head/1900 GSM CheekHigh/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.762 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 0.926 mW/g
SAR(1 g) = 0.557 mW/g; SAR(10 g) = 0.300 mW/g
Maximum value of SAR (measured) = 0.611 W/kg



0 dB = 0.636 W/kg = -3.93 dB W/kg

GSM1900 Left Head Tilted-Mid

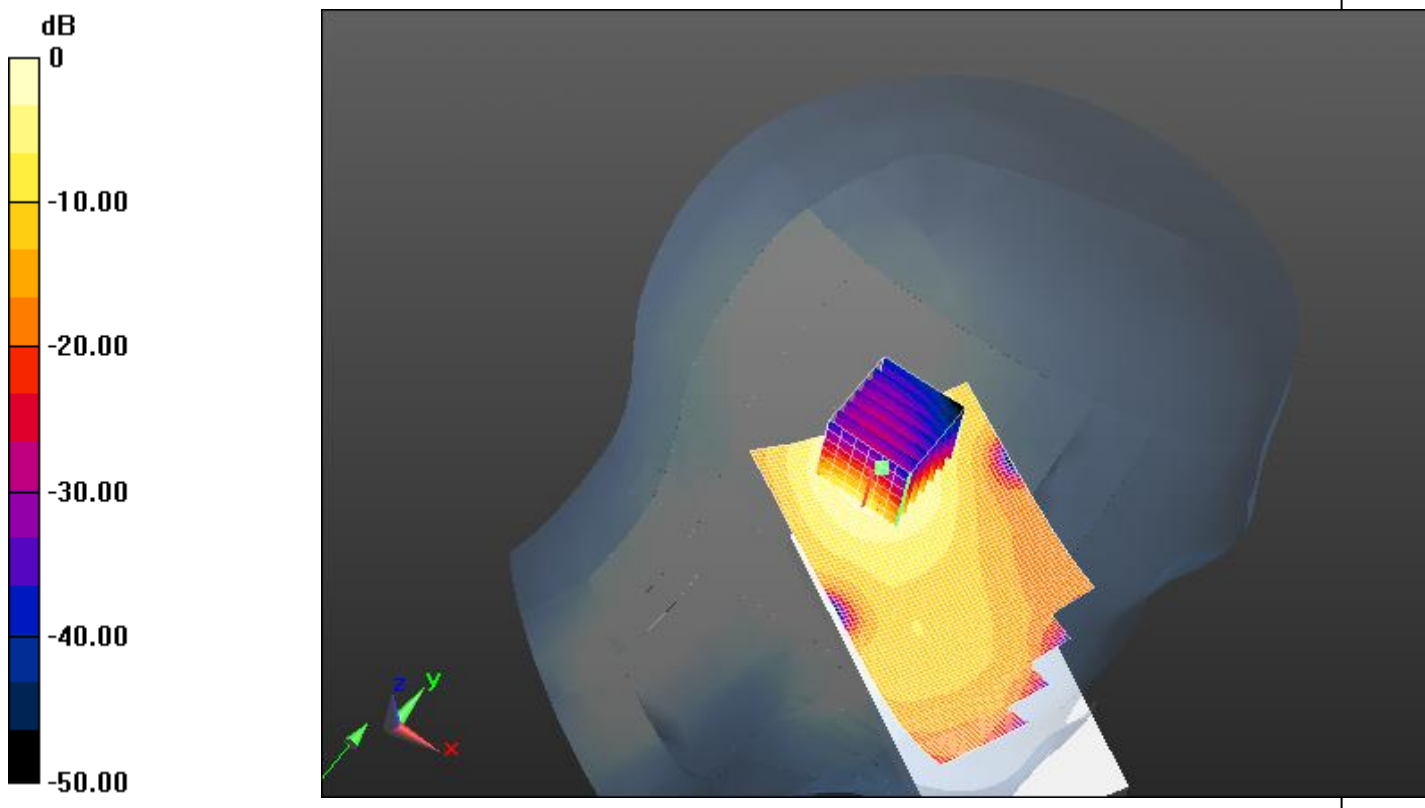
DUT: CLARO; Type: default; Serial: Not Specified

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1880 MHz;Communication System PAR: 9.191 dB
Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51.14; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(4.69, 4.69, 4.69); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

1900_Left GSM Head/1900GSM Tilted2-Mid/Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 13.000 V/m; Power Drift = -0.01 dB
Fast SAR: SAR(1 g) = 0.293 mW/g; SAR(10 g) = 0.159 mW/g
Maximum value of SAR (interpolated) = 0.338 W/kg

1900_Left GSM Head/1900GSM Tilted2-Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.000 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.536 mW/g
SAR(1 g) = 0.308 mW/g; SAR(10 g) = 0.163 mW/g
Maximum value of SAR (measured) = 0.335 W/kg



0 dB = 0.338 W/kg = -9.43 dB W/kg

GSM1900 Right Head Cheek-Mid

DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1880 MHz;Communication System PAR: 9.191 dB
Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51.14; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

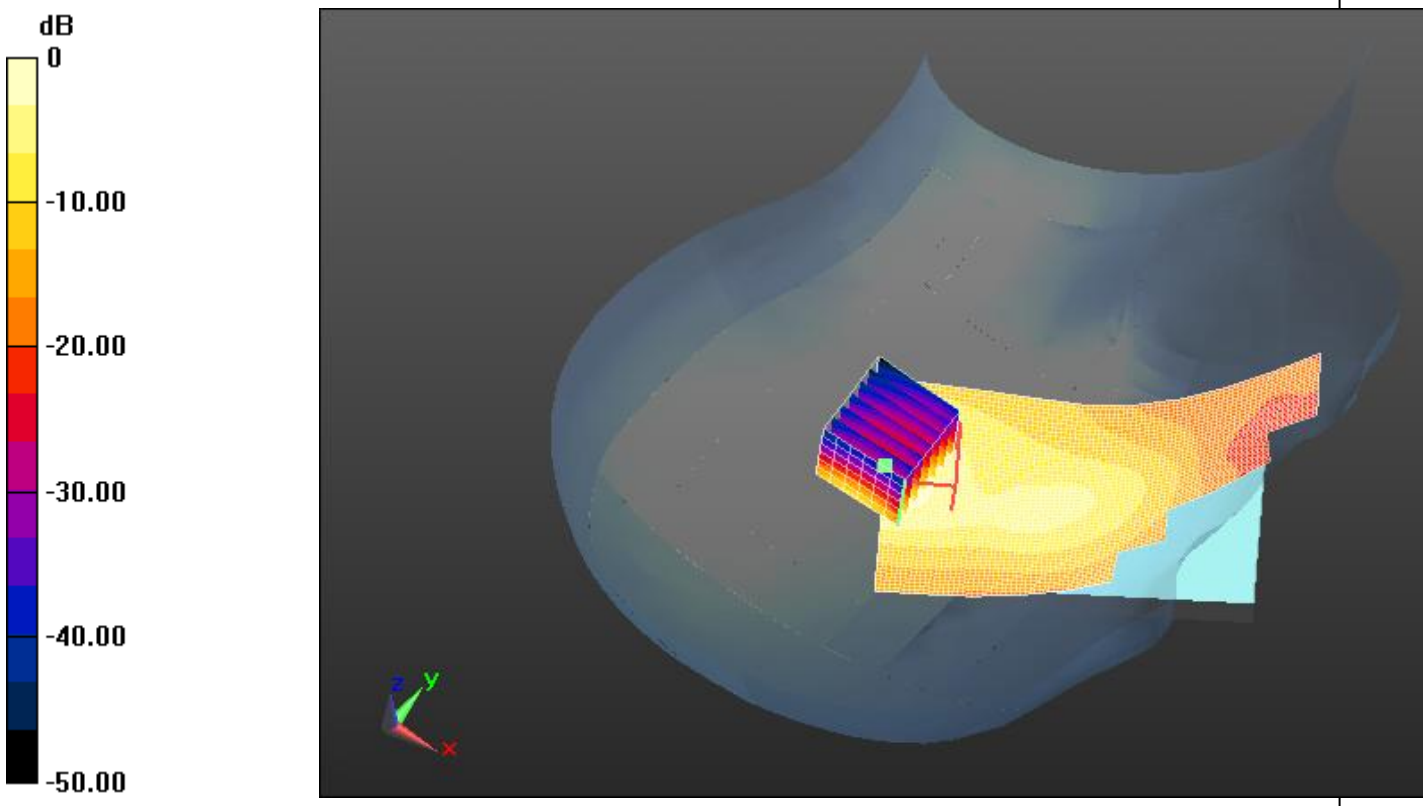
- Probe: ES3DV3 - SN3203; ConvF(4.69, 4.69, 4.69); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

1900_Right GSM Head 2/1900 GSM Cheek-Mid/Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 12.465 V/m; Power Drift = -0.01 dB
Fast SAR: SAR(1 g) = 0.216 mW/g; SAR(10 g) = 0.101 mW/g

Maximum value of SAR (interpolated) = 0.290 W/kg

1900_Right GSM Head 2/1900 GSM Cheek-Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.465 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.427 mW/g
SAR(1 g) = 0.271 mW/g; SAR(10 g) = 0.151 mW/g
Maximum value of SAR (measured) = 0.301 W/kg



0 dB = 0.290 W/kg = -10.75 dB W/kg

GSM1900 Right Head Tilted-Mid

DUT: CLARO; Type: default; Serial: Not Specified
Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1880 MHz;Communication System PAR: 9.191 dB
Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51.14; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

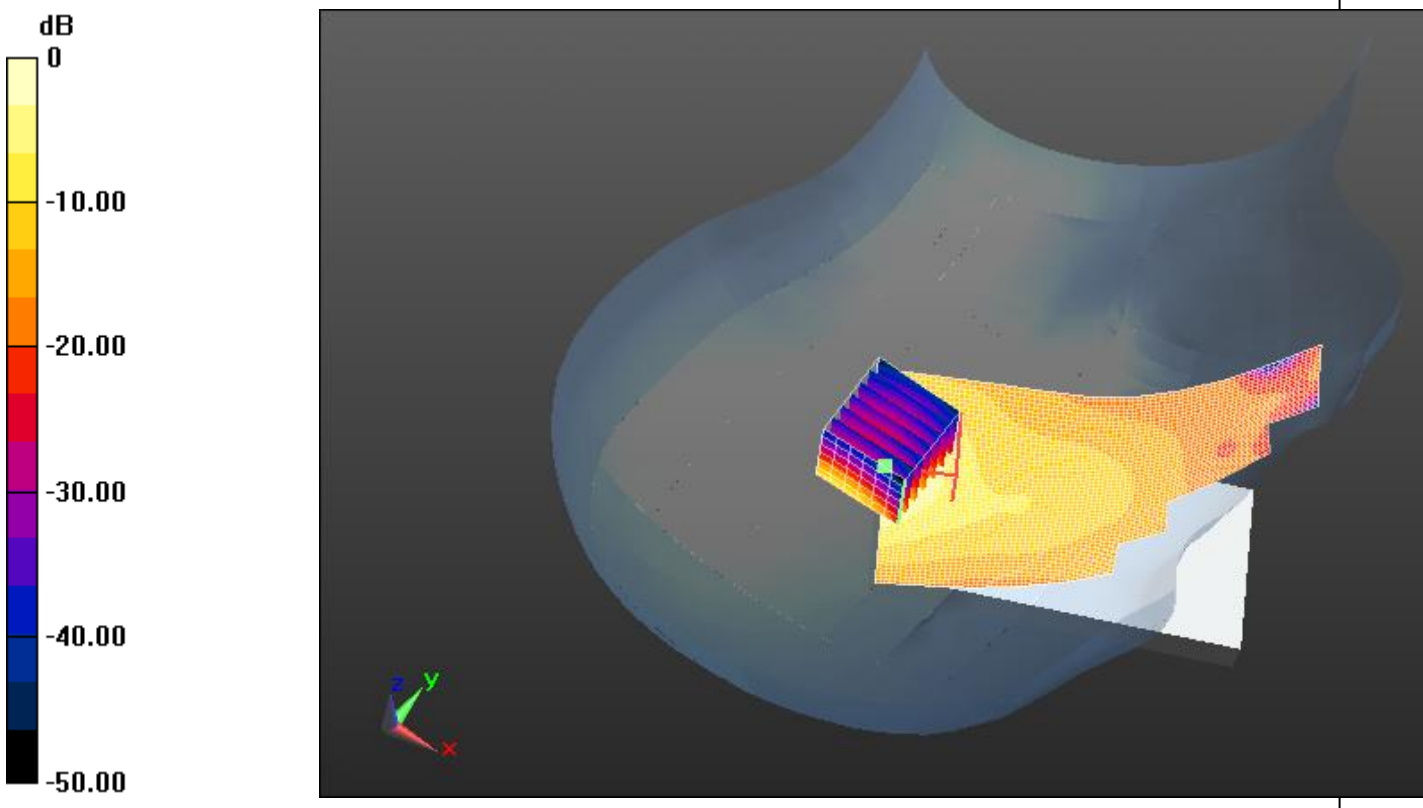
- Probe: ES3DV3 - SN3203; ConvF(4.69, 4.69, 4.69); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

1900_Right GSM Head 2/1900GSM Tilted2-Mid/Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 10.168 V/m; Power Drift = 0.29 dB
Fast SAR: SAR(1 g) = 0.132 mW/g; SAR(10 g) = 0.055 mW/g

Maximum value of SAR (interpolated) = 0.214 W/kg

1900_Right GSM Head 2/1900GSM Tilted2-Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.168 V/m; Power Drift = 0.29 dB
Peak SAR (extrapolated) = 0.421 mW/g
SAR(1 g) = 0.261 mW/g; SAR(10 g) = 0.140 mW/g

Maximum value of SAR (measured) = 0.285 W/kg



0 dB = 0.214 W/kg = -13.38 dB W/kg

GSM850 Body GSM Facedown-Low

DUT: DUT Sample-2; Type: Sample; Serial: IMEI Number

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 824.2 MHz;Communication System PAR: 9.191 dB

Medium parameters used (extrapolated): f = 824.2 MHz; σ = 0.999 mho/m; ε_r = 55.967; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(6.09, 6.09, 6.09); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

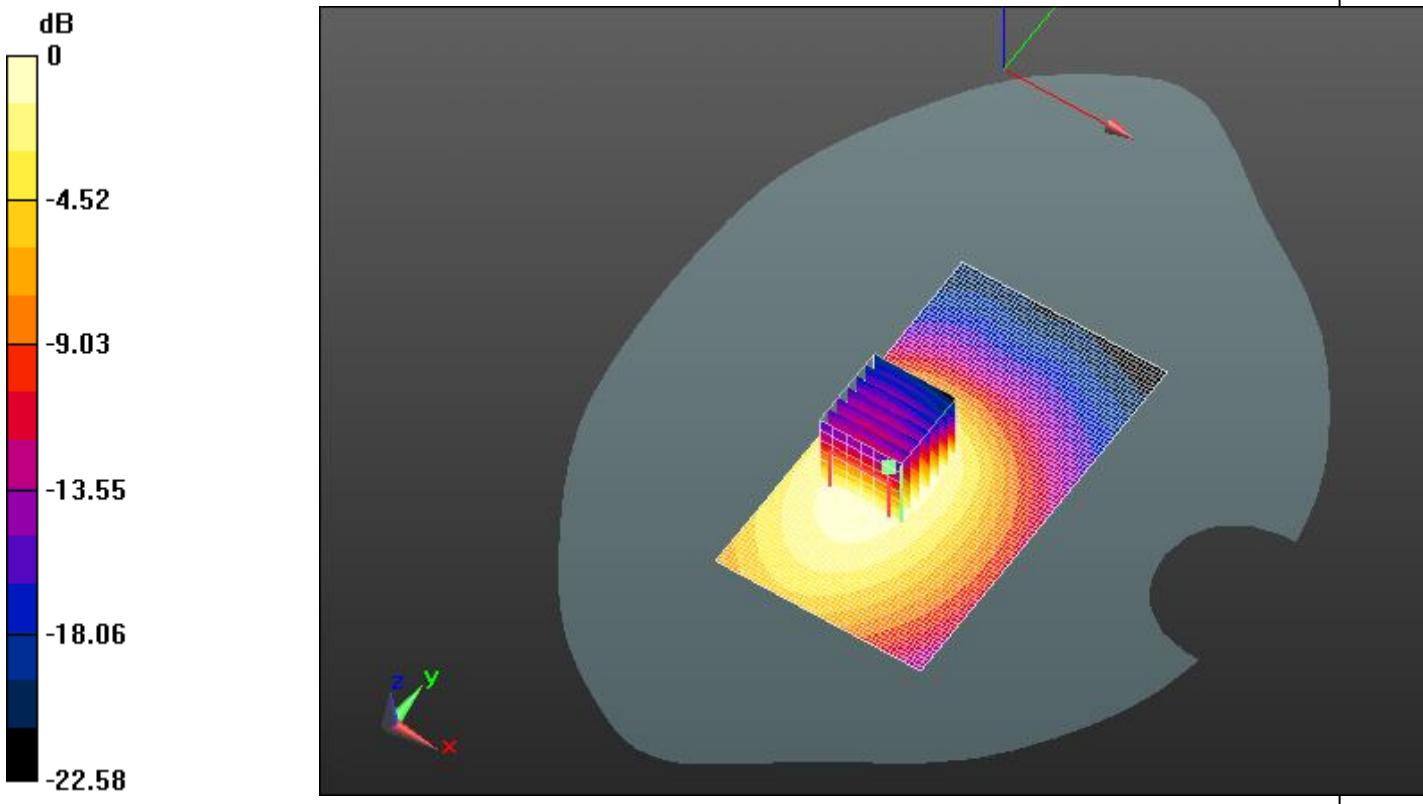
GSM 850_Facedown/Low/Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 17.493 V/m; Power Drift = -0.03 dB
Fast SAR: SAR(1 g) = 0.591 mW/g; SAR(10 g) = 0.401 mW/g

Info: Extrapolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.629 W/kg

GSM 850_Facedown/Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.493 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.837 mW/g
SAR(1 g) = 0.571 mW/g; SAR(10 g) = 0.400 mW/g

Info: Extrapolated medium parameters used for SAR evaluation.

Warning: Maximum averaged SAR over 10 g is located on the boundary of the measurement cube. This cube might not incorporate the absolute averaged SAR. Please consider a refinement of the Area Scan measurement.
Maximum value of SAR (measured) = 0.612 W/kg



0 dB = 0.629 W/kg = -4.03 dB W/kg

GSM850 Body GSM Facedown-Mid

DUT: DUT Sample-2; Type: Sample; Serial: IMEI Number

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 836.6 MHz;Communication System PAR: 9.191 dB

Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 55.858; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(6.09, 6.09, 6.09); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

GSM 850_Facedown/Mid/Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 18.264 V/m; Power Drift = 0.09 dB

Fast SAR: SAR(1 g) = 0.699 mW/g; SAR(10 g) = 0.473 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.744 W/kg

GSM 850_Facedown/Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.264 V/m; Power Drift = 0.09 dB

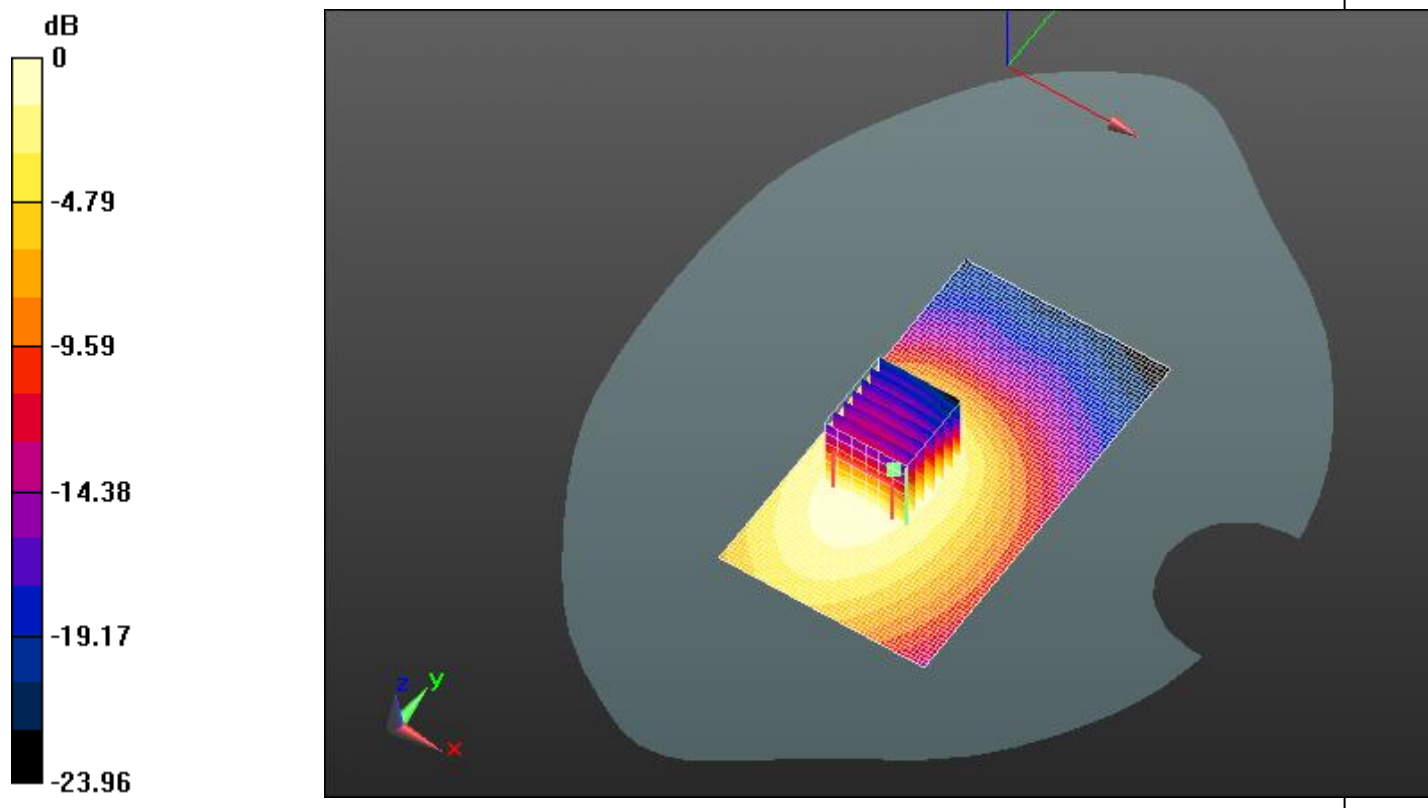
Peak SAR (extrapolated) = 0.988 mW/g

SAR(1 g) = 0.680 mW/g; SAR(10 g) = 0.479 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Warning: Maximum averaged SAR over 10 g is located on the boundary of the measurement cube. This cube might not incorporate the absolute averaged SAR. Please consider a refinement of the Area Scan measurement.

Maximum value of SAR (measured) = 0.725 W/kg



0 dB = 0.744 W/kg = -2.56 dB W/kg

GSM850 Body GSM Facedown-High

DUT: DUT Sample-2; Type: Sample; Serial: IMEI Number
Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz);
Frequency: 848.8 MHz;Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 848.8 MHz; σ = 1.019 mho/m; ε_r = 55.75; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(6.09, 6.09, 6.09); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

GSM 850_Facedown/High/Area Scan (51x91x1): Interpolated grid: dx=1.500 mm,

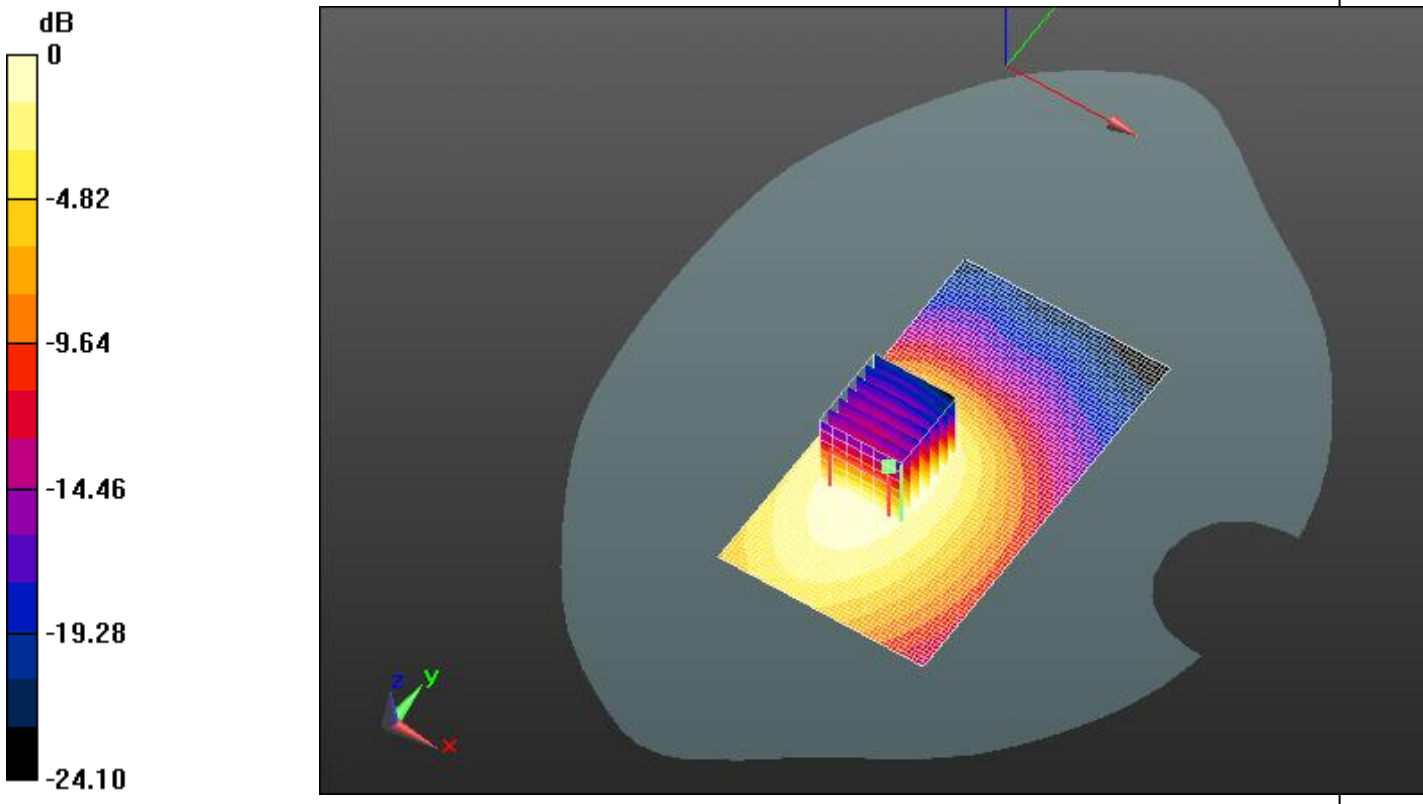
dy=1.500 mm
Reference Value = 18.344 V/m; Power Drift = 0.09 dB
Fast SAR: SAR(1 g) = 0.745 mW/g; SAR(10 g) = 0.504 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.793 W/kg

GSM 850_Facedown/High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.344 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.031 mW/g
SAR(1 g) = 0.722 mW/g; SAR(10 g) = 0.506 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Warning: Maximum averaged SAR over 10 g is located on the boundary of the measurement cube. This cube might not incorporate the absolute averaged SAR. Please consider a refinement of the Area Scan measurement.
Maximum value of SAR (measured) = 0.771 W/kg



0 dB = 0.793 W/kg = -2.01 dB W/kg

GSM850 Body GSM Faceup-Mid

DUT: CLARO; Type: Sample; Serial: IMEI Number

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 836.6 MHz;Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.96 mho/m; ε_r = 55.858; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

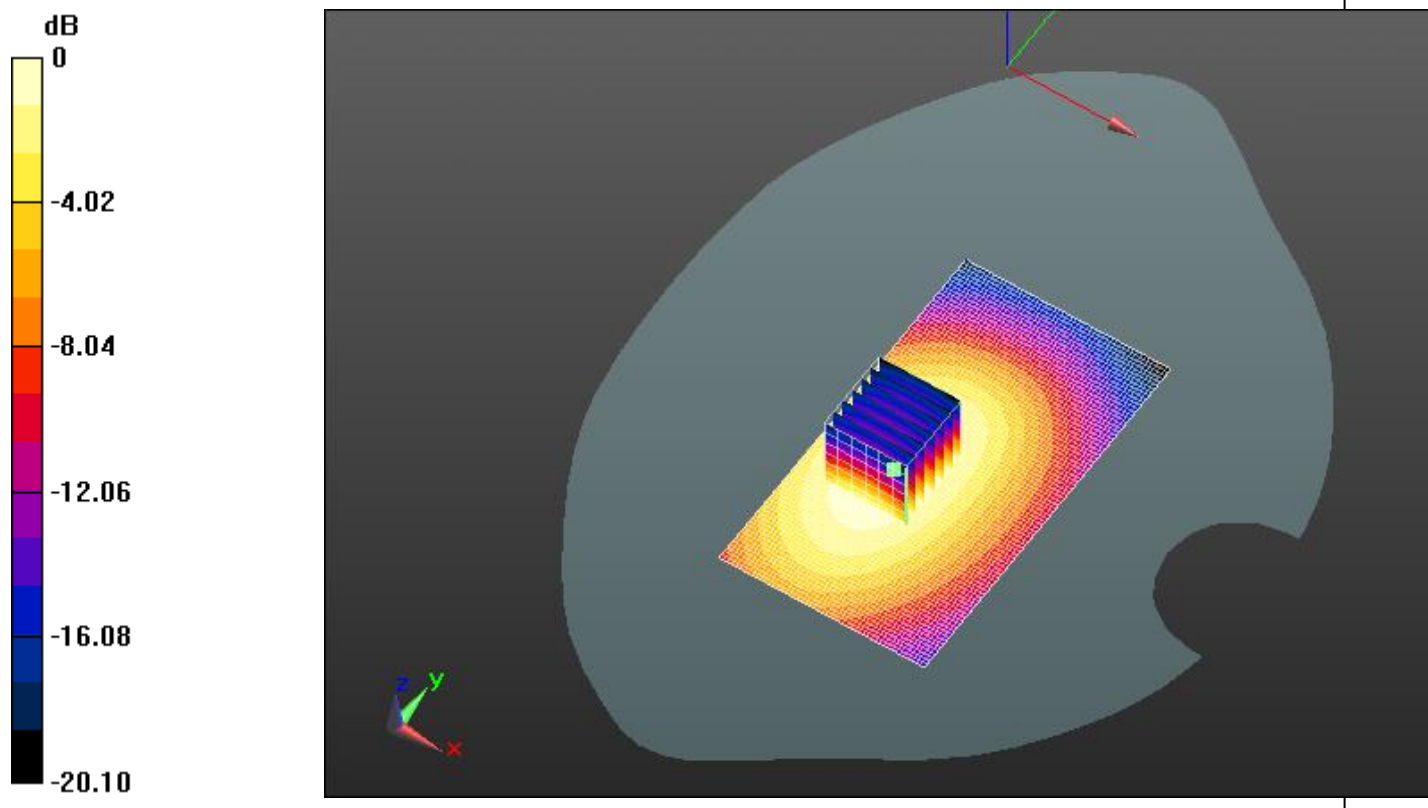
- Probe: ES3DV3 - SN3203; ConvF(6.09, 6.09, 6.09); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

GSM 850_Faceup/Mid/Area Scan (51x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 13.955 V/m; Power Drift = -0.11 dB
Fast SAR: SAR(1 g) = 0.243 mW/g; SAR(10 g) = 0.166 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.259 W/kg

GSM 850_Faceup/Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.955 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.322 mW/g
SAR(1 g) = 0.241 mW/g; SAR(10 g) = 0.169 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.254 W/kg



0 dB = 0.259 W/kg = -11.74 dB W/kg

GSM1900 BODY GSM Faceup-Mid

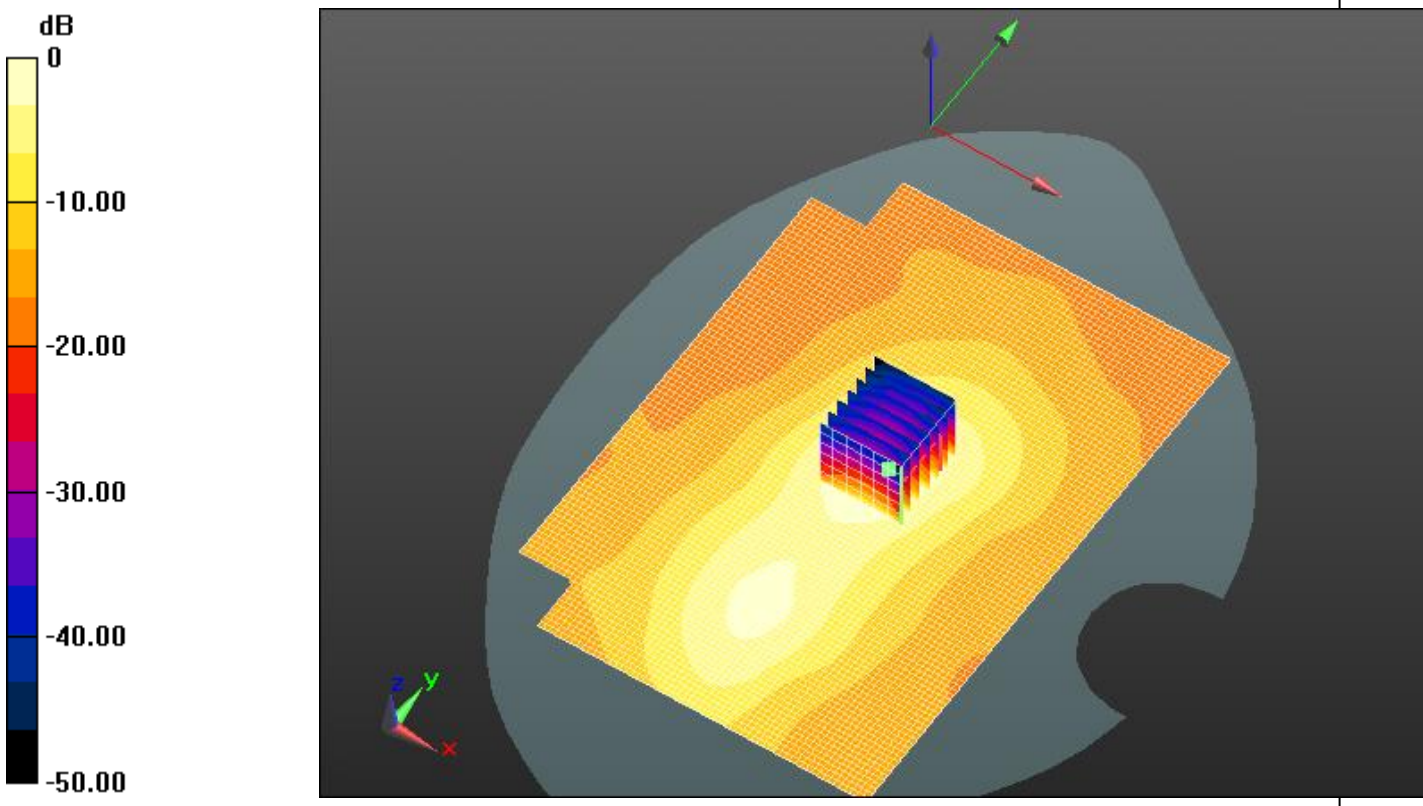
DUT: sq35; Type: Sample; Serial: IMEI Number
Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1880 MHz;Communication System PAR: 9.191 dB
Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51.14; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(4.69, 4.69, 4.69); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

1900_GSM1900/1900 GSM-Mid faceup/Area Scan (101x71x1): Interpolated grid: dx=2.000 mm, dy=2.000 mm

Reference Value = 8.819 V/m; Power Drift = 0.09 dB
Fast SAR: SAR(1 g) = 0.124 mW/g; SAR(10 g) = 0.071 mW/g
Maximum value of SAR (interpolated) = 0.146 W/kg

1900_GSM1900/1900 GSM-Mid faceup/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.819 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.575 mW/g
SAR(1 g) = 0.155 mW/g; SAR(10 g) = 0.081 mW/g
Maximum value of SAR (measured) = 0.136 W/kg



0 dB = 0.146 W/kg = -16.73 dB W/kg

GSM1900 BODY GSM Facedown-Low

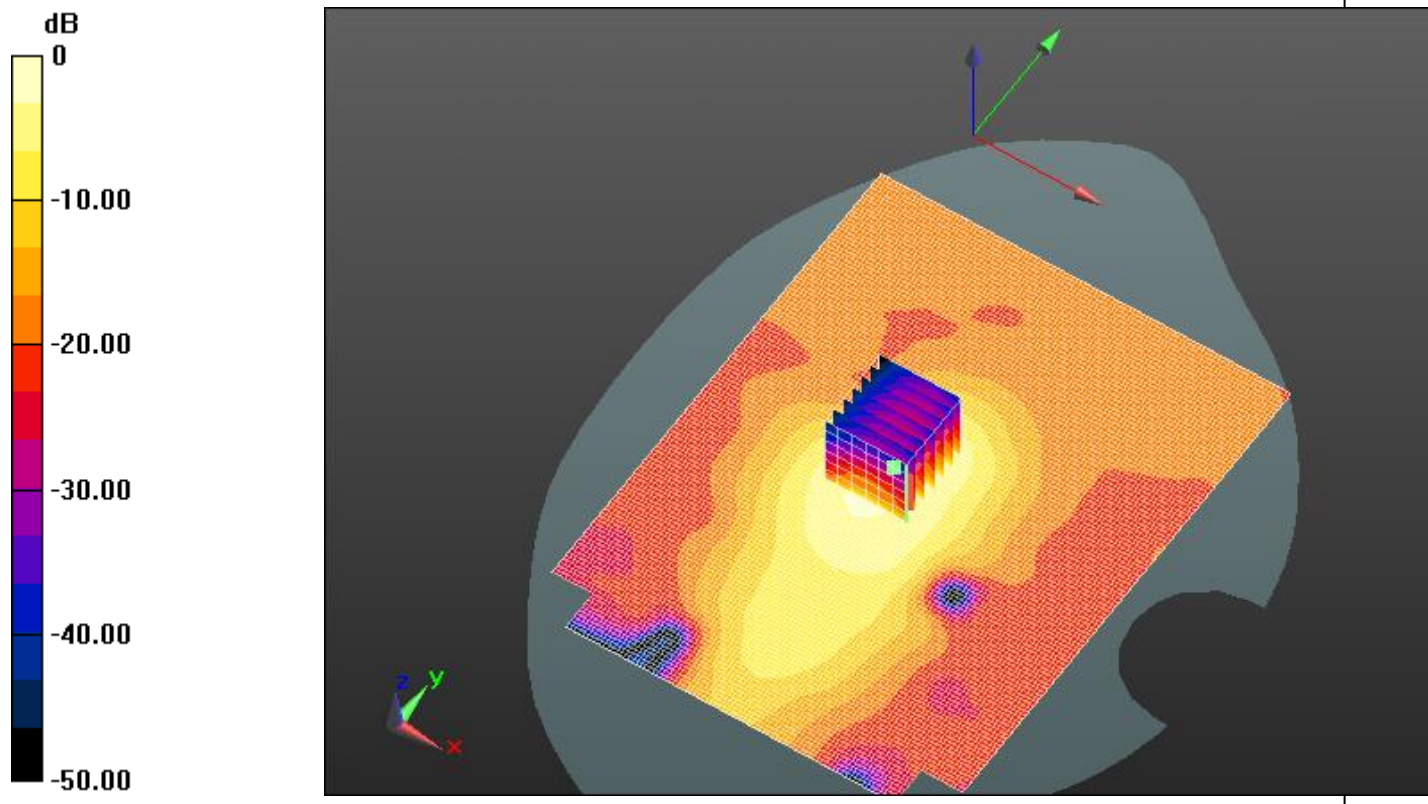
DUT: sq35; Type: Sample; Serial: IMEI Number
Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1850.2 MHz;Communication System PAR: 9.191 dB
Medium parameters used: f = 1850.2 MHz; σ = 1.53 mho/m; ε_r = 51.24; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(4.69, 4.69, 4.69); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated

- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

1900_GSM1900/1900 GSM- 1-Low/Area Scan (131x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 12.077 V/m; Power Drift = 0.18 dB
Fast SAR: SAR(1 g) = 0.425 mW/g; SAR(10 g) = 0.221 mW/g
Maximum value of SAR (interpolated) = 0.513 W/kg

1900_GSM1900/1900 GSM- 1-Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.077 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 2.267 mW/g
SAR(1 g) = 0.551 mW/g; SAR(10 g) = 0.262 mW/g
Maximum value of SAR (measured) = 0.495 W/kg



0 dB = 0.513 W/kg = -5.79 dB W/kg

GSM1900 BODY GSM Facedown-Mid

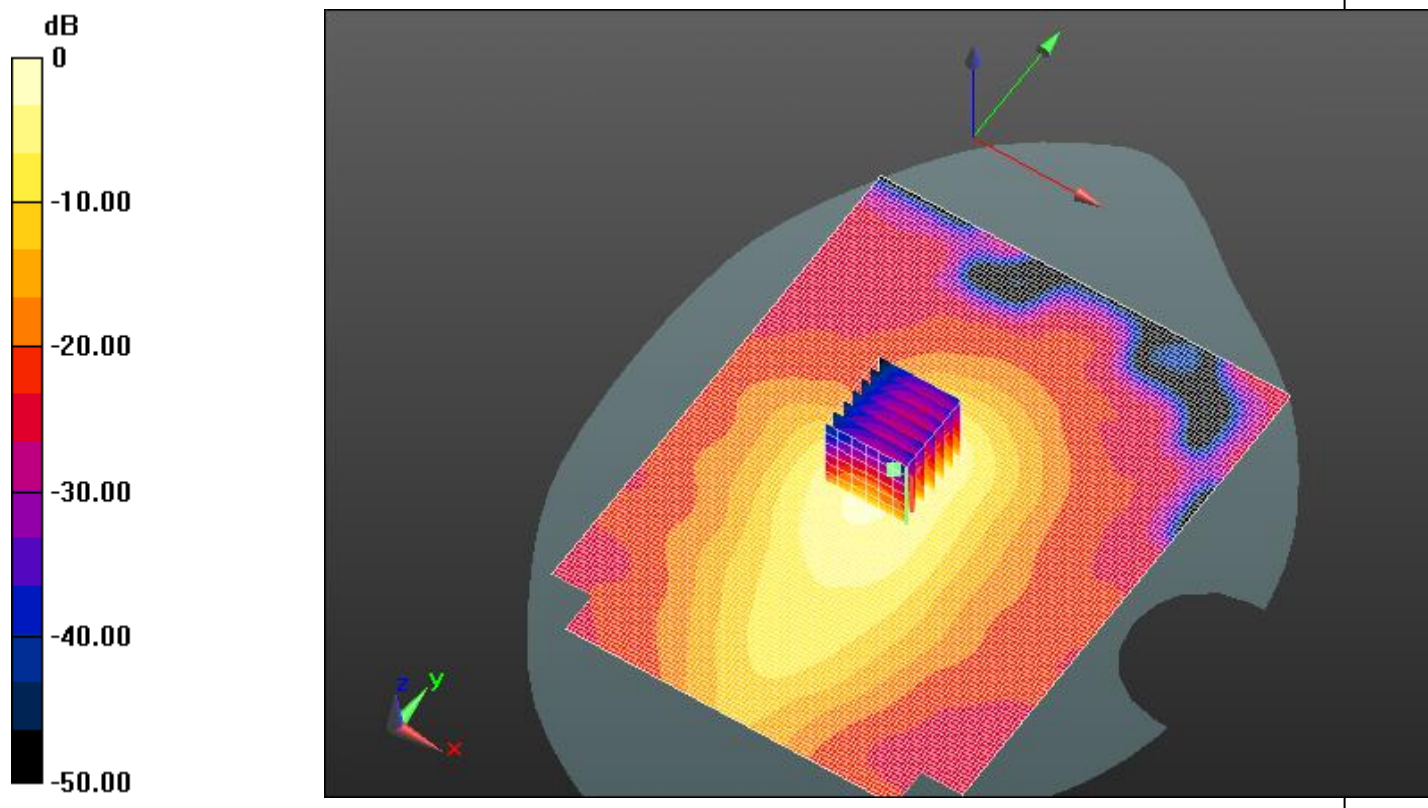
DUT: sq35; Type: Sample; Serial: IMEI Number

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1880 MHz;Communication System PAR: 9.191 dB
Medium parameters used: f = 1880 MHz; σ = 1.57 mho/m; ε_r = 51.14; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3203; ConvF(4.69, 4.69, 4.69); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

1900_GSM1900/1900 GSM-Mid facedown/Area Scan (131x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 12.100 V/m; Power Drift = 0.07 dB
Fast SAR: SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.232 mW/g
Maximum value of SAR (interpolated) = 0.548 W/kg

1900_GSM1900/1900 GSM-Mid facedown/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.100 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 2.384 mW/g
SAR(1 g) = 0.579 mW/g; SAR(10 g) = 0.272 mW/g
Maximum value of SAR (measured) = 0.520 W/kg



0 dB = 0.548 W/kg = -5.23 dB W/kg

GSM1900 BODY GSM Facedown-High

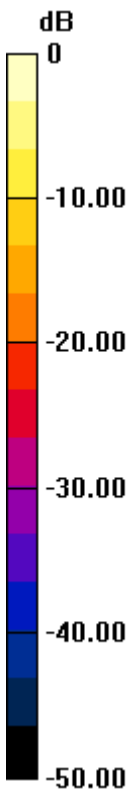
DUT: sq35; Type: Sample; Serial: IMEI Number
Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1909.8 MHz;Communication System PAR: 9.191 dB
Medium parameters used: f = 1909.8 MHz; σ = 1.59 mho/m; ε_r = 51.04; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

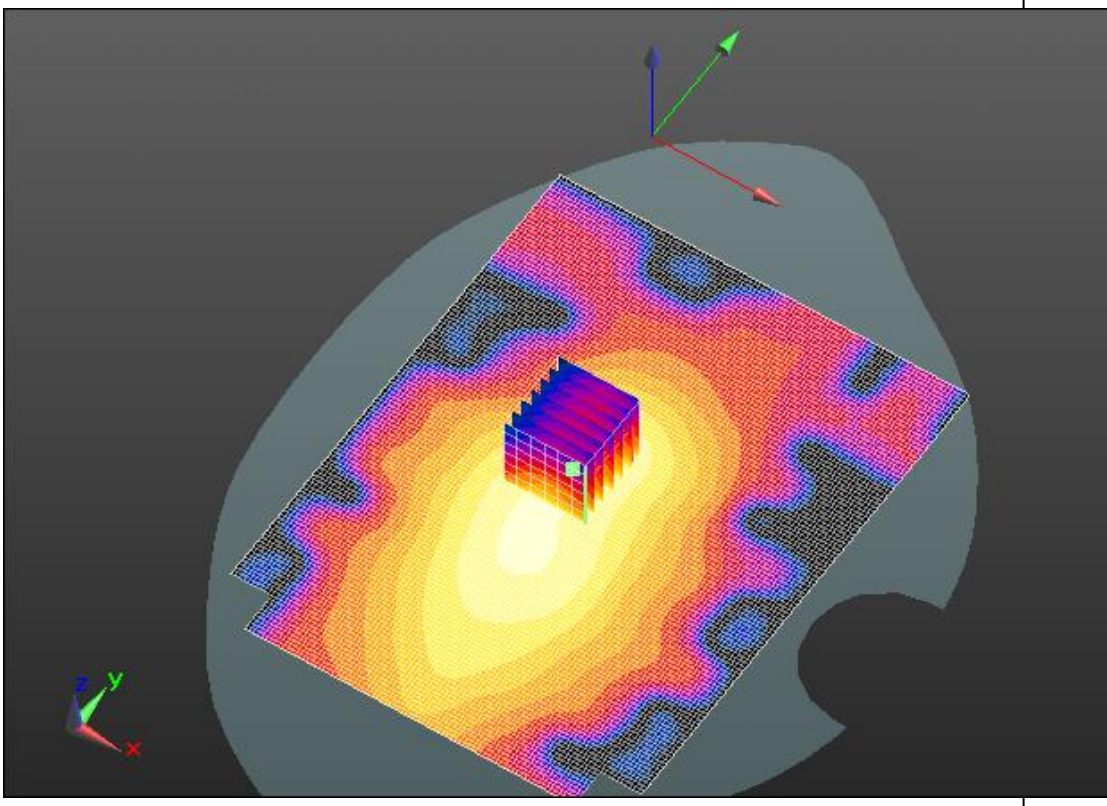
- Probe: ES3DV3 - SN3203; ConvF(4.69, 4.69, 4.69); Calibrated: 2012.10.12.;
    - Modulation Compensation: Not calibrated
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn876; Calibrated: 2009.02.03.
- Phantom: SAM 1; Type: QD000P40CC; Serial: TP:1504
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

1900_GSM1900/1900 GSM- 1-High/Area Scan (131x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Reference Value = 9.959 V/m; Power Drift = -0.01 dB
Fast SAR: SAR(1 g) = 0.339 mW/g; SAR(10 g) = 0.173 mW/g
Maximum value of SAR (interpolated) = 0.416 W/kg

1900_GSM1900/1900 GSM- 1-High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.959 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.836 mW/g
SAR(1 g) = 0.445 mW/g; SAR(10 g) = 0.203 mW/g
Maximum value of SAR (measured) = 0.408 W/kg





0 dB = 0.416 W/kg = -7.62 dB W/kg

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

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

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Accreditation No.: SCS 108

Client SMQ (Auden)

Certificate No: ES3-3203_Oct12

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3203

Calibration procedure(s): QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: October 24, 2012

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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
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: October 25, 2012

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

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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) **Accreditation No.: SCS 108**

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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	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., $\vartheta = 0$ 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 $\vartheta = 0$ ($f \leq 900$ 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, VRx,y,z*: *A, B, C* 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 $f \leq 800$ 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:3203

Manufactured: July 1, 2008
Calibrated: October 24, 2012

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3203

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.48	1.35	1.17	± 10.1 %
DCP (mV)[B]	97.4	98.4	100.6	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.0	0.0	1.0	165.4	±3.3 %
			Y	0.0	0.0	1.0	162.0	
			Z	0.0	0.0	1.0	142.5	

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.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3203

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)
900	41.5	0.97	6.17	6.17	6.17	0.22	2.35	± 12.0 %
1810	40.0	1.40	5.20	5.20	5.20	0.62	1.36	± 12.0 %
2450	39.2	1.80	4.48	4.48	4.48	0.62	1.54	± 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:3203

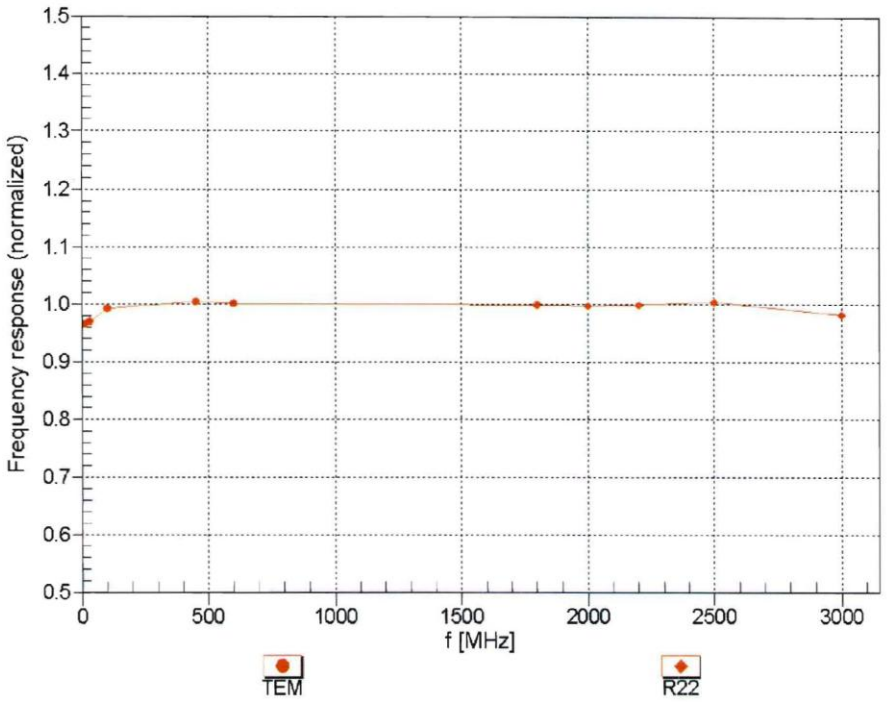
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.35	7.35	7.35	0.08	1.20	± 13.4 %
900	55.0	1.05	6.19	6.19	6.19	0.26	2.17	± 12.0 %
1810	53.3	1.52	4.91	4.91	4.91	0.58	1.45	± 12.0 %
2450	52.7	1.95	4.22	4.22	4.22	0.80	1.18	± 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.

Frequency Response of E-Field

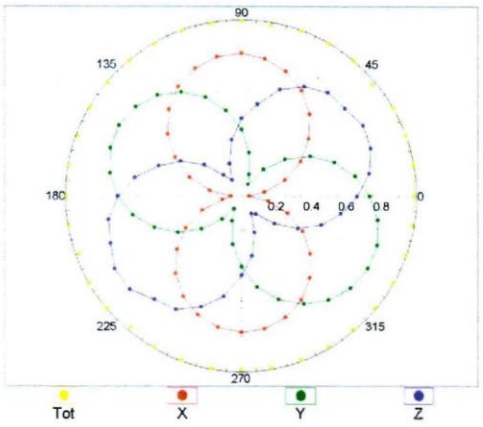
(TEM-Cell:ifi110 EXX, Waveguide: R22)



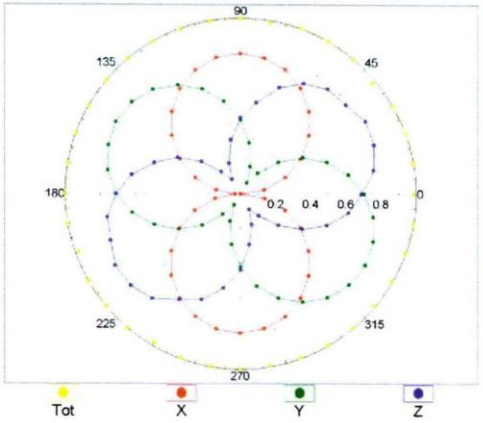
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

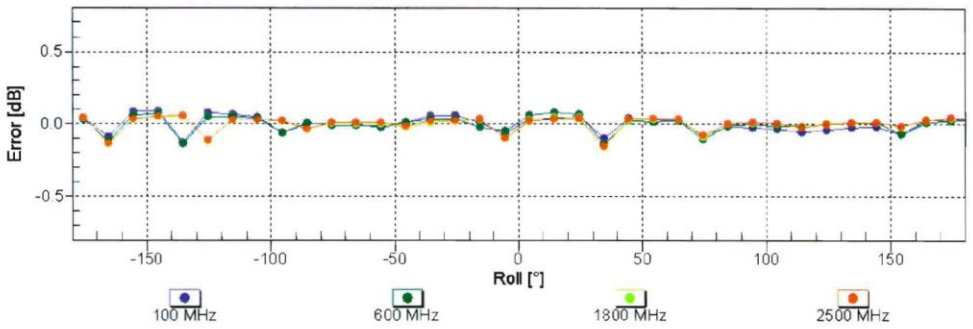
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



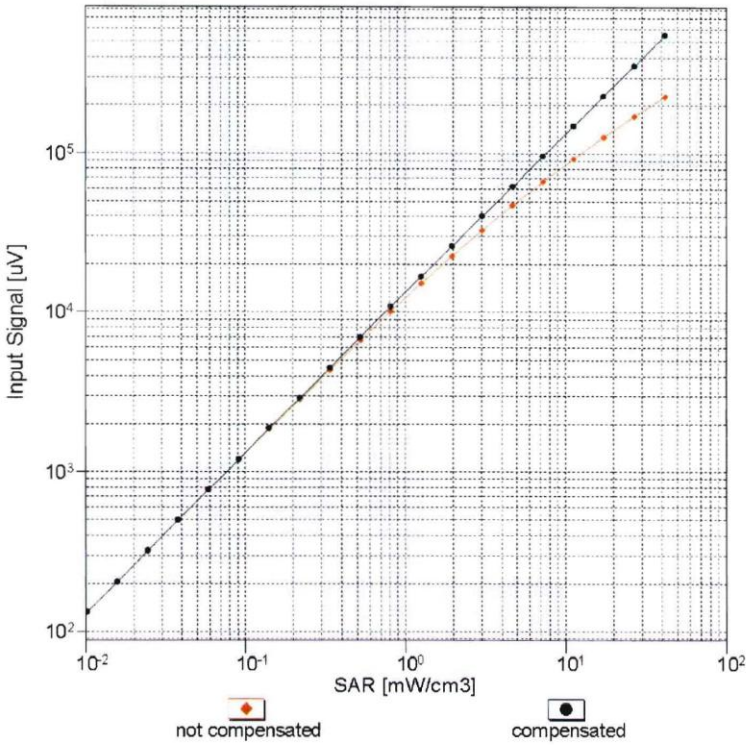
f=1800 MHz,R22

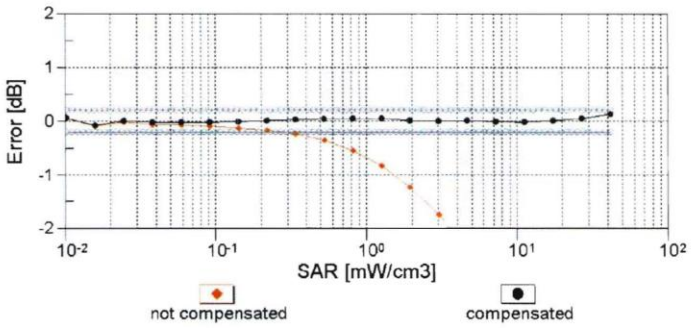




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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





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

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

Calibration Laboratory of
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Accreditation No.: SCS 108

Client **SMQ (Auden)**

Certificate No: D900V2-1d077_Oct12

CALIBRATION CERTIFICATE

Object	D900V2 - SN: 1d077
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	October 16, 2012

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 16, 2012

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
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 1528-2003, "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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

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	V52.8.3
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 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	0.97 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.1 ± 6 %	0.98 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	2.73 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**10.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.99 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	55.0	1.05 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.1 ± 6 %	1.05 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	2.78 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**11.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.78 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**7.08 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.0 Ω - 7.3 jΩ
Return Loss	- 22.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.3 Ω - 8.0 jΩ
Return Loss	- 20.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.410 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	January 29, 2008

DASY5 Validation Report for Head TSL

Date: 16.10.2012

Test Laboratory: SPEAG

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN: 1d077

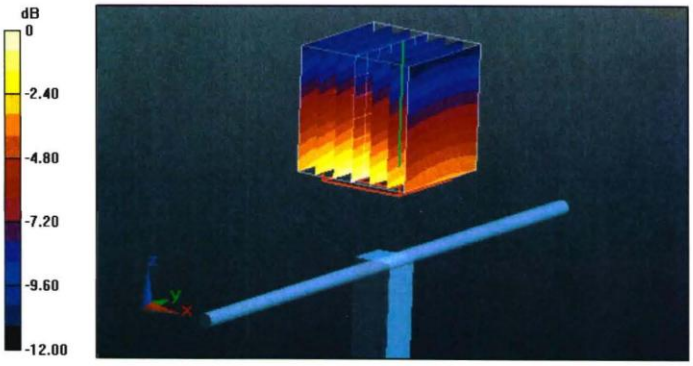
Communication System: CW; Frequency: 900 MHz
Medium parameters used: f = 900 MHz; σ = 0.98 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.97, 5.97, 5.97); Calibrated: 12/30/2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 6/27/2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

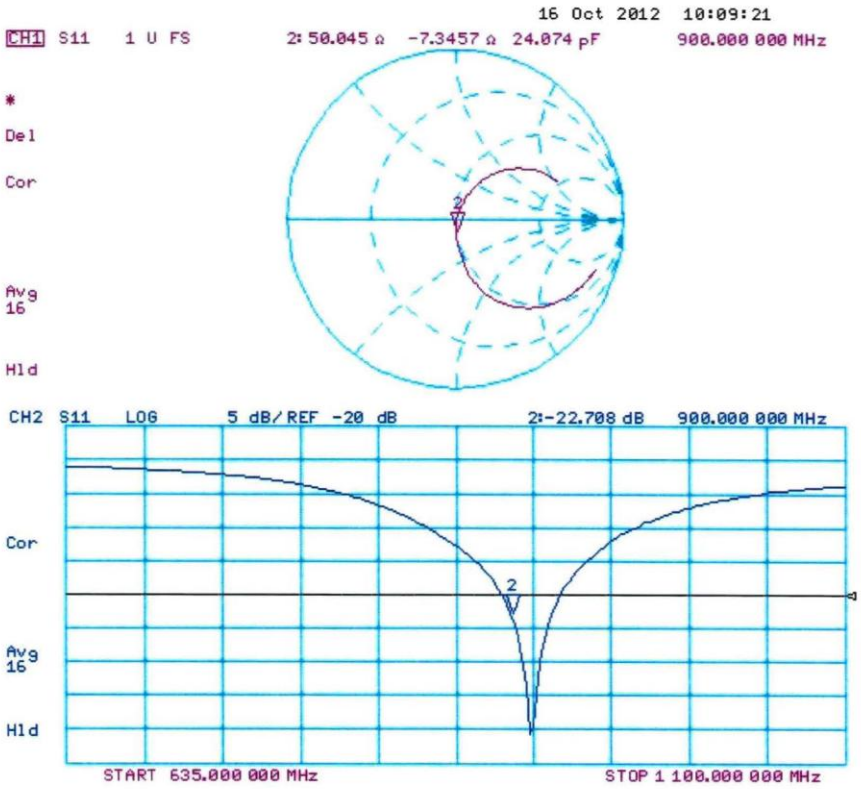
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.073 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 4.10 W/kg
SAR(1 g) = 2.73 W/kg; SAR(10 g) = 1.76 W/kg
Maximum value of SAR (measured) = 3.17 W/kg



0 dB = 3.17 W/kg = 5.01 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.10.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN: 1d077

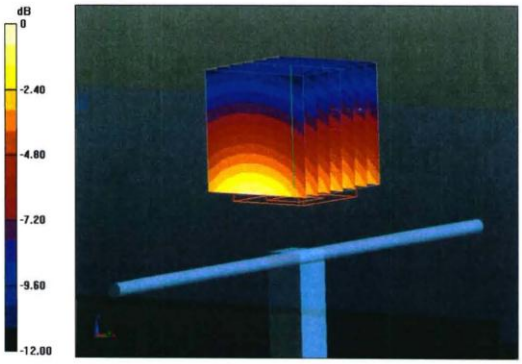
Communication System: CW; Frequency: 900 MHz
Medium parameters used: f = 900 MHz; σ = 1.05 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.94, 5.94, 5.94); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

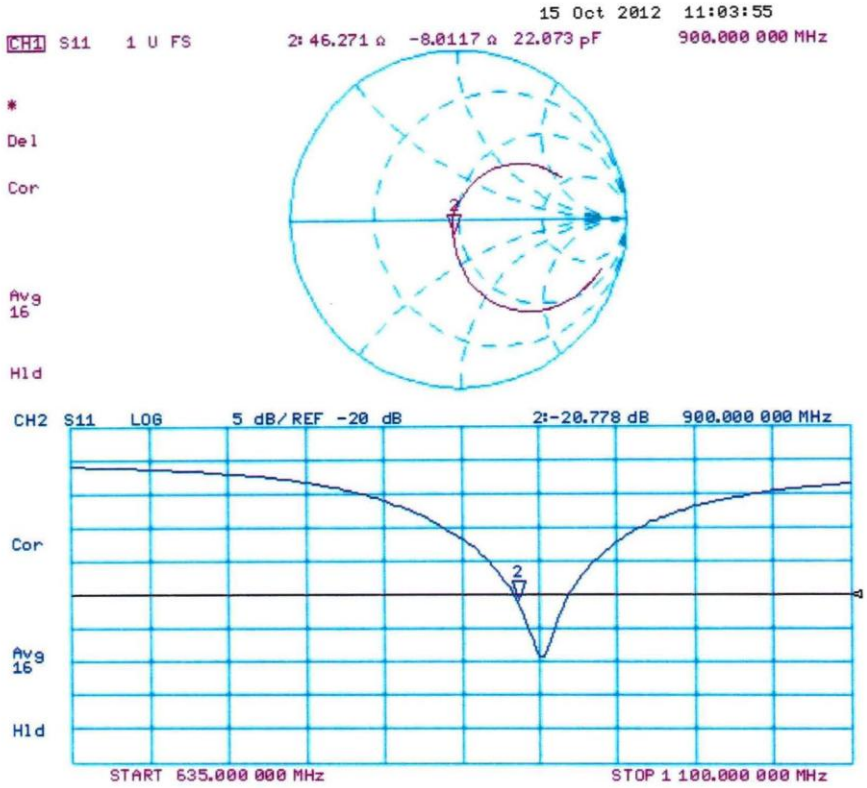
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.073 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 4.26 W/kg
SAR(1 g) = 2.78 W/kg; SAR(10 g) = 1.78 W/kg
Maximum value of SAR (measured) = 3.25 W/kg



0 dB = 3.25 W/kg = 5.12 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client SMQ (Auden)

Certificate No: D1800V2-2d171_Oct12

CALIBRATION CERTIFICATE

Object: D1800V2 - SN: 2d171

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: October 12, 2012

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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

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

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

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
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 1528-2003, "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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

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	V52.8.3
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 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	39.4 ± 6 %	1.38 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	9.44 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**38.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.98 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.0 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	51.8 ± 6 %	1.53 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	9.57 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**37.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.06 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.1 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.7 Ω - 1.6 jΩ
Return Loss	- 35.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.1 Ω - 2.2 jΩ
Return Loss	- 26.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.211 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 04, 2008