SAR TEST REPORT

Equipment Under Test	:	Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN
Model No.	:	LG-C205 (add: C205, LGC205)
Applicant	:	LG Electronics MobileComm U.S.A., Inc.
Address of Applicant	:	10101 Old Grove Road, San Diego, CA 92131
FCC ID	:	ZNFC205
Device Category	:	Portable Device
Exposure Category	:	General Population/Uncontrolled Exposure
Date of Receipt	:	2012-01-02
Date of Test(s)	:	2012-03-24 ~ 2012-03-26, 2012-04-16~2012-04-17
Date of Issue	:	2012-04-17
Max. SAR	:	0.704 W/kg (GSM850), 1.18 W/kg (PCS1900), 0.581 W/kg (WLAN 11b)

Standards:

FCC OET Bulletin 65 supplement C
IEEE 1528, 2003
ANSI/IEEE C95.1, C95.3

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Korea Co., Ltd. (Gunpo Laboratory) or testing done by SGS Korea Co., Ltd. (Gunpo Laboratory) in connection with distribution or use of the product described in this report must be approved by SGS Korea Co., Ltd. (Gunpo Laboratory) in writing.

Tested by	:	**Fred Jeong**	정 용 모	**2012-04-17**
Approved by	:	**Charles Kim**	C.K.K	**2012-04-17**

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APPENDIX

A. DASY4 SAR Report
B. Uncertainty Analysis
C. Calibration certificate

1. General Information

1.1 Testing Laboratory

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Telephone : +82 +31 428 5700
FAX : +82 +31 427 2371
Homepage : www.kr.sgs.com/ee

1.2 Details of Manufacturer

Manufacturer : LG Electronics MobileComm U.S.A., Inc.
Address : 10101 Old Grove Road, San Diego, CA 92131
Contact Person : smyung - Lee
Phone No. : 82-2-2033-1222
E-mail : smyung.lee@lge.com

1.3 Version of Report

Version Number	Date	Revision
00	2012-04-10	Initial issue
01	2012-04-17	Revision 01

1.4 Description of EUT(s)

EUT Type	: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN
Model	: LG-C205 (add : C205, LGC205)
Serial Number	: 202KPGS137023
Mode of Operation	: GSM850, PCS1900, WLAN, Bluetooth
Duty Cycle	: 8.3(GSM), 8.3(GPRS 1Tx Slot), 4.15(GPRS 2Tx Slot), 2.77(GPRS 3Tx Slot), 2.075(GPRS 4Tx Slot)
Body worn Accessory	: None
Tx Frequency Range	: 824.2 ㎒ ~ 848.8 ㎒ (GSM850) 1850.2 ㎒ ~ 1909.8 ㎒ (PCS1900) 2412 ㎒ ~ 2462 ㎒ (WLAN) 2402 ㎒ ~ 2480 ㎒ (Bluetooth)
Conducted Max Power	: 33.09 ㏈m(GSM850), 30.11 ㏈m(PCS1900), 14.24 ㏈m(WLAN), -0.86 ㏈m(Bluetooth)
Battery Type	: 3.7 V d.c. (Lithum-ion Battery)

1.5 Test Environment

Ambient temperature	: (22 ± 2) ° C
Tissue Simulating Liquid	: (22 ± 2) ° C
Relative Humidity	: (55 ± 5) % R.H.

1.6 Operation Configuration

The device in GSM was controlled by using a Communication tester (CMU 200). Communication between the device and the tester was established by air link. And the client provided a special driver and test program which can control the frequency and power of the WLAN module. Measurements were performed at the lowest, middle and highest channels of the operating band. The EUT was set to maximum power level during all tests and at the beginning of each test the battery was fully charged.

The DASY4 system measures power drift during SAR testing by comparing e-field in the same location at the beginning and at the end of measurement. Based on the RF Power and antenna separation distance, stand-alone BT SAR and simultaneous SAR evaluation are not required.

1.7 EVALUATION PROCEDURES

- Power Reference Measurement Procedures

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 4 ㎜. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties (for example, 2.7 ㎜ for an ET3DV6 probe type).

- The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan.
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1 g and 10 g.

The probe is calibrated at the center of the dipole sensors that is located 1 ㎜ to 2.7 ㎜ away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within –2 ㏈ of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1 % for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 ㎜.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1 g and 10 g peak evaluations are only available for the predefined cube 7x7x7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30x30x30 ㎜ contains about 30 g of tissue. The first procedure is an extrapolation (incl. Boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume. In the last step, a 1 g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

1.8 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (Speag Dasy 4 professional system). A Model ET3DV6 1782 E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-simulant. The DASY4 system for performing compliance tests consists of the following items:

•A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).

•A dosimeter probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

•A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

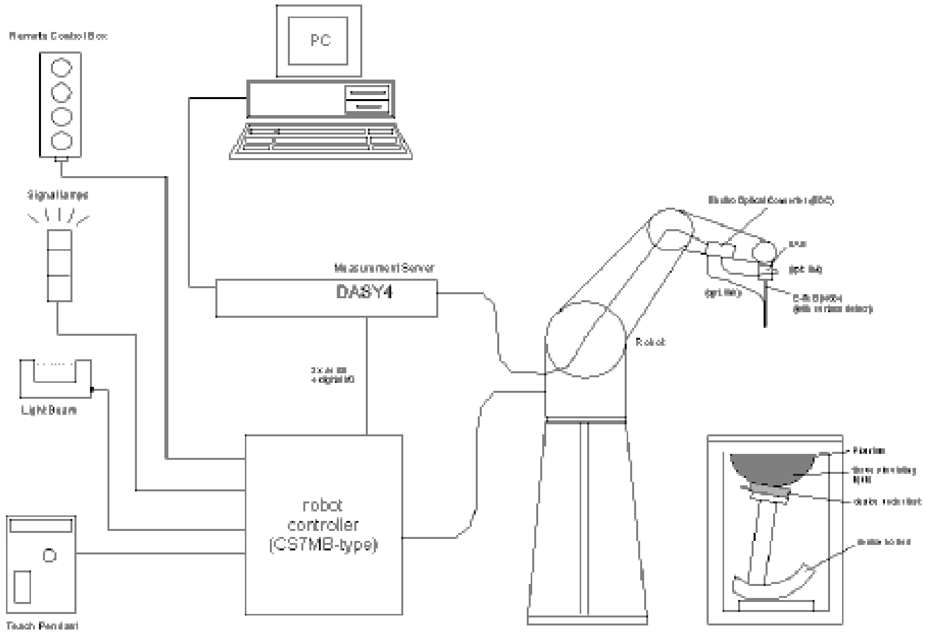


Fig a. The microwave circuit arrangement used for SAR system verification

- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing body usage.
- The device holder for flat phantom.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

1.9 System Components

ET3DV6 E-Field Probe

Construction	:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol).
Calibration	:	In air from 10 ㎒ to 2.5 ㎓ In brain simulating tissue (accuracy ± 8 %)
Frequency	:	10 ㎒ to >6 ㎓; Linearity: ±0.2 ㏈ (30 ㎒ to 3 ㎓)
Directivity	:	±0.2 ㏈ in brain tissue (rotation around probe axis) ±0.4 ㏈ in brain tissue (rotation normal to probe axis)
Dynamic Range	:	5 µW/g to >100 mW/g; Linearity: ±0.2 ㏈
Srfce. Detect	:	±0.2 ㎜ repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	:	Overall length: 330 ㎜ Tip length: 16 ㎜ Body diameter: 12 ㎜ Tip diameter: 6.8 ㎜ Distance from probe tip to dipole centers: 2.7 ㎜
Application	:	General dosimetry up to 3 ㎓ Compliance tests of mobile phone


ET3DV6 E-Field Probe

ES3DV3 E-Field Probe

Construction	:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol).
Calibration	:	In air from 10 ㎒ to 4 ㎓ In brain simulating tissue (accuracy ± 8 %)
Frequency	:	10 ㎒ to >4 ㎓; Linearity: ±0.2 ㏈ (30 ㎒ to 4 ㎓)
Directivity	:	±0.2 ㏈ in brain tissue (rotation around probe axis) ±0.3 ㏈ in brain tissue (rotation normal to probe axis)
Dynamic Range	:	5 µW/g to >100 mW/g; Linearity: ±0.2 ㏈
Srfce. Detect	:	±0.2 ㎜ repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	:	Overall length: 337 ㎜ Tip length: 3.9 ㎜ Body diameter: 12 ㎜ Tip diameter: 6.8 ㎜ Distance from probe tip to dipole centers: 2.0 ㎜
Application	:	General dosimetry up to 4 ㎓ Compliance tests of mobile phone


ES3DV3 E-Field Probe

NOTE:

1. The Probe parameters have been calibrated by the SPEAG. Please reference "APPENDIX D" for the Calibration Certification Report.

SAM Phantom

Construction: The SAM Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90 % of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot

Shell Thickness: 2.0 ㎜ ± 0.1 ㎜

Filling Volume: Approx. 25 liters

SAM Phantom

DEVICE HOLDER

Construction In combination with the Twin SAM PhantomV4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Device Holder

1.10 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10 % from the target SAR values. These tests were done at 835 ㎒, 1900 ㎒, 2450 ㎒. The tests for EUT were conducted within 24 hours after each validation. The obtained results from the system accuracy verification are displayed in the table 1. During the tests, the ambient temperature of the laboratory was in the range (22 ± 2) ° C, the relative humidity was in the range (55 ± 5) % R.H. and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

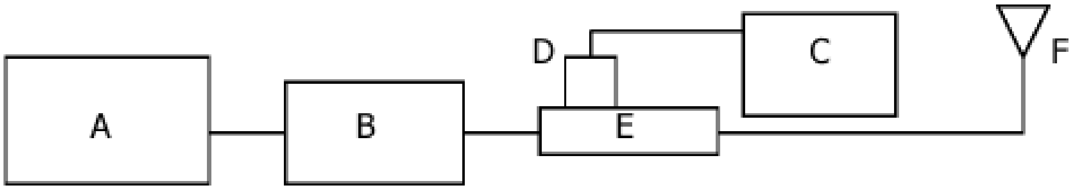


Fig b. The microwave circuit arrangement used for SAR system verification

A. Agilent Model E4421B Signal Generator
B. EMPOWER Model 2001-BBS3Q7ECK Amplifier
C. Agilent Model E4419B Power Meter
D. Agilent Model 9300H Power Sensor
E. Agilent Model 777D/778D Dual directional coupling
F. Reference dipole Antenna

Photo of the dipole Antenna

System Validation Results

Validation Kit	Tissue	Target SAR 1 g from Calibration Certificate (1 W)	Measured SAR 1 g (0.1 W)	Measured SAR 1 g (1 W)	Deviation (%)	Date	Liquid Temp. (°C)
D835V2 S/N: 490	835 ㎒ Head	9.62 W/kg	0.966 W/kg	**9.66 W/kg**	**0.42**	2012-03-26	21.9
D835V2 S/N: 490	835 ㎒ Head	9.62 W/kg	0.975 W/kg	**9.75 W/kg**	**1.35**	2012-04-17	21.7
D835V2 S/N: 490	835 ㎒ Body	9.84 W/kg	0.994 W/kg	**9.94 W/kg**	**1.02**	2012-03-24	22.1
D1900V2 S/N: 5d033	1900 ㎒ Head	39.4 W/kg	4.00 W/kg	**40.0 W/kg**	**1.52**	2012-03-26	22.0
D1900V2 S/N: 5d033	1900 ㎒ Head	39.4 W/kg	4.03 W/kg	**40.3 W/kg**	**2.28**	2012-04-17	21.7
D1900V2 S/N: 5d033	1900 ㎒ Body	41.3 W/kg	4.06 W/kg	**40.6 W/kg**	**-1.69**	2012-03-26	22.0
D2450V2 S/N: 734	2450 MHz Head	51.7 W/kg	5.03 W/kg	**50.3 W/kg**	**-2.71**	2012-03-24	22.3
D2450V2 S/N: 734	2450 MHz Body	53.5 W/kg	5.61 W/kg	**56.1 W/kg**	**4.86**	2012-03-23	22.3
D2450V2 S/N: 734	2450 MHz Head	51.7 W/kg	5.27 W/kg	**52.7 W/kg**	**1.93**	2012-04-17	21.8
D2450V2 S/N: 734	2450 MHz Body	53.5 W/kg	5.23 W/kg	**52.3 W/kg**	**-2.24**	2012-04-16	22.0

Table 1. Results system validation

1.11 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this simulant fluid were measured by using the Agilent Model 85070D Dielectric Probe (rates frequence band 200 ㎒ to 20 ㎓) in conjunction with Agilent E5070B Network Analyzer(300 ㎑ - 3 ㎓) by using a procedure detailed in Section V.

f (㎒)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(℃)
835	Head	Measured, 2012-03-26	42.7	0.90	21.9
		Recommended Limits	41.5	0.90	21.0 ~ 23.0
		Deviation(%)	**2.89**	**0.00**	-
	Head	Measured, 2012-04-17	41.3	0.88	21.9
		Recommended Limits	41.5	0.90	21.0 ~ 23.0
		Deviation(%)	**-0.48**	**-2.27**	-
	Body	Measured, 2012-03-24	54.6	0.96	21.7
		Recommended Limits	55.2	0.97	21.0 ~ 23.0
		Deviation(%)	**-1.09**	**-1.03**	-
1900	Head	Measured, 2012-03-26	39.6	1.45	22.0
		Recommended Limits	40.0	1.40	21.0 ~ 23.0
		Deviation(%)	**-1.00**	**3.57**	-
	Head	Measured, 2012-04-17	39.6	1.42	21.7
		Recommended Limits	40.0	1.40	21.0 ~ 23.0
		Deviation(%)	**-1.01**	**1.41**	-
	Body	Measured, 2012-03-26	53.5	1.53	22.0
		Recommended Limits	53.3	1.52	21.0 ~ 23.0
		Deviation(%)	**0.38**	**0.66**	-
2450	Head	Measured, 2012-03-24	39.3	1.80	22.3
		Recommended Limits	39.2	1.80	21.0 ~ 23.0
		Deviation(%)	**0.26**	**0.00**	-
	Body	Measured, 2012-03-23	52.8	1.99	22.3
		Recommended Limits	52.7	1.95	21.0 ~ 23.0
		Deviation(%)	**0.19**	**2.05**	-
2450	Head	Measured, 2012-04-17	38.5	1.84	21.8
		Recommended Limits	39.2	1.80	21.0 ~ 23.0
		Deviation(%)	**-1.82**	**2.17**	-
	Body	Measured, 2012-04-16	51.7	1.98	22.0
		Recommended Limits	52.7	1.95	21.0 ~ 23.0
		Deviation(%)	**-1.93**	**1.52**	-

The composition of the brain tissue simulating liquid

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	**Frequency (MHz)**									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99 $^{+}$% Pure Sodium Chloride Sugar: 98 $^{+}$% Pure Sucrose
Water: De-ionized, 16 $M\Omega^{+}$ resistivity HEC: Hydroxyethyl Cellulose
DGBE: 99 $^{+}$% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

1.12 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (‘‘SAR’’) in Section 4.2 of ‘‘IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,’’ ANSI/IEEE C95.3–2003, Copyright 2003 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in ‘‘Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields,’’ NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 ㎑ to 6 ㎓. Portable devices that transmit at frequencies above 6 ㎓ are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 ㎓ should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

(2) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.(Table .4)

Human Exposure	**Uncontrolled Environment General Population**	**Controlled Environment Occupational**
Partial Peak SAR (Partial)	1.60 m W/g	8.00 m W/g
Partial Average SAR (Whole Body)	0.08 m W/g	0.40 m W/g
Partial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 m W/g	20.00 m W/g

Table .2 RF exposure limits

1.13 Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 2 years ago but more than 1 year ago were confirmed in maintaining return loss (< -20 dB, within 20 % of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB publication 450824:

D835V2_Body (SN : 490)				
Measurement Date	Return Loss (dB)	Δ%	Impedence (Ω)	ΔΩ
2010-05-21	-21.2	-	45.4	-
2011-06-07	-21.8	2.83	43.9	3.30

D835V2_Head (SN : 490)				
Measurement Date	Return Loss (dB)	Δ%	Impedence (Ω)	ΔΩ
2010-05-21	-25.4	-	49.9	-
2011-06-07	-24.8	-2.36	47.8	-4.21

D1900V2_Body (SN : 5d033)				
Measurement Date	Return Loss (dB)	Δ%	Impedence (Ω)	ΔΩ
2010-05-26	-25.4	-	47.1	-
2011-06-07	-24.3	4.33	46.4	1.49

D1900V2_Head (SN : 5d033)				
Measurement Date	Return Loss (dB)	Δ%	Impedence (Ω)	ΔΩ
2010-05-26	-28.4	-	49.5	-
2011-06-07	-27.8	-2.11	47.7	-3.64

D2450V2_Body (SN : 734)				
Measurement Date	Return Loss (dB)	Δ%	Impedence (Ω)	ΔΩ
2010-05-27	-27.1	-	49.8	-
2011-06-07	-26.2	-3.32	48.3	-3.01

D2450V2_Head (SN : 734)				
Measurement Date	Return Loss (dB)	Δ%	Impedence (Ω)	ΔΩ
2010-05-27	-26.4	-	53.8	-
2011-06-07	25.9	-1.89	51.6	-4.09

2. Instruments List

Maunfacturer	Device	Type	Serial Number	Due date of Calibration
Stäubli	Robot	RX90BL	F03/5W05A1/A/01	N/A
Schmid& Partner Engineering AG	Dosimetric E-Field Probe	ET3DV6	1782	April 14, 2012
Schmid& Partner Engineering AG	Dosimetric E-Field Probe	ES3DV3	3068	May 20, 2012
Schmid& Partner Engineering AG	835 ㎒ System Validation Dipole	D835V2	490	May 21, 2012
Schmid& Partner Engineering AG	1900 ㎒ System Validation Dipole	D1900V2	5d033	May 26, 2012
Schmid& Partner Engineering AG	2450 ㎒ System Validation Dipole	D2450V2	734	May 27, 2012
Schmid& Partner Engineering AG	Data acquisition Electronics	DAE3	567	January 20, 2013
Schmid& Partner Engineering AG	Software	DASY 4 V4.7	-	N/A
Schmid& Partner Engineering AG	Phantom	SAM Phantom V4.0	TP-1645 TP-1300	N/A
Agilent	Network Analyzer	E5070B	MY42100282	January 03, 2013
Agilent	Dielectric Probe Kit	85070D	2184	N/A
Agilent	Power Meter	E4419B	GB43311125	July 05, 2012
Agilent	Power Sensor	E9300H	MY41495314	September 29, 2012
			MY41495307	September 29, 2012
Agilent	Signal Generator	E4421B	MY43350132	July 05, 2012
Empower RF Systems	Power Amplifier	2001-BBS3Q7ECK	1032 D/C 0336	March 31, 2013
Agilent	Dual Directional Coupler	778D	50454	April 07, 2012
Microlab	LP Filter	LA-15N LA-30N	N/A	September 29, 2012
R & S	Spectrum Analyzer	FSV30	100768	March 29, 2013
Agilent	Attenuator	8491B	50566	September 29. 2012
R&S	Mobile Test Unit	CMU 200	107279	January 03, 2013

3.Summary of Results

3.1 FCC Power Measurement Procedures

Power measurements were performed using a base station simulator under digital average power.
The handset was placed into a simulated call using a base station simulator in shielded chamber. SAR measurements were taken with a fully charged battery. In order to verify that the device was tested and maintained at full power, this was configured with the base station simulator. The SAR measurement Software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5 % occurred, the tests were repeated.

3.2 RF Conducted Power

GSM

GSM	Channel	Frequency(㎒)	Conducted Average Power(㏈ m)				
			GSM	GPRS			
				1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot
GSM 850 Band	128	824.2	33.08	33.09	30.67	28.66	27.75
	190	836.6	33.08	33.09	30.68	28.66	27.77
	251	848.8	33.08	33.09	30.70	28.69	27.80
PCS 1900 Band	512	1850.2	30.11	30.11	28.22	26.75	25.31
	661	1880.0	30.11	30.11	28.22	26.74	25.30
	810	1909.8	30.10	30.11	28.22	26.73	25.30

Bluetooth

Channel	Frequency (㎒)	GFSK (㏈ m)	8DPSK (㏈ m)
Low	2402	**-0.86**	-3.12
Middle	2441	-0.93	-3.17
High	2480	-1.06	-3.26

WLAN

802.11b Mode		Rated	Measured Power
Frequency (㎒)	**Channel No.**	**(Mbps)**	**(dBm)**
2412	1	1	**13.88**
		2	13.81
		5.5	14.15
		11	13.83
2437	6	1	**13.86**
		2	13.84
		5.5	14.16
		11	13.98
2462	11	1	**14.24**
		2	14.22
		5.5	14.48
		11	14.29

802.11g Mode		Rated	Measured Power
Frequency (㎒)	Channel No.	(Mbps)	(dBm)
2412	1	6	12.22
		9	12.10
		12	11.82
		18	11.63
		24	11.50
		36	11.21
		48	10.95
		54	10.73
2437	6	6	12.20
		9	12.06
		12	11.97
		18	11.80
		24	11.63
		36	11.11
		48	10.91
		54	10.82
2462	11	6	12.40
		9	12.40
		12	12.18
		18	12.03
		24	11.80
		36	11.54
		48	11.07
		54	11.02

3.3 KDB 648474 D01 SAR Handsets Multi Xmiter and Ant v01r05 _Sept. 2008

Summary of SAR Evaluation Requirements for Cell Phone with Multiple Transmitters

These procedures were followed according to KDB 648474 document “SAR Handsets Multi Xmiter and Ant v01r05”, September 2008. The procedures are applicable to phones with built-in unlicensed transmitters, such as 802.11 a/b/g and Bluetooth devices.

<Output Power Thresholds for Unlicensed Transmitters>

	2.45	5.15 - 5.35	5.47 - 5.85	GHz
P_{Ref}	12	6	5	mW
Device output power should be rounded to the nearest mW to compare with values specified in this table.				

<SAR Evaluation Requirements for Cellphones with Multiple Transmitters>

<table>
<tr><th></th><th>Individual Transmitter</th><th>Simultaneous Transmission</th></tr>
<tr><td>Licensed Transmitters</td><td>Routine evaluation required</td><td rowspan="2">SAR not required:
Unlicensed only
○ when stand-alone 1-g SAR is not required and antenna is $\geq$ 5 cm from other antennas
Licensed & Unlicensed
○ when the sum of the 1-g SAR is $<$ 1.6 W/kg for all simultaneous transmitting antennas
○ when SAR to peak location separation ratio of simultaneous transmitting antenna pair is $<$ 0.3
SAR required:
Licensed & Unlicensed
antenna pairs with SAR to peak location separation ratio $\geq$ 0.3; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition
Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</td></tr>
<tr><td>Unlicensed Transmitters</td><td>When there is no simultaneous transmission –
○ output $\leq$ 60/f: SAR not required
○ output $>$ 60/f: stand-alone SAR required
When there is simultaneous transmission –
Stand-alone SAR not required when
○ output $\leq 2 \cdot P_{Ref}$ and antenna is $\geq$ 5.0 cm from other antennas
○ output $\leq P_{Ref}$ and antenna is $\geq$ 2.5 cm from other antennas
○ output $\leq P_{Ref}$ and antenna is $<$ 2.5 cm from other antennas, each with either output power $\leq P_{Ref}$ or 1-g SAR $<$ 1.2 W/kg
Otherwise stand-alone SAR is required
When stand-alone SAR is required
○ test SAR on highest output channel for each wireless mode and exposure condition
○ if SAR for highest output channel is $>$ 50% of SAR limit, evaluate all channels according to normal procedures</td></tr>
<tr><td>Jaw, Mouth and Nose</td><td>Flat phantom SAR required
○ when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues
○ position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations</td><td>When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.</td></tr>
</table>

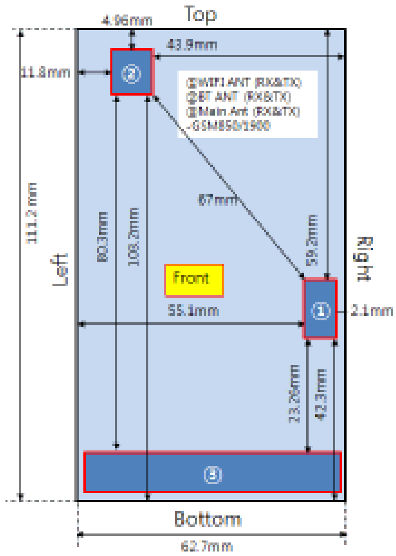
<The Distance information of Antenna to Edges of EUT>

FCC ID: ZNFC205

BT Max RF Average Output Power : -0.86 ㏈m (0.82 mW)

Antenna separation distance between Main and BT: 8.3 ㎝

✓ **<u>Therefore Bluetooth stand alone SAR is not required.</u>**



< Simultaneous Transmission Summation for Held to Ear Voice Call with Active Scenario >

Simultaneous TX	configuration	850 GSM SAR(W/kg)	WIFI SAR (W/kg)	∑SAR (W/kg)
Head SAR	Left Cheek	0.653	0.270	0.923
	Left Tilt	0.370	0.075	0.445
	Right Cheek	0.624	0.581	1.205
	Right Tilt	0.360	0.069	0.429
	configuration	1900 GSM SAR(W/kg)	WIFI SAR (W/kg)	∑SAR (W/kg)
	Left Cheek	1.18	0.195	**<u>1.375</u>**
	Left Tilt	0.337	0.075	0.412
	Right Cheek	0.691	0.581	1.272
	Right Tilt	0.311	0.069	0.380

< Simultaneous Transmission Summation Scenario >

Simultaneous TX	configuration	GPRS850 SAR(W/kg)	WIFI SAR (W/kg)	∑SAR (W/kg)
Body SAR	Front	0.449	0.042	0.491
	Back	0.704	0.019	**<u>0.723</u>**
	configuration	GPRS1900 SAR(W/kg)	WIFI SAR (W/kg)	∑SAR (W/kg)
	Front	0.189	0.042	0.231
	Back	0.306	0.019	0.325

The above numerical summed SAR was below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. Therefore, no volumetric SAR summation is required since the numerical sums are below the limit.

Ambient Temperature (°C)	22.1	22.0
Liquid Temperature (°C)	21.9	21.7
Date	2012-03-26	2012-04-17

GSM850 Head SAR

Head	EUT Position	Traffic Channel		Power Drift(dB)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
		Frequency (MHz)	Channel			
Left Ear	Cheek	836.6	190	-0.066	0.653	1.6
	Tilt	836.6	190	-0.167	0.370	
Right Ear	Cheek	836.6	190	-0.096	0.624	
	Tilt	836.6	190	0.128	0.360	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 cm.
5. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.
6. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.

Ambient Temperature (°C)	22.3
Liquid Temperature (°C)	22.1
Date	2012-03-24

GSM850 Body SAR

Test Mode	EUT Position	Slot	Traffic Channel		Power Drift(㏈)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
			Frequency (㎒)	Channel			
GPRS	Front	1 Tx	836.6	190	-0.050	0.449	1.6
	Back	1 Tx	836.6	190	-0.056	0.620	
	Back	2 Tx	836.6	190	-0.044	**0.704**	
	Back	3 Tx	836.6	190	-0.052	0.653	
	Back	4 Tx	836.6	190	-0.060	0.667	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 cm.
5. The EUT is tested 2^{nd} hot-spot peak, if it is less than 2 dB below the highest peak.
6. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 ㏈ lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
7. The distance from EUT to flat phantom for testing Body SAR is 15 ㎜.

Ambient Temperature (°C)	22.2	22.0
Liquid Temperature (°C)	22.0	21.7
Date	2012-03-26	2012-04-17

PCS1900 Head SAR

Head	EUT Position	Traffic Channel		Cube	Power Drift(㏈)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
		Frequency (㎒)	Channel				
Left Ear	Cheek	1880.0	661	0	0.060	1.12	1.6
	Tilt	1880.0	661	0	-0.015	0.337	
	Cheek	1850.2	512	0	-0.016	**1.18**	
	Cheek	1909.8	810	0	-0.043	1.00	
Right Ear	Cheek	1880.0	661	0	0.042	0.691	
	Cheek	1880.0	661	1	0.042	0.497	
	Tilt	1880.0	661	0	-0.138	0.311	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 cm.
5. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.
6. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 ㏈ lower than the SAR limit, testing at the high and low channel is optional for such test configurations.

Ambient Temperature (°C)	22.2
Liquid Temperature (°C)	22.0
Date	2012-03-26

PCS1900 Body SAR

Test Mode	EUT Position	Slot	Traffic Channel		Power Drift(㏈)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
			Frequency (㎒)	Channel			
GPRS	Front	1 Tx	1880.0	661	-0.028	0.189	1.6
	Back	1 Tx	1880.0	661	-0.025	0.270	
	Back	2 Tx	1880.0	661	-0.093	0.306	
	Back	3 Tx	1880.0	661	-0.020	0.291	
	Back	4 Tx	1880.0	661	-0.092	0.304	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 cm.
5. The EUT is tested 2^{nd} hot-spot peak, if it is less than 2 dB below the highest peak.
6. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 ㏈ lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
7. The distance from EUT to flat phantom for testing Body SAR is 15 ㎜.

Ambient Temperature (°C)	22.4	22.0
Liquid Temperature (°C)	22.3	21.7
Date	2012-03-24	2012-04-17

WLAN Head SAR

Head	EUT Position	Traffic Channel		Power Drift(dB)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
		Frequency (MHz)	Channel			
Left Ear	Cheek	2462	11	-0.010	0.270	1.6
	Tilt	2462	11	0.001	0.075	
Right Ear	Cheek	2462	11	-0.042	0.581	
	Tilt	2462	11	-0.059	0.069	
	Cheek	2412	1	0.138	0.390	
	Cheek	2437	6	-0.053	0.531	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 cm.
5. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.
6. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
7. WLAN could be used for data transmission during voice communication at the same time.
8. Justification for reduced test configuration for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n and higher data rates) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11a modes
9. WLAN transmission was verified using a spectrum analyzer

Ambient Temperature (°C)	22.4	22.3
Liquid Temperature (°C)	22.3	22.0
Date	2012-03-23,	2012-04-16

WLAN Body SAR

Body	Test Mode	EUT Position	Traffic Channel		Power Drift(dB)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
			Frequency (MHz)	Channel			
Body	11b [1Mbps]	Front	2462	11	0.062	0.040	1.6
	11b [1Mbps]	Back	2462	11	-0.165	0.019	
	11b [1Mbps]	Front	2412	1	-0.042	0.025	
	11b [1Mbps]	Front	2437	6	0.077	0.035	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Battery is fully charged for all readings and the standard batteries are the only options.
4. Liquid tissue depth was at least 15 cm.
5. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.
6. Justification for reduced test configuration : Per FCC/OET Bulletin 65 Supplement C [July 2001], if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channel is optional for such test configurations.
7. WLAN could be used for data transmission during voice communication at the same time.
8. Justification for reduced test configuration for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n and higher data rates) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11a modes
9. WLAN transmission was verified using a spectrum analyzer.
10. The distance from EUT to flat phantom for testing Body SAR is 15 ㎜.

Appendix

List

Appendix A	DASY4 Report (Plots of the SAR Measurements)	- 835 ㎒, 1900 ㎒, 2450 ㎒ Validation Test - GSM850 Test - PCS1900 Test - WLAN Test
Appendix B	Uncertainty Analysis	
Appendix C	Calibration Certificate	- PROBE - DAE - DIPOLE

Appendix A

Test Plot - DASY4 Report

835 ㎒ Validation Test_Head

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: Validation 835 MHz_Head.da4

Input Power : 100 mW

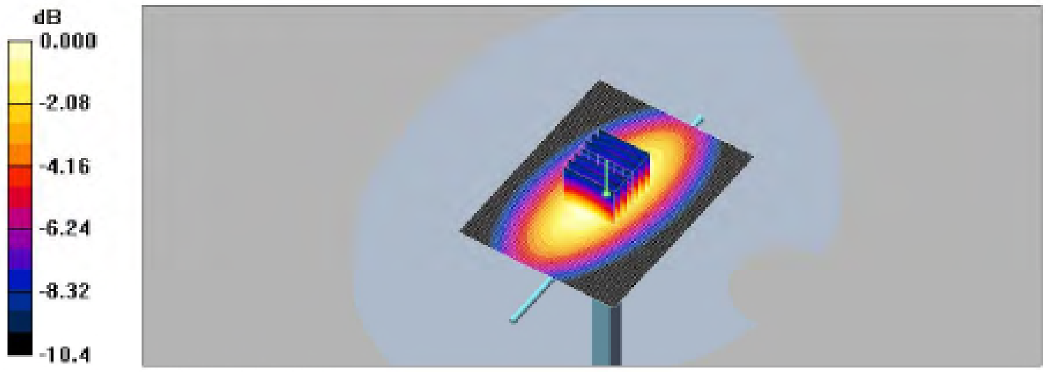
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490
Program Name: Vaildation 835 MHz_Head

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.899 mho/m; ε_r = 42.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.22, 6.22, 6.22); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

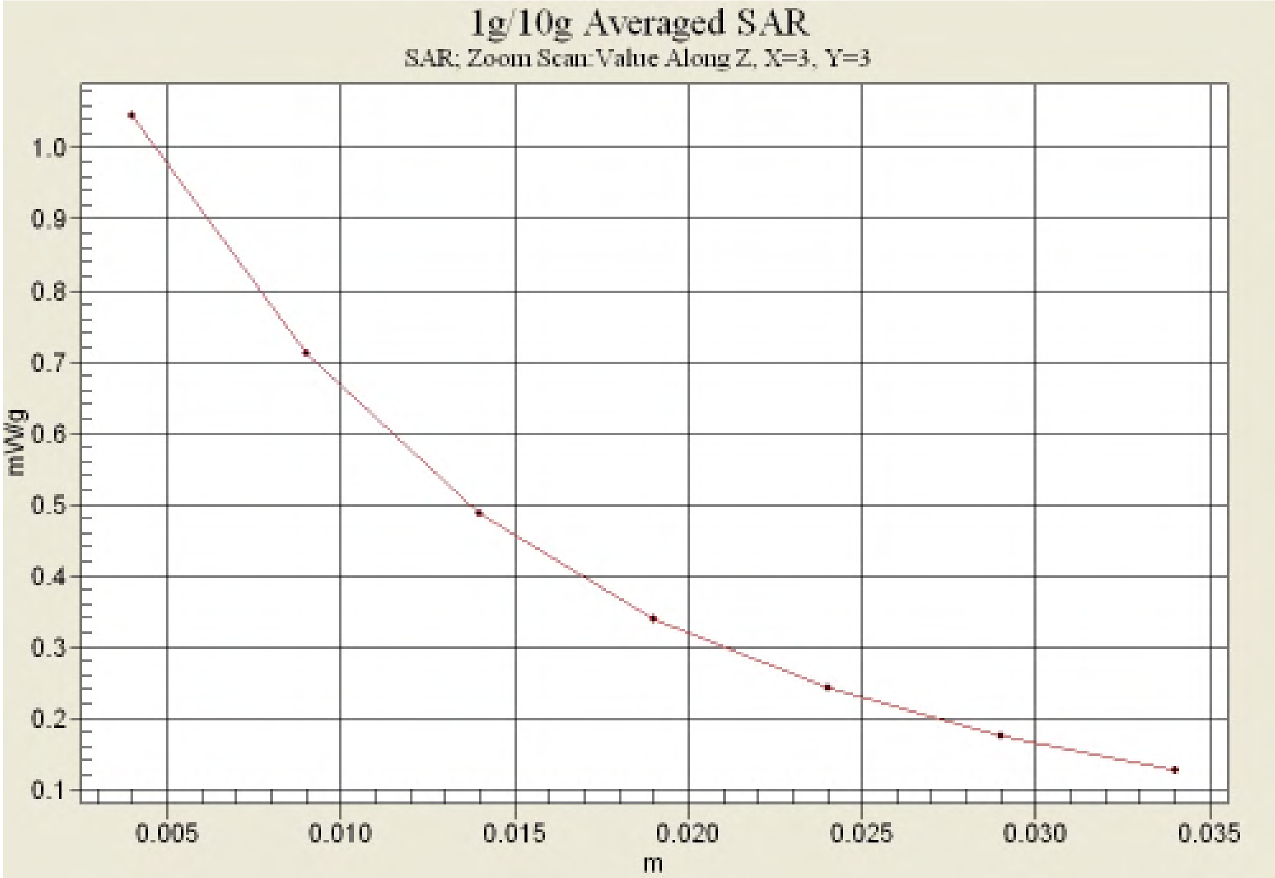
Validation 835 MHz_Head/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.04 mW/g

Validation 835 MHz_Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 35.5 V/m; Power Drift = -0.032 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.966 mW/g; SAR(10 g) = 0.635 mW/g
Maximum value of SAR (measured) = 1.04 mW/g



0 dB = 1.04mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date: 2012-04-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: Validation 835 MHz_Head.da4

Input Power : 100 mW

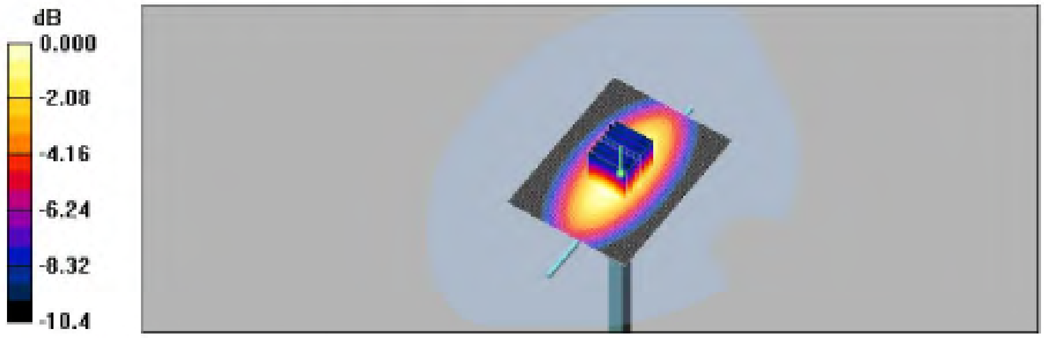
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490
Program Name: Vaildation 835 MHz_Head

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.884 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(6.06, 6.06, 6.06); Calibrated: 2011-05-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

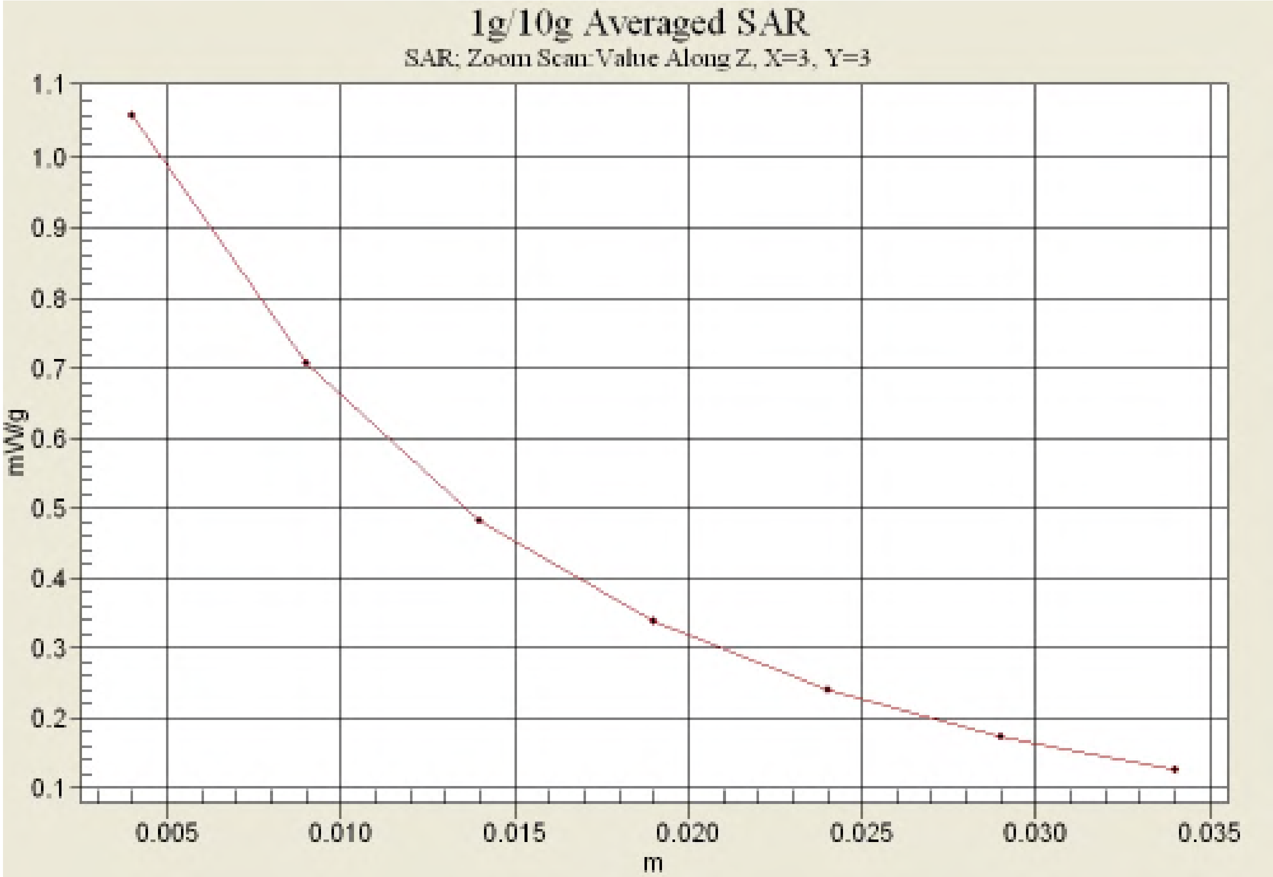
Validation 835 MHz_Head/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.06 mW/g

Validation 835 MHz_Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34.9 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.975 mW/g; SAR(10 g) = 0.634 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

835 ㎒ Validation Test_Body

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: Validation 835 MHz_Body.da4

Input Power : 100mW

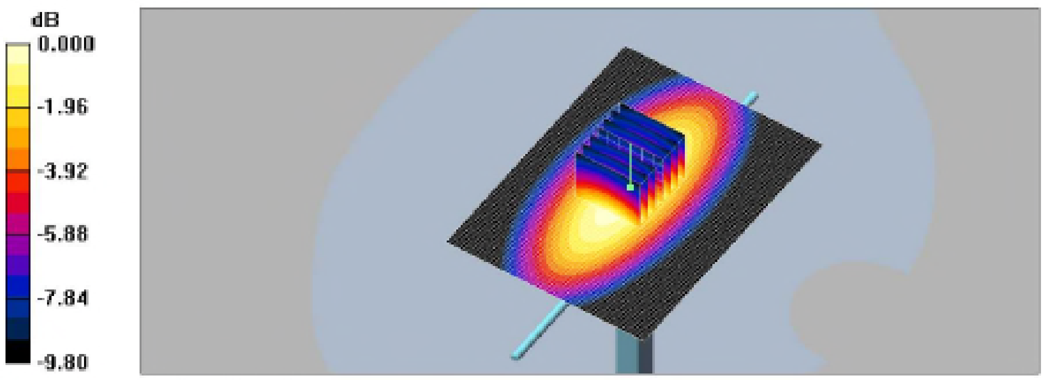
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490
Program Name: Vaildation 835 MHz_Body

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.963 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.03, 6.03, 6.03); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

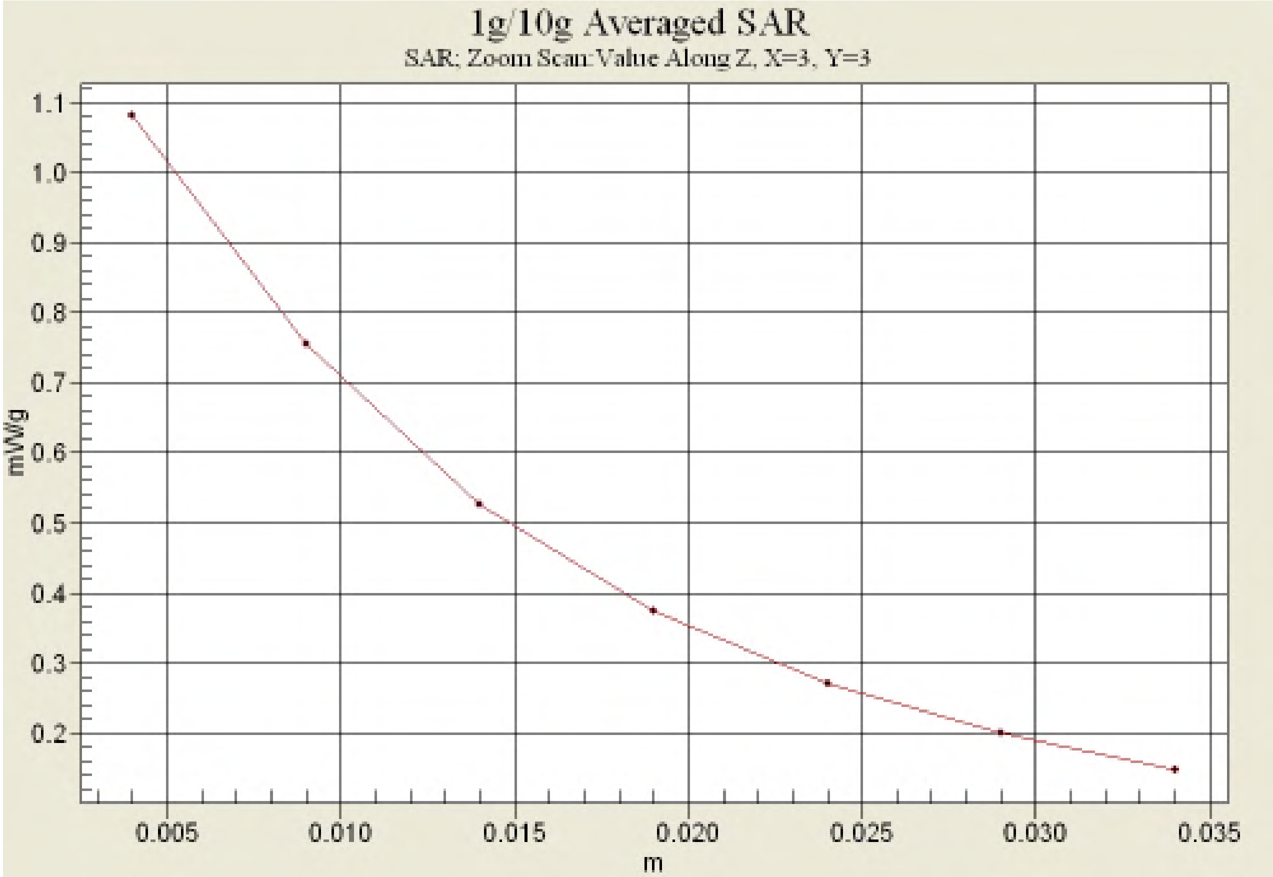
Validation 835 MHz_Body/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.08 mW/g

Validation 835 MHz_Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34.7 V/m; Power Drift = -0.022 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.994 mW/g; SAR(10 g) = 0.662 mW/g
Maximum value of SAR (measured) = 1.08 mW/g



0 dB = 1.08mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

1900 ㎒ Validation Test_Head

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: Validation 1900 MHz_Head.da4

Input Power : 100 mW

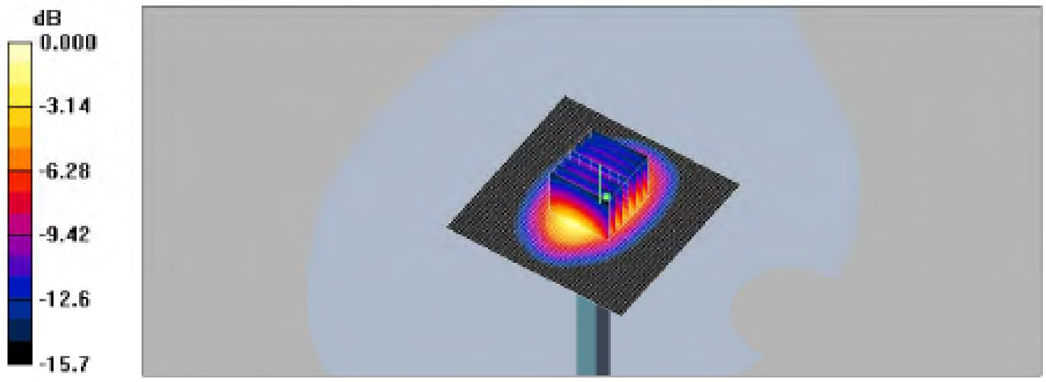
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033
Program Name: Validation 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.45 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

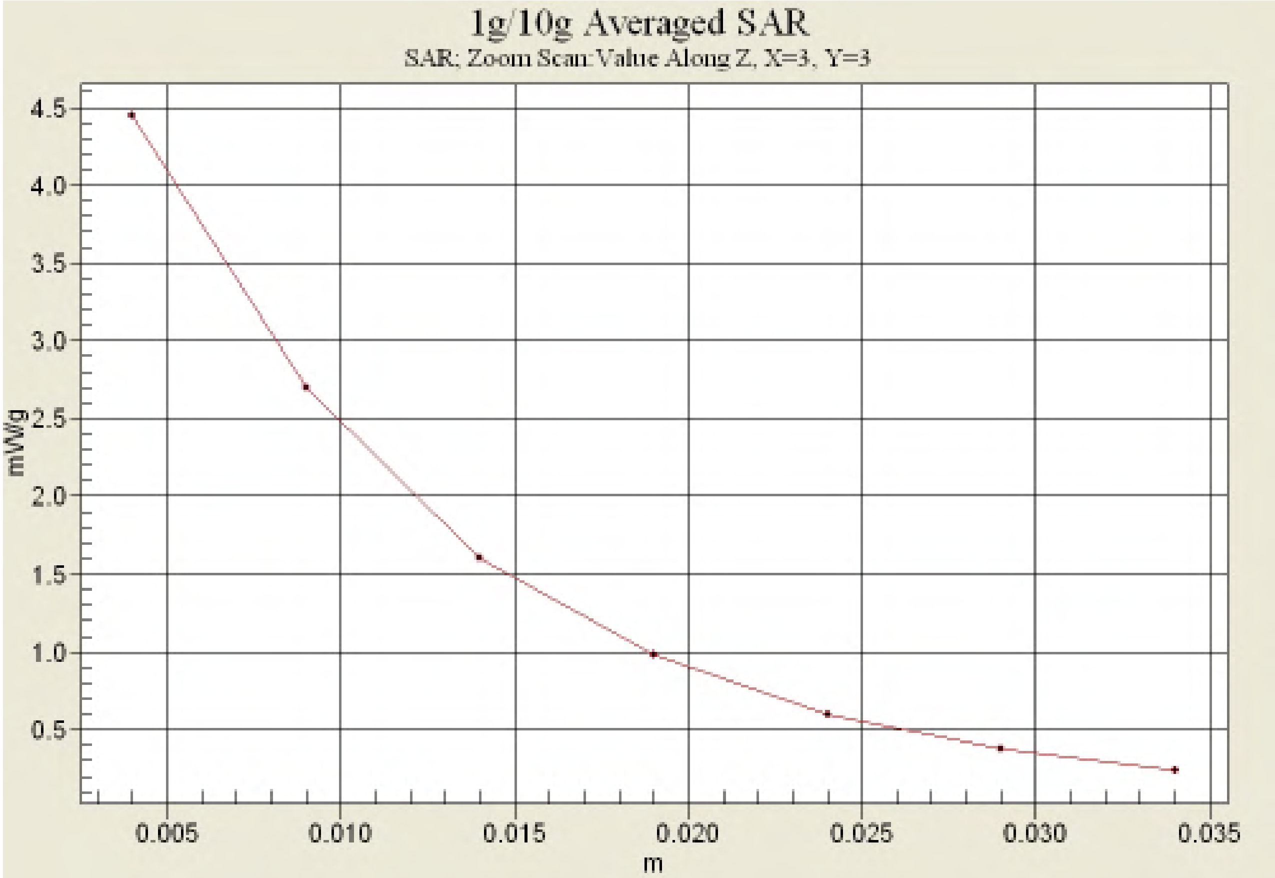
Validation 1900 MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.97 mW/g

Validation 1900 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.9 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 6.50 W/kg
SAR(1 g) = 4 mW/g; SAR(10 g) = 2.19 mW/g
Maximum value of SAR (measured) = 4.45 mW/g



0 dB = 4.45mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
mW/g
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date: 2012-04-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: Validation 1900 MHz_Head.da4

Input Power : 100 mW

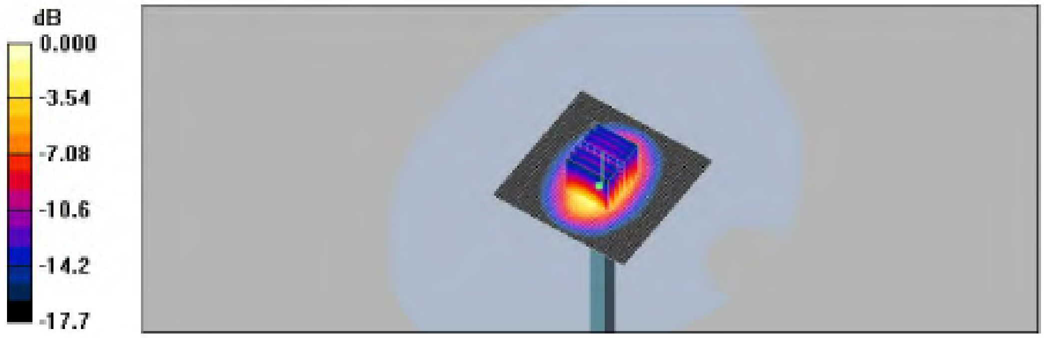
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033
Program Name: Validation 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(5.01, 5.01, 5.01); Calibrated: 2011-05-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

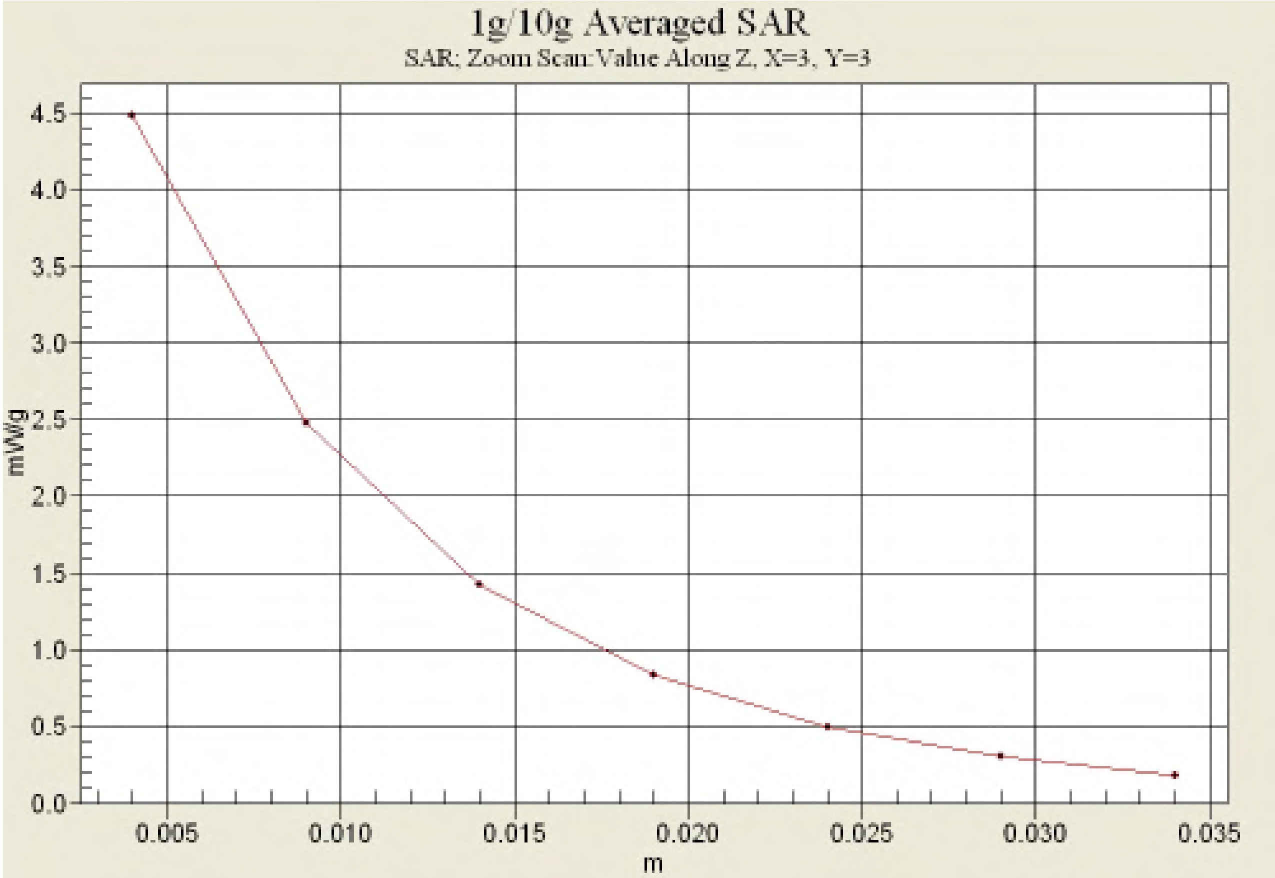
Validation 1900 MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.75 mW/g

Validation 1900 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.5 V/m; Power Drift = -0.038 dB
Peak SAR (extrapolated) = 7.55 W/kg
SAR(1 g) = 4.03 mW/g; SAR(10 g) = 2.1 mW/g
Maximum value of SAR (measured) = 4.48 mW/g



0 dB = 4.48mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

1900 ㎒ Validation Test_Body

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: Validation 1900 MHz_Body.da4

Input Power : 100 mW

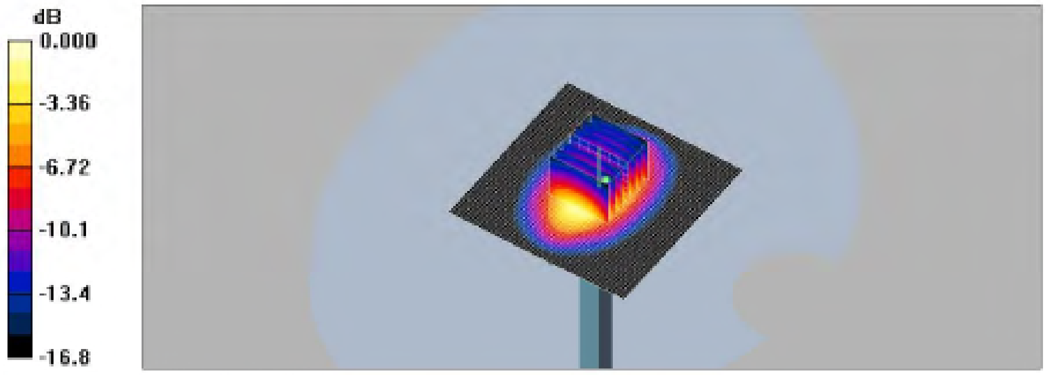
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033
Program Name: Validation 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

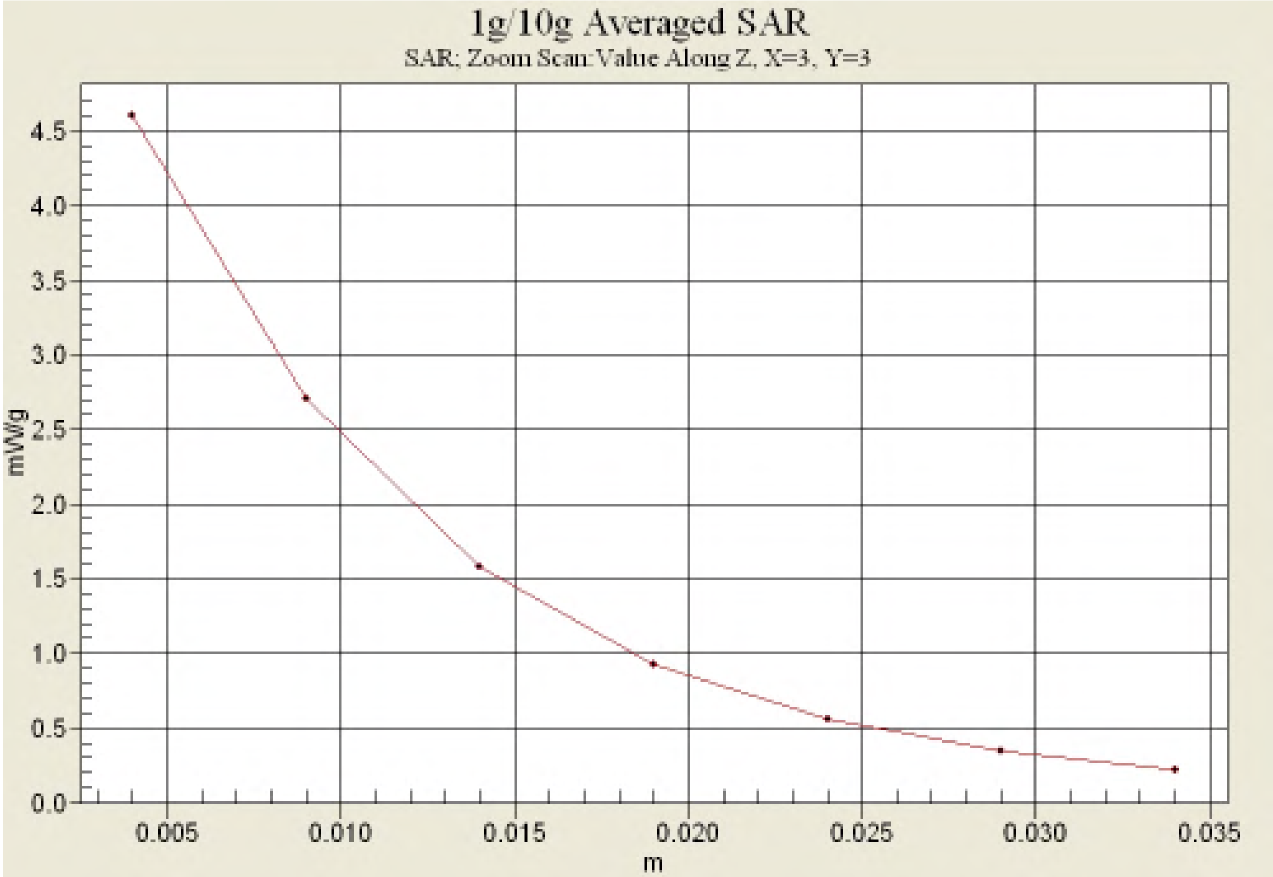
Validation 1900 MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.94 mW/g

Validation 1900 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.0 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 6.94 W/kg
SAR(1 g) = 4.06 mW/g; SAR(10 g) = 2.15 mW/g
Maximum value of SAR (measured) = 4.60 mW/g



0 dB = 4.60mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
mW/g
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

2450 MHz Validation Test_Head

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: Validation 2450 MHz_Head.da4

Input Power : 100mW

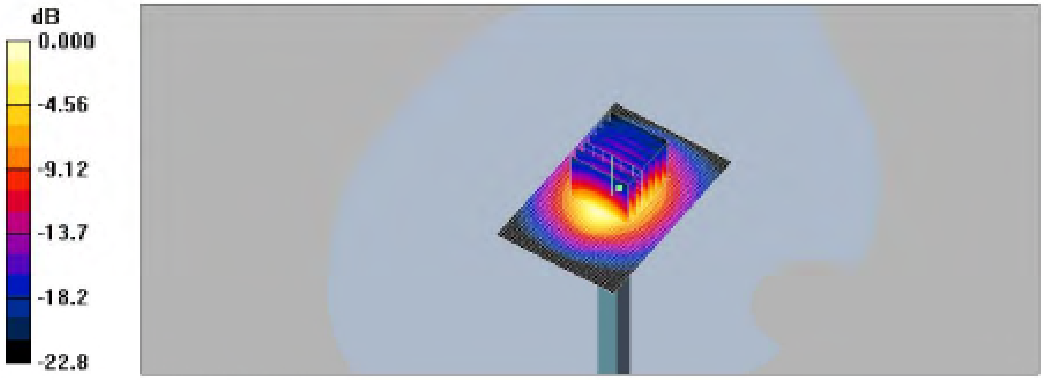
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 735
Program Name: Validation_2450MHz

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

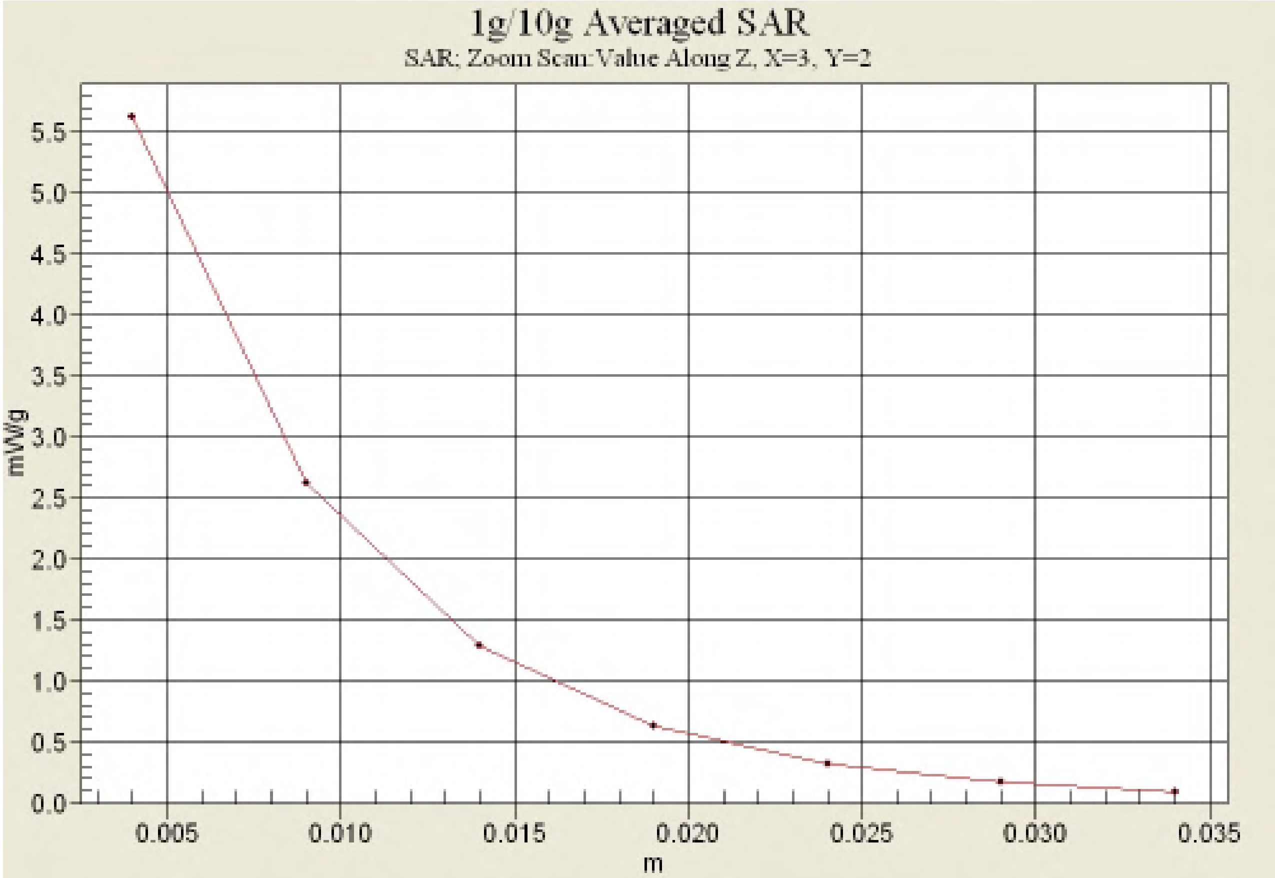
Validation_2450MHz/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 6.20 mW/g

Validation_2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.5 V/m; Power Drift = -0.035 dB
Peak SAR (extrapolated) = 11.2 W/kg
SAR(1 g) = 5.03 mW/g; SAR(10 g) = 2.3 mW/g
Maximum value of SAR (measured) = 5.62 mW/g



0 dB = 5.62mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=2
mW/g
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date: 2012-04-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: Validation 2450 MHz_Head.da4

Input Power : 100 mW

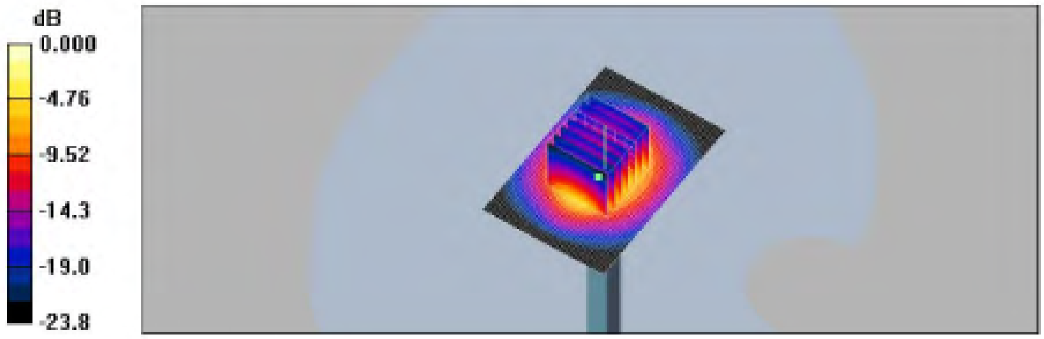
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 735
Program Name: Validation_2450MHz

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.84 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(4.4, 4.4, 4.4); Calibrated: 2011-05-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

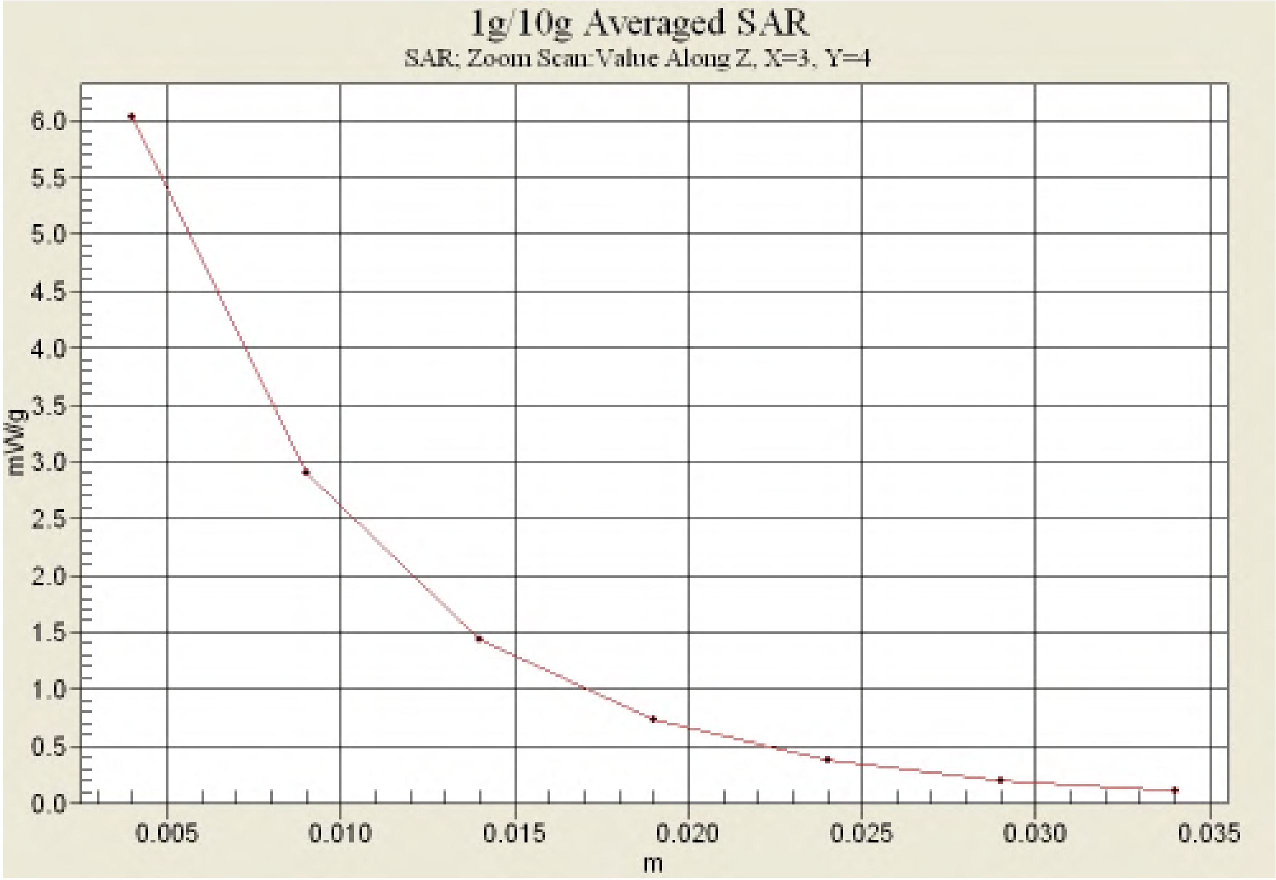
Validation_2450MHz/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 6.15 mW/g

Validation_2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.1 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 11.5 W/kg
SAR(1 g) = 5.27 mW/g; SAR(10 g) = 2.38 mW/g
Maximum value of SAR (measured) = 6.03 mW/g



0 dB = 6.03mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=4
mW/g
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

2450 MHz Validation Test_Body

Date: 2012-03-23

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: Validation 2450 MHz_Body.da4

Input Power : 100mW

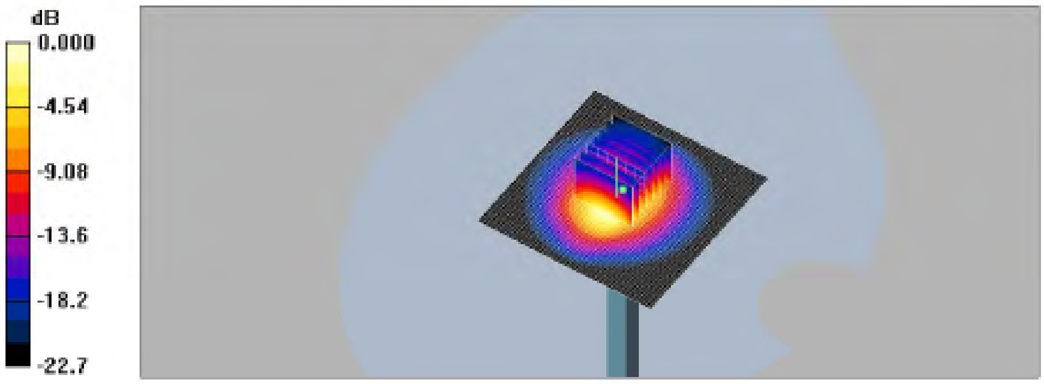
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:734
Program Name: Validation 2450 MHz_Body

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(3.94, 3.94, 3.94); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

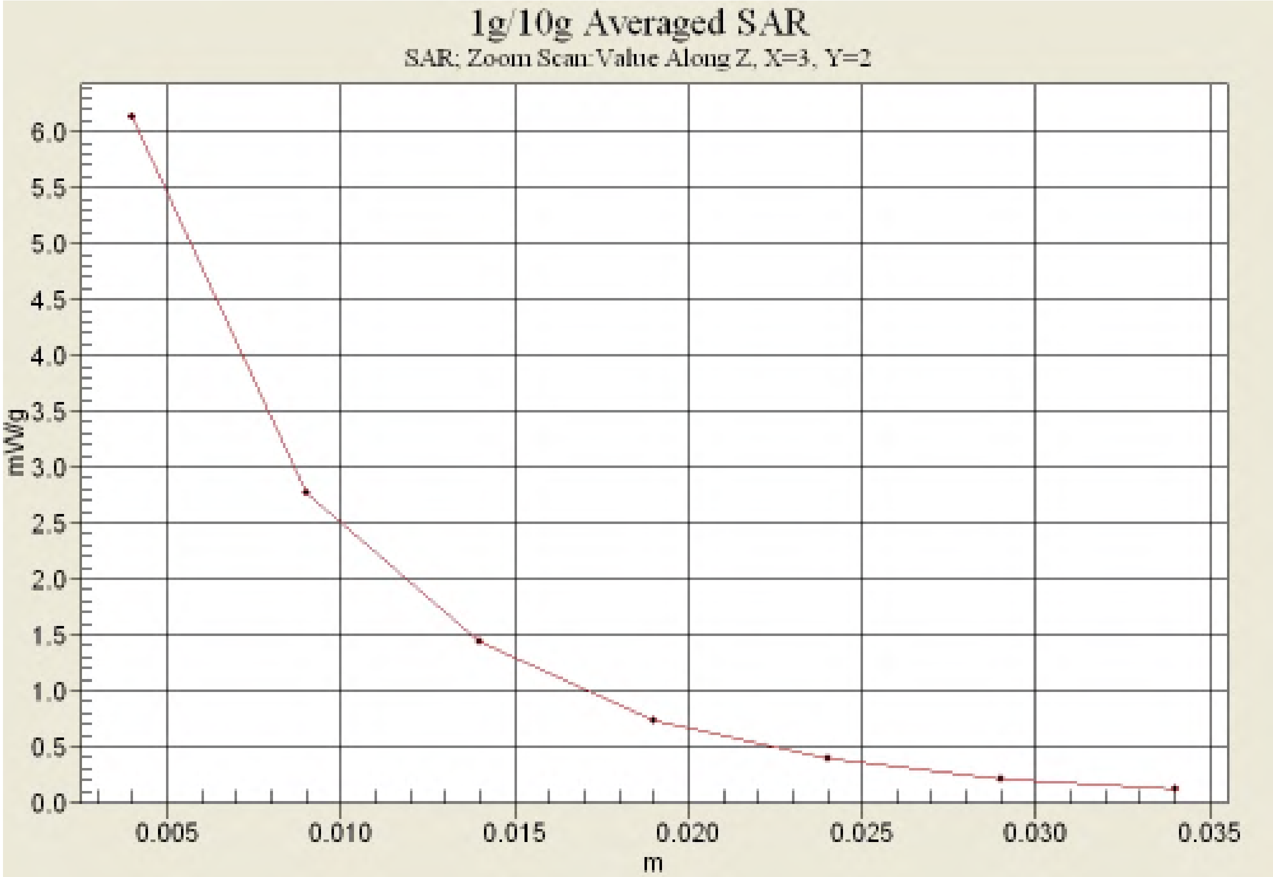
Validation 2450 MHz_Body/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 6.30 mW/g

Validation 2450 MHz_Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.1 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 14.3 W/kg
SAR(1 g) = 5.61 mW/g; SAR(10 g) = 2.5 mW/g
Maximum value of SAR (measured) = 6.14 mW/g



0 dB = 6.14mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=2
mW/g
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date: 2012-04-16

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: Validation 2450 MHz_Body.da4

Input Power : 100 mW

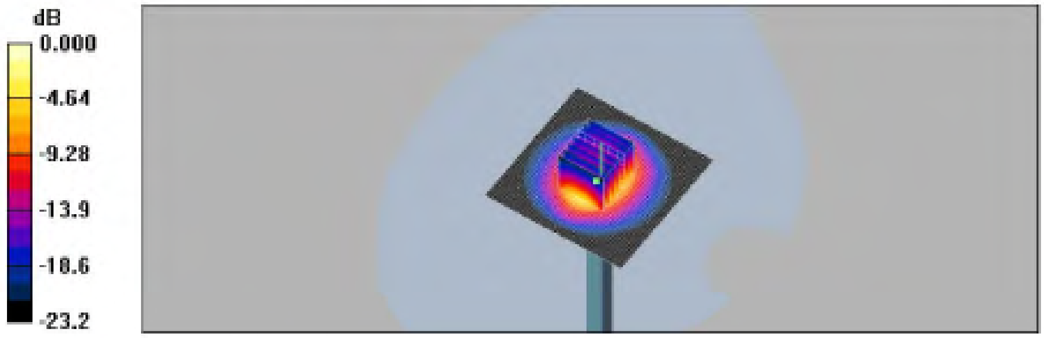
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:734
Program Name: Validation 2450 MHz_Body

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.98 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(4.28, 4.28, 4.28); Calibrated: 2011-05-20
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

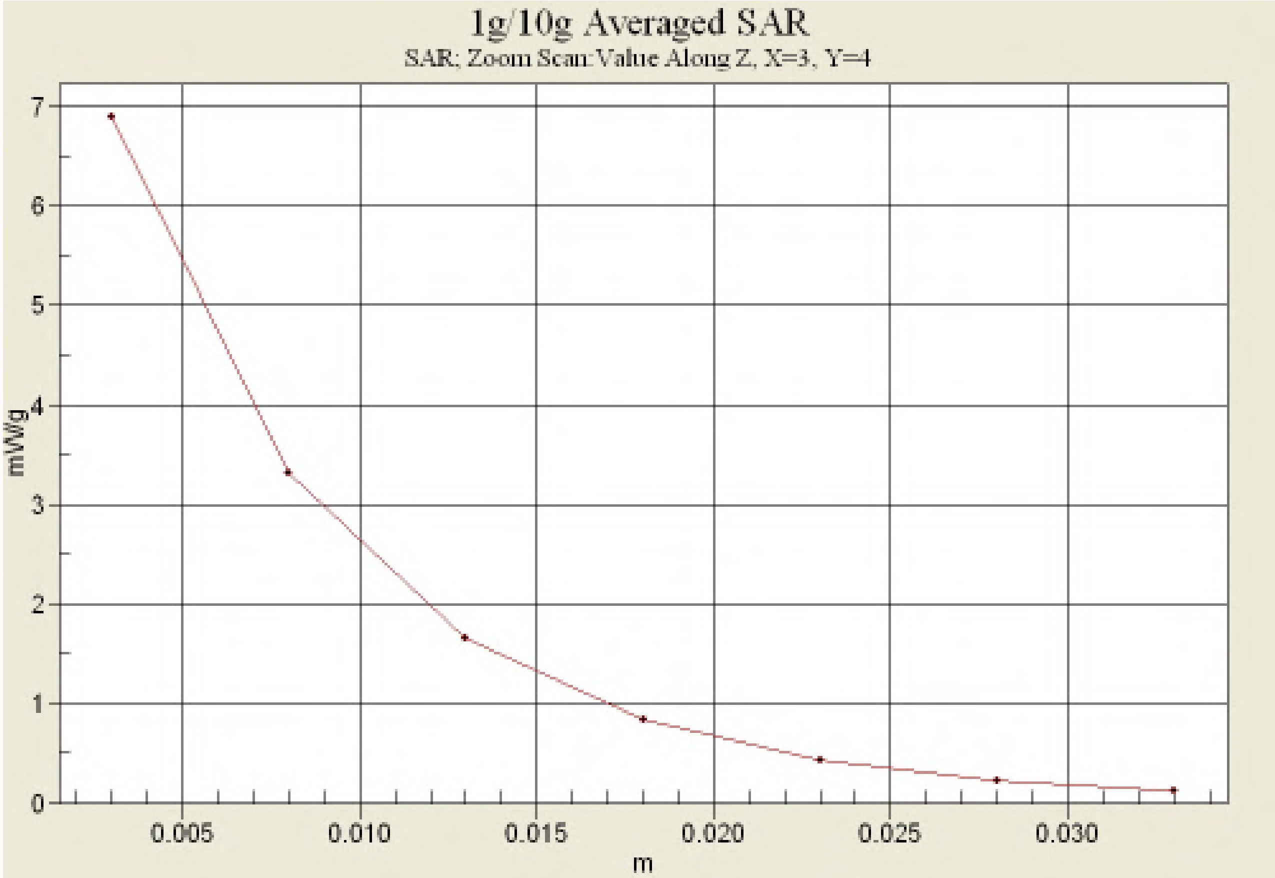
Validation 2450 MHz_Body/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 6.99 mW/g

Validation 2450 MHz_Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 61.3 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 11.1 W/kg
SAR(1 g) = 5.23 mW/g; SAR(10 g) = 2.38 mW/g
Maximum value of SAR (measured) = 6.90 mW/g



0 dB = 6.90mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=4
mW/g
7
6
5
4
3
2
1
0
0.005
0.010
0.015
0.020
0.025
0.030
m

GSM 850 Head SAR Test

Date: 2012-04-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850 Left Touch CH190.da4

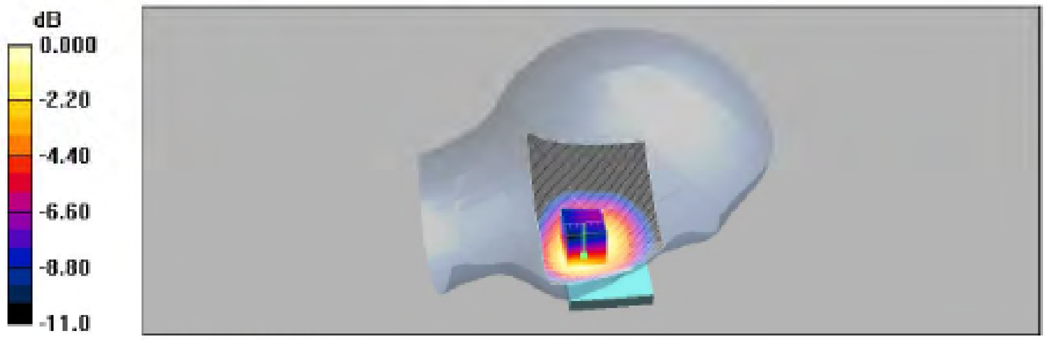
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.886 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(6.06, 6.06, 6.06); Calibrated: 2011-05-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

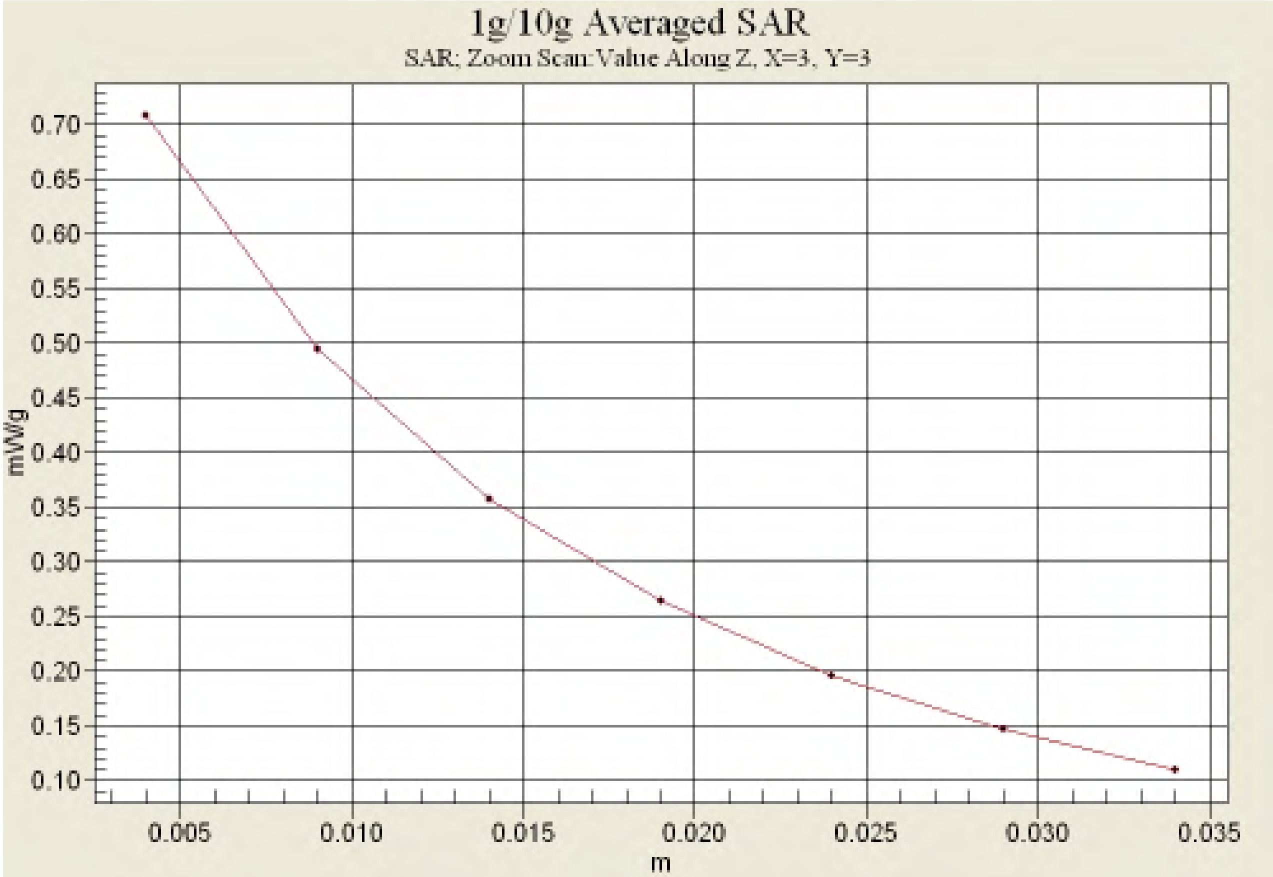
GSM850_Left Touch_Mid/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.709 mW/g

GSM850_Left Touch_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.78 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 0.980 W/kg
SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.451 mW/g
Maximum value of SAR (measured) = 0.705 mW/g



0 dB = 0.705mW/g

Z-scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850 Left Tilt CH190.da4

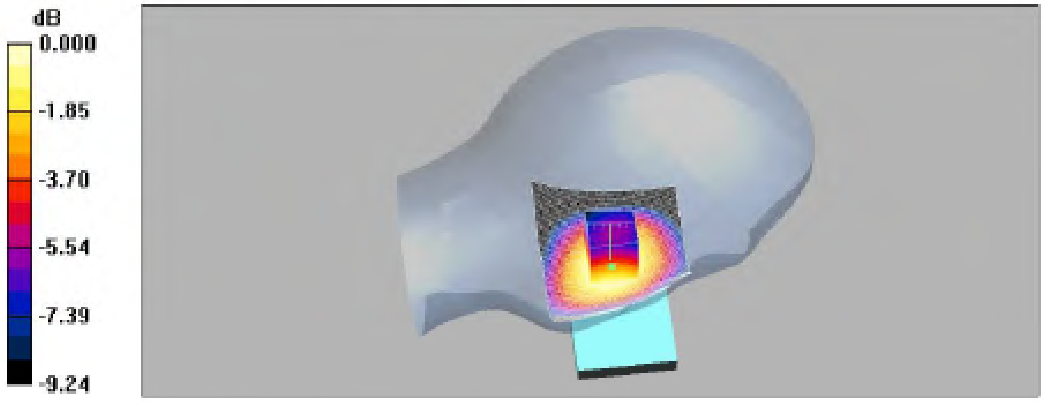
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.9 mho/m; ε_r = 42.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.22, 6.22, 6.22); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GSM850_Left Tilt_Mid/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.395 mW/g

GSM850_Left Tilt_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = -0.167 dB
Peak SAR (extrapolated) = 0.452 W/kg
SAR(1 g) = 0.370 mW/g; SAR(10 g) = 0.280 mW/g
Maximum value of SAR (measured) = 0.388 mW/g



0 dB = 0.388mW/g

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850 Right Touch CH190.da4

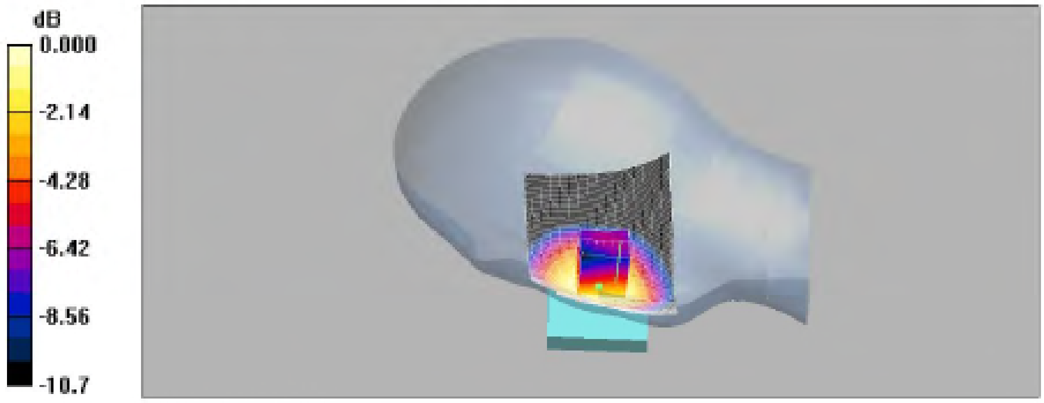
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.9 mho/m; ε_r = 42.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.22, 6.22, 6.22); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GSM850_Right Touch_Mid/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.665 mW/g

GSM850_Right Touch_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.19 V/m; Power Drift = -0.096 dB
Peak SAR (extrapolated) = 0.793 W/kg
SAR(1 g) = 0.624 mW/g; SAR(10 g) = 0.463 mW/g
Maximum value of SAR (measured) = 0.660 mW/g



0 dB = 0.660mW/g

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850 Right Tilt CH190.da4

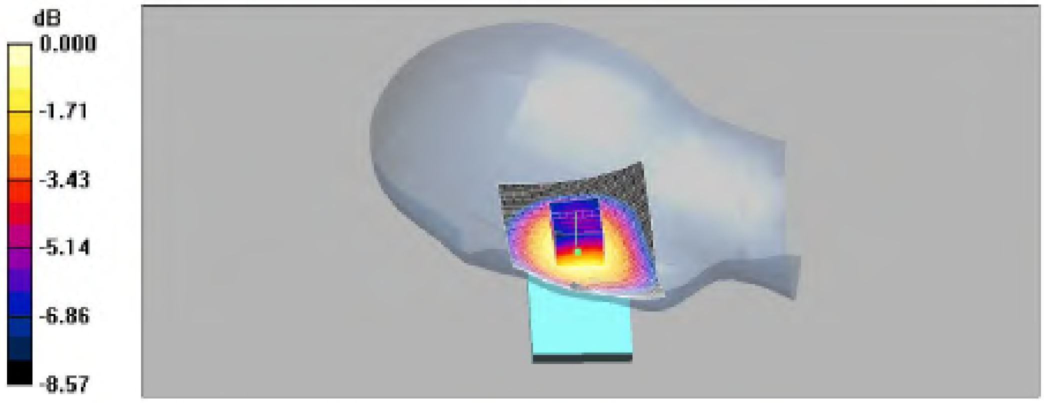
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.9 mho/m; ε_r = 42.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.22, 6.22, 6.22); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GSM850_Right Tilt_Mid/Area Scan (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.383 mW/g

GSM850_Right Tilt_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.8 V/m; Power Drift = 0.128 dB
Peak SAR (extrapolated) = 0.447 W/kg
SAR(1 g) = 0.360 mW/g; SAR(10 g) = 0.271 mW/g
Maximum value of SAR (measured) = 0.379 mW/g



0 dB = 0.379mW/g

GSM 850 Body SAR Test

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GPRS850_Front 1TX.da4

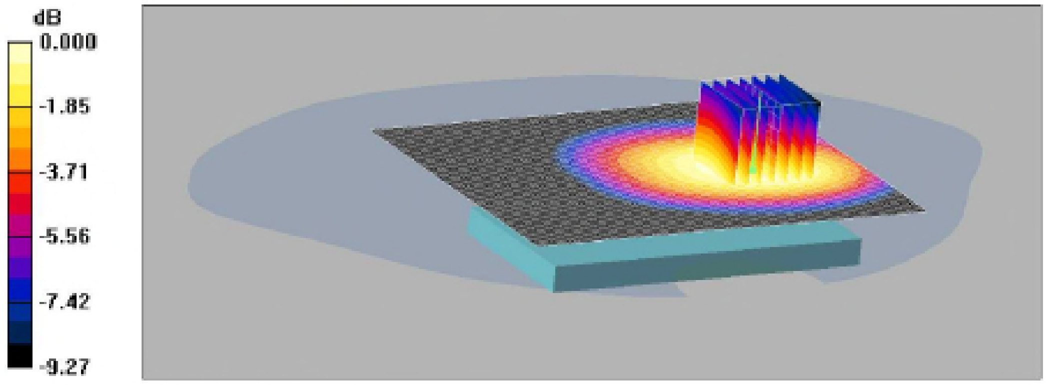
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GPRS850_Body

Communication System: GPRS850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.965 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.03, 6.03, 6.03); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850 Front_Mid/Area Scan (81x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.474 mW/g

GPRS850 Front_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.0 V/m; Power Drift = -0.050 dB
Peak SAR (extrapolated) = 0.560 W/kg
SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.332 mW/g
Maximum value of SAR (measured) = 0.475 mW/g



0 dB = 0.475mW/g

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GPRS850_Rear 1TX.da4

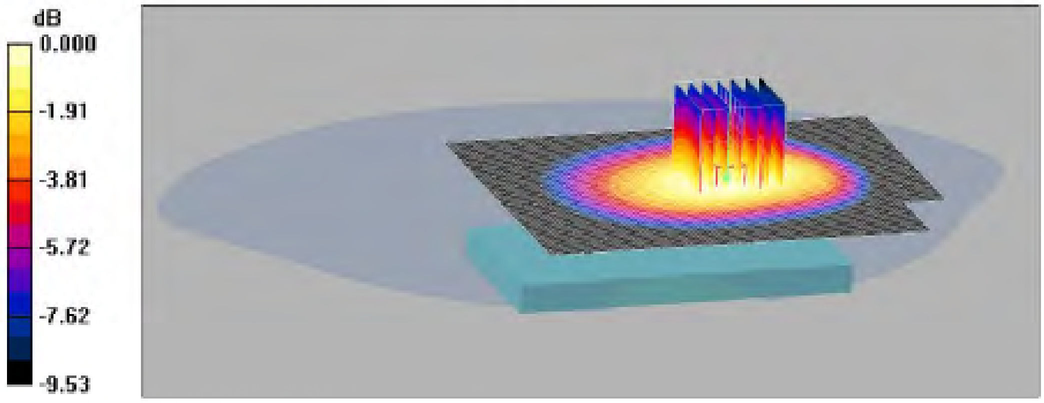
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GPRS850_Body

Communication System: GPRS850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 837 MHz; σ = 0.965 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.03, 6.03, 6.03); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850 Rear_Mid/Area Scan (81x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.658 mW/g

GPRS850 Rear_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.5 V/m; Power Drift = -0.056 dB
Peak SAR (extrapolated) = 0.795 W/kg
SAR(1 g) = 0.620 mW/g; SAR(10 g) = 0.449 mW/g
Maximum value of SAR (measured) = 0.657 mW/g



0 dB = 0.657mW/g

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GPRS850_Rear 2TX.da4

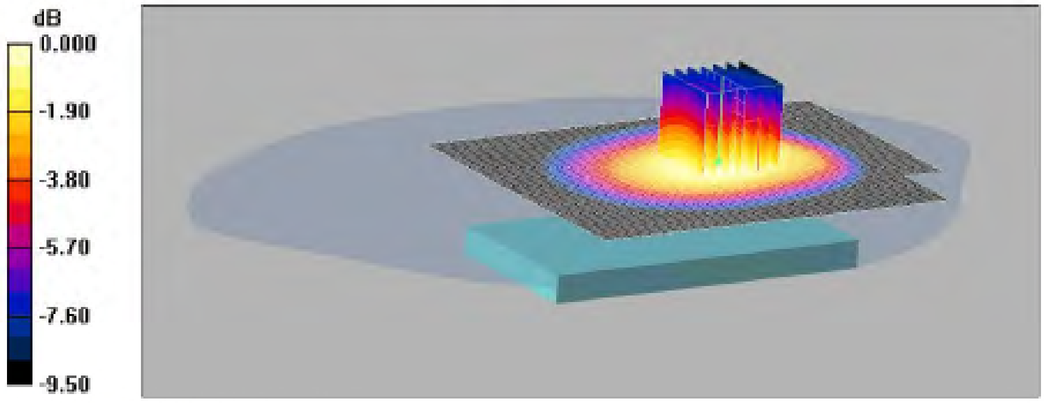
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GPRS850_Body

Communication System: GPRS850; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 837 MHz; σ = 0.965 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.03, 6.03, 6.03); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

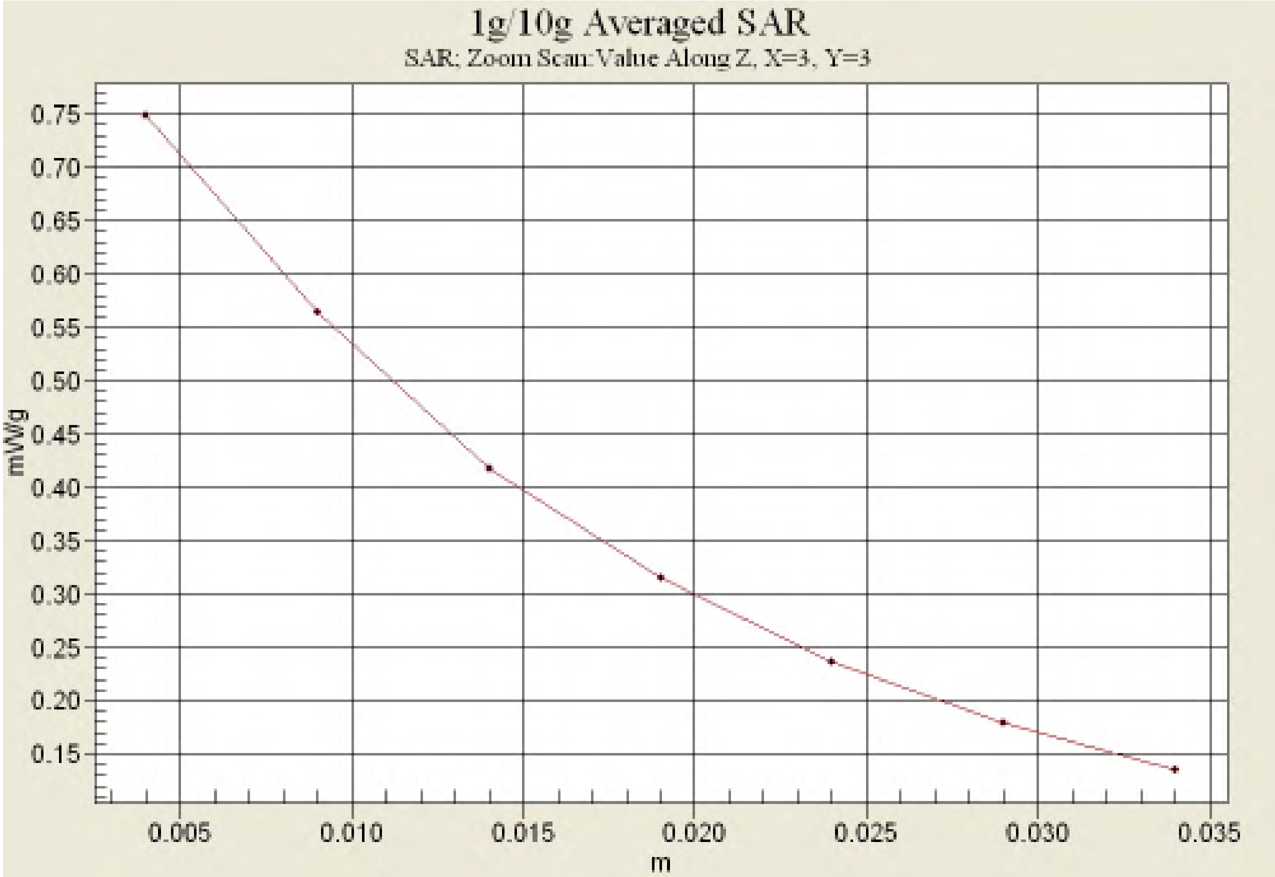
GPRS850 Rear_Mid/Area Scan (81x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.743 mW/g

GPRS850 Rear_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.5 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 0.915 W/kg
SAR(1 g) = 0.704 mW/g; SAR(10 g) = 0.509 mW/g
Maximum value of SAR (measured) = 0.748 mW/g



0 dB = 0.748mW/g

Z-Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
mW/g
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GPRS850_Rear 3TX.da4

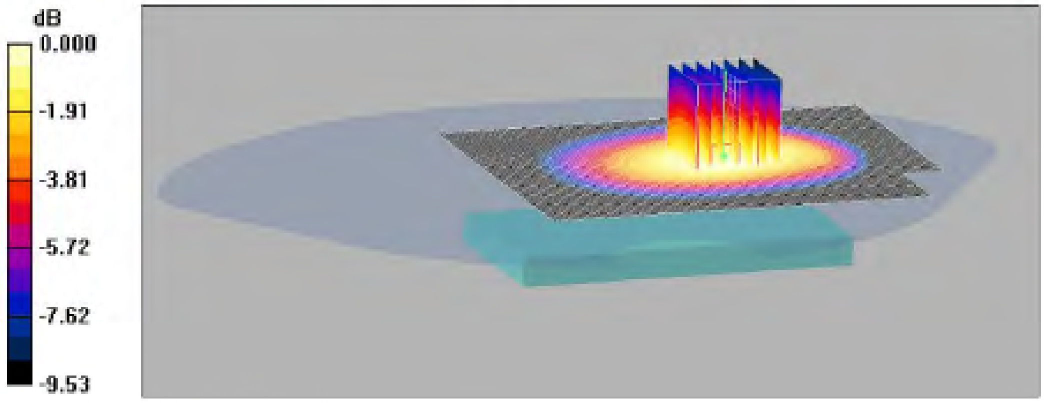
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GPRS850_Body

Communication System: GPRS850; Frequency: 836.6 MHz;Duty Cycle: 1:2.77
Medium parameters used: f = 837 MHz; σ = 0.965 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.03, 6.03, 6.03); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850 Rear_Mid/Area Scan (81x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.697 mW/g

GPRS850 Rear_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.0 V/m; Power Drift = -0.052 dB
Peak SAR (extrapolated) = 0.838 W/kg
SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.474 mW/g
Maximum value of SAR (measured) = 0.696 mW/g



0 dB = 0.696mW/g

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GPRS850_Rear 4TX.da4

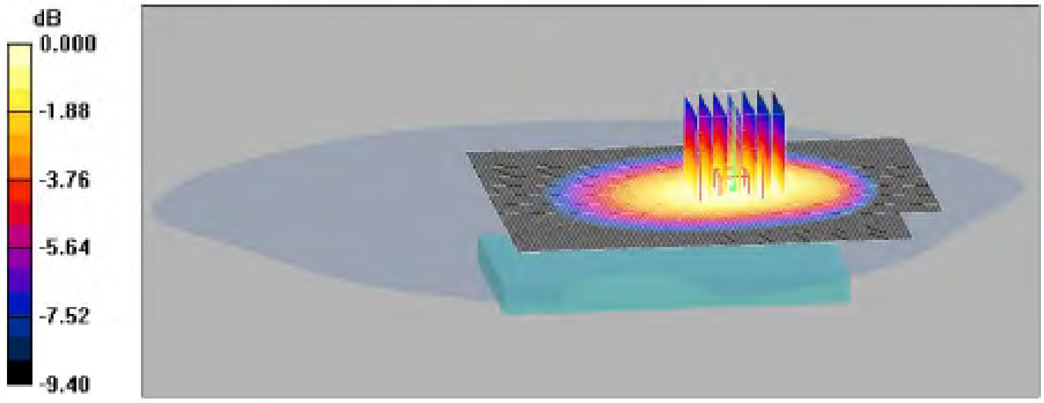
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GPRS850_Body

Communication System: GPRS850; Frequency: 836.6 MHz;Duty Cycle: 1:2.075
Medium parameters used: f = 837 MHz; σ = 0.965 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(6.03, 6.03, 6.03); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS850 Rear_Mid/Area Scan (81x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.713 mW/g

GPRS850 Rear_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.1 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 0.852 W/kg
SAR(1 g) = 0.667 mW/g; SAR(10 g) = 0.485 mW/g
Maximum value of SAR (measured) = 0.708 mW/g



0 dB = 0.708mW/g

GSM 1900 Head SAR Test

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Left Touch_CH661.da4

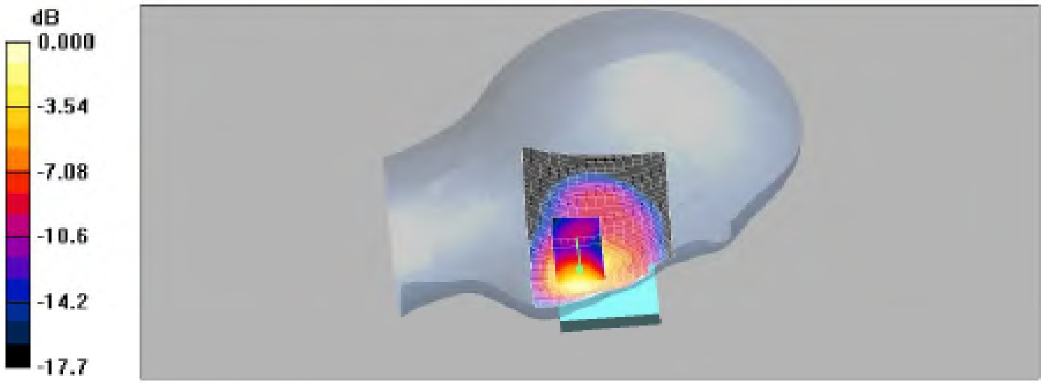
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

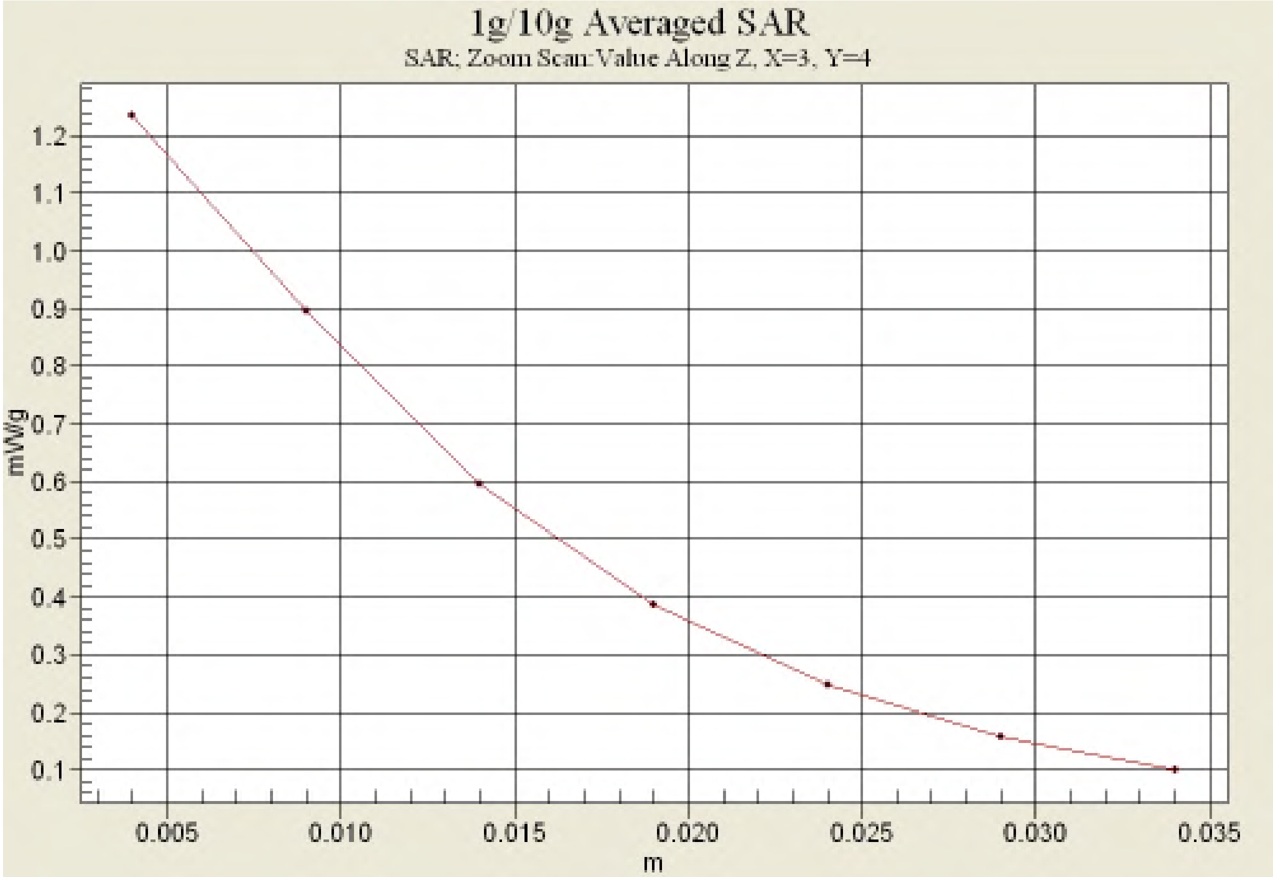
PCS1900_Left Touch_Mid/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.25 mW/g

PCS1900_Left Touch_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = 0.060 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.658 mW/g
Maximum value of SAR (measured) = 1.23 mW/g



0 dB = 1.23mW/g

Z-Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=4
mW/g
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date: 2012-04-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Left Tilt_CH661.da4

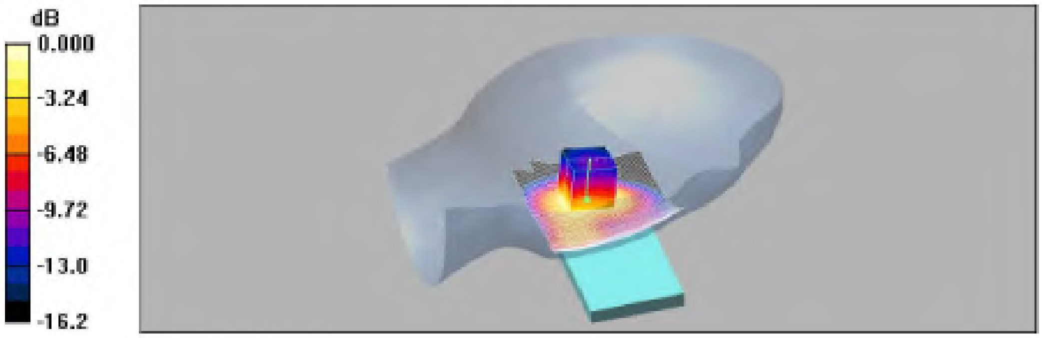
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(5.01, 5.01, 5.01); Calibrated: 2011-05-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

PCS1900_Left Tilt_Mid/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.394 mW/g

PCS1900_Left Tilt_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.7 V/m; Power Drift = -0.015 dB
Peak SAR (extrapolated) = 0.549 W/kg
SAR(1 g) = 0.337 mW/g; SAR(10 g) = 0.197 mW/g
Maximum value of SAR (measured) = 0.371 mW/g



0 dB = 0.371mW/g

Date: 2012-04-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Left Touch_CH512.da4

DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.37 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3
Phantom section: Left Section

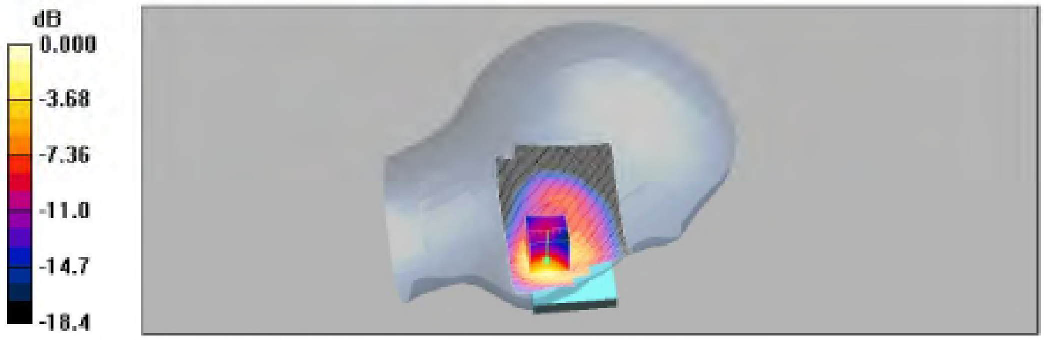
DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(5.01, 5.01, 5.01); Calibrated: 2011-05-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

PCS1900_Left Touch_Low/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.33 mW/g

PCS1900_Left Touch_Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 1.78 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.687 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.29 mW/g



0 dB = 1.29mW/g

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Left Touch_CH810.da4

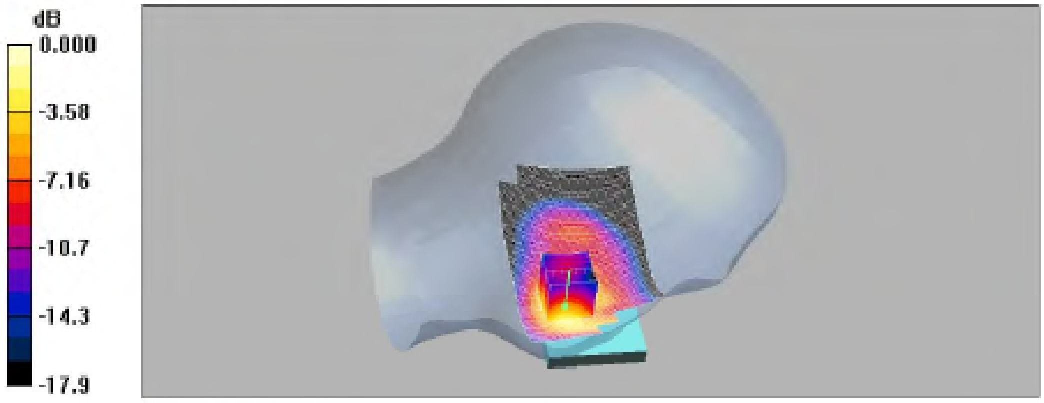
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.43 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

PCS1900_Left Touch_High/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.14 mW/g

PCS1900_Left Touch_High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.85 V/m; Power Drift = -0.043 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 1 mW/g; SAR(10 g) = 0.595 mW/g
Maximum value of SAR (measured) = 1.11 mW/g



0 dB = 1.11mW/g

Date: 2012-04-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Right Touch_CH661.da4

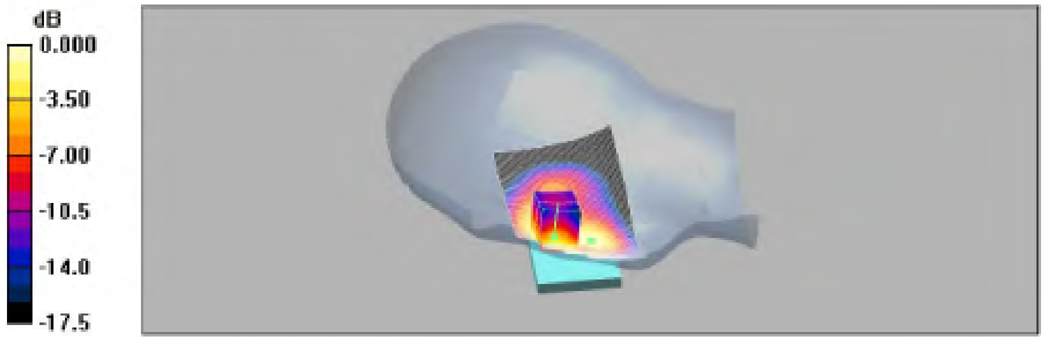
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(5.01, 5.01, 5.01); Calibrated: 2011-05-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

PCS1900_Right Touch_Mid/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.726 mW/g

PCS1900_Right Touch_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.07 V/m; Power Drift = 0.042 dB
Peak SAR (extrapolated) = 0.993 W/kg
SAR(1 g) = 0.691 mW/g; SAR(10 g) = 0.426 mW/g
Maximum value of SAR (measured) = 0.748 mW/g



0 dB = 0.748mW/g

Date: 2012-04-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Right Touch_CH661.da4

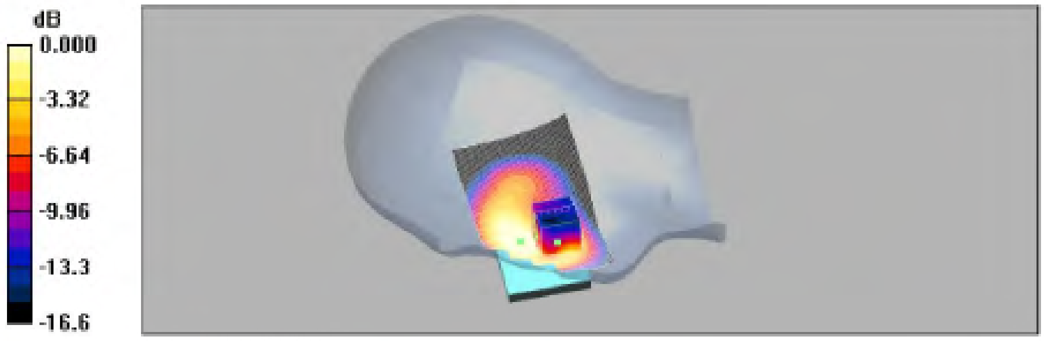
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(5.01, 5.01, 5.01); Calibrated: 2011-05-20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

PCS1900_Right Touch_Mid/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.726 mW/g

PCS1900_Right Touch_Mid/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.07 V/m; Power Drift = 0.042 dB
Peak SAR (extrapolated) = 0.880 W/kg
SAR(1 g) = 0.497 mW/g; SAR(10 g) = 0.295 mW/g
Maximum value of SAR (measured) = 0.599 mW/g



0 dB = 0.599mW/g

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Right Tilt_CH661.da4

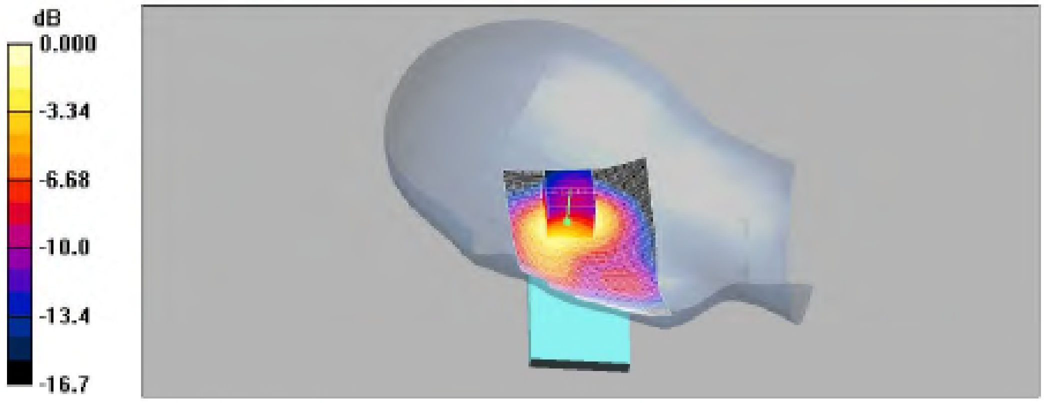
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

PCS1900_Right Tilt_Mid/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.370 mW/g

PCS1900_Right Tilt_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.3 V/m; Power Drift = -0.138 dB
Peak SAR (extrapolated) = 0.451 W/kg
SAR(1 g) = 0.311 mW/g; SAR(10 g) = 0.190 mW/g
Maximum value of SAR (measured) = 0.346 mW/g



0 dB = 0.346mW/g

GSM 1900 Body SAR Test

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GPRS1900_Front_CH661_1TX.da4

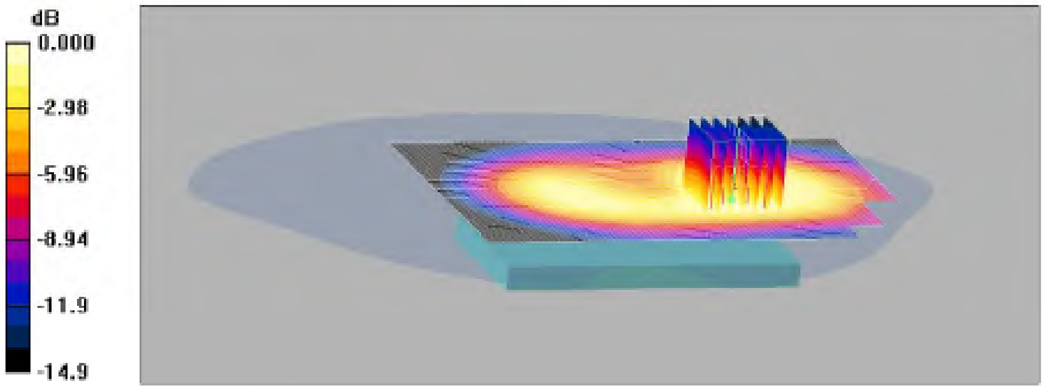
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900 Front_Mid/Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.197 mW/g

GPRS1900 Front_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.7 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 0.313 W/kg
SAR(1 g) = 0.189 mW/g; SAR(10 g) = 0.115 mW/g
Maximum value of SAR (measured) = 0.205 mW/g



0 dB = 0.205mW/g

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GPRS1900_Rear_CH661_1TX.da4

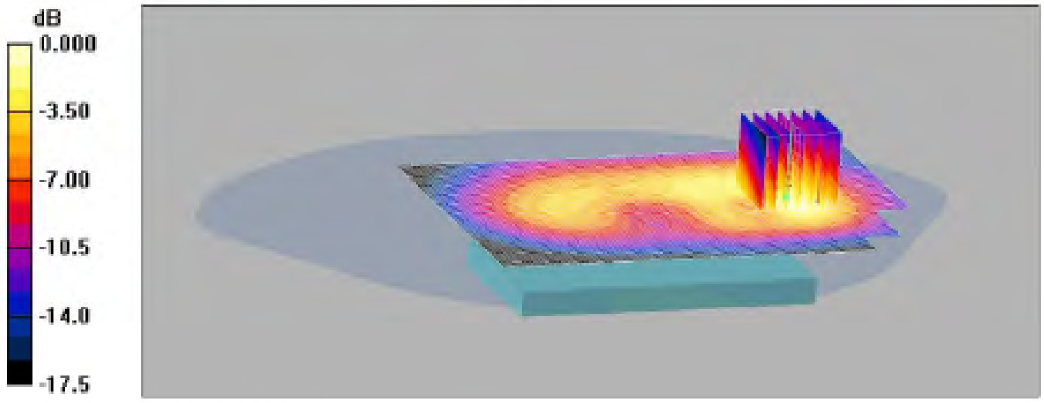
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900 Rear_Mid/Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.298 mW/g

GPRS1900 Rear_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.46 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 0.421 W/kg
SAR(1 g) = 0.270 mW/g; SAR(10 g) = 0.157 mW/g
Maximum value of SAR (measured) = 0.297 mW/g



0 dB = 0.297mW/g

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GPRS1900_Rear_CH661_2TX.da4

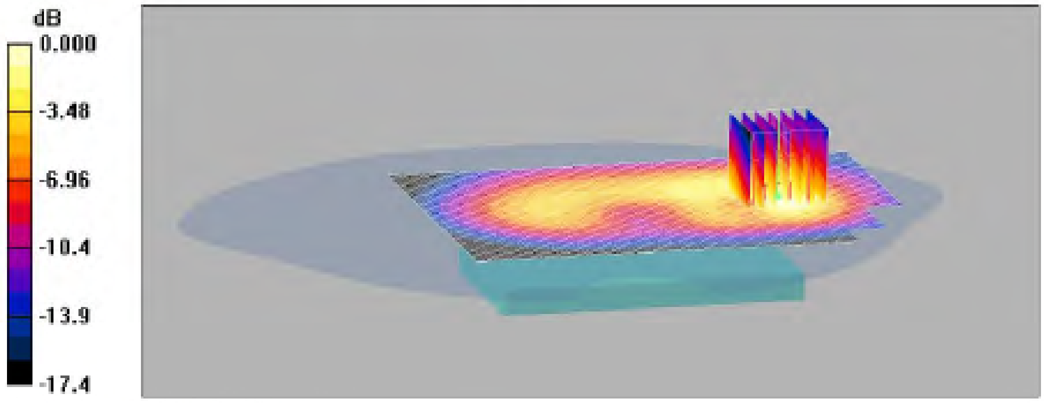
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

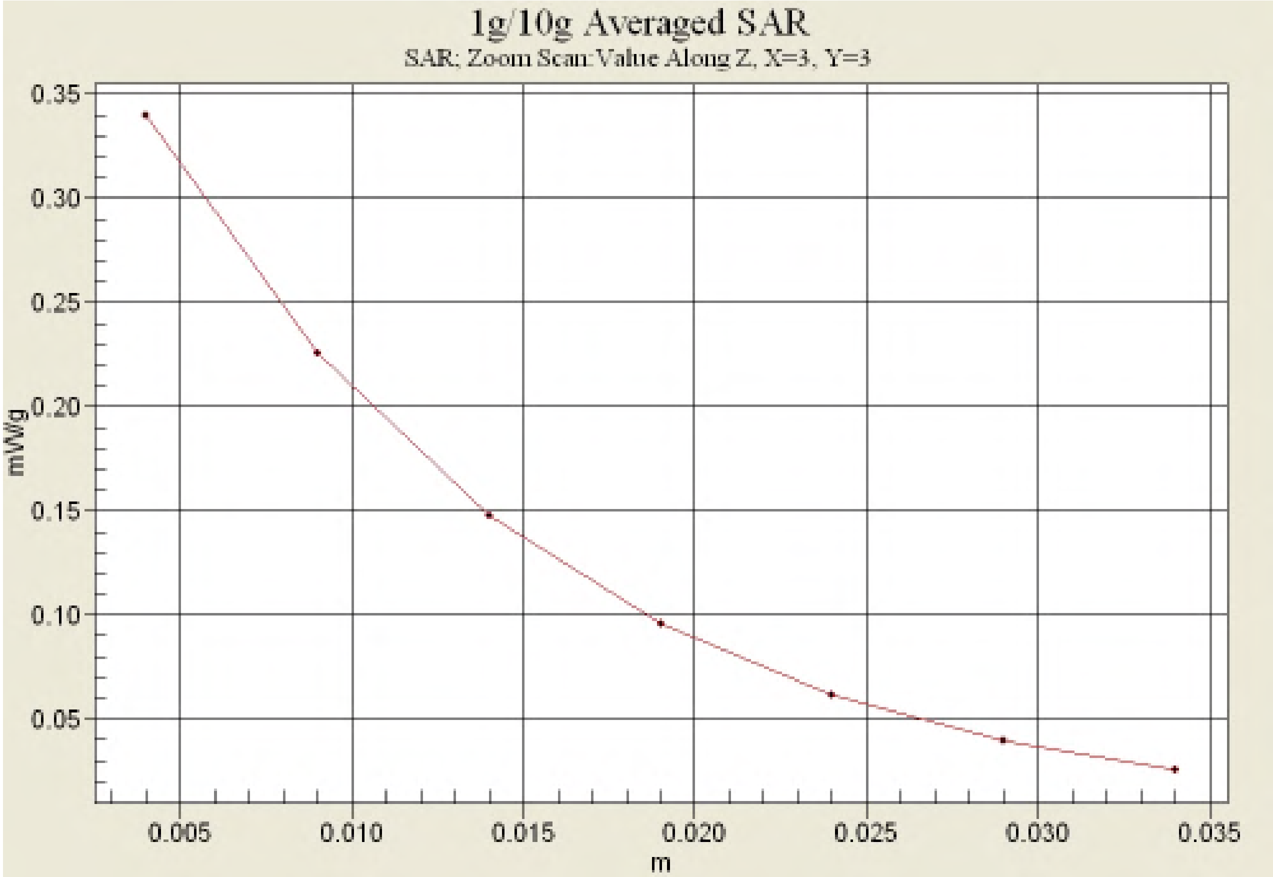
GPRS1900 Rear_Mid/Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.346 mW/g

GPRS1900 Rear_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.13 V/m; Power Drift = -0.093 dB
Peak SAR (extrapolated) = 0.472 W/kg
SAR(1 g) = 0.306 mW/g; SAR(10 g) = 0.179 mW/g
Maximum value of SAR (measured) = 0.338 mW/g



0 dB = 0.338mW/g

Z-Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GPRS1900_Rear_CH661_3TX.da4

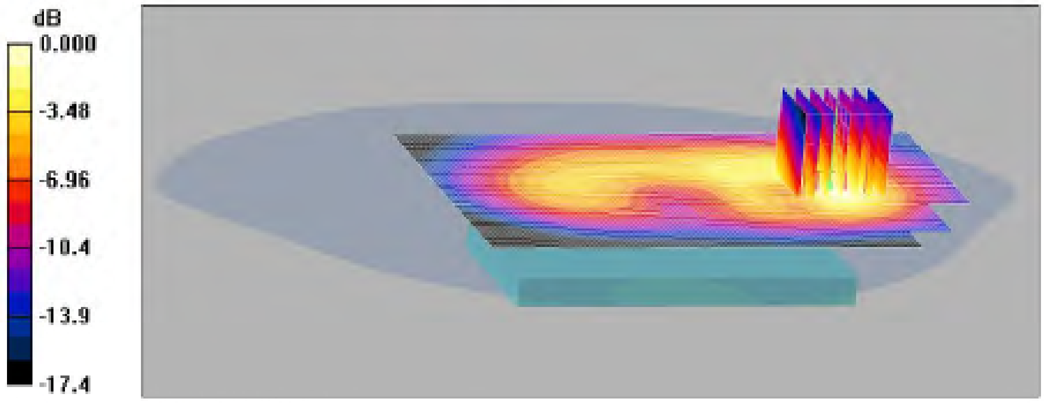
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.77
Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900 Rear_Mid/Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.326 mW/g

GPRS1900 Rear_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.90 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 0.452 W/kg
SAR(1 g) = 0.291 mW/g; SAR(10 g) = 0.171 mW/g
Maximum value of SAR (measured) = 0.321 mW/g



0 dB = 0.321mW/g

Date: 2012-03-26

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GPRS1900_Rear_CH661_4TX.da4

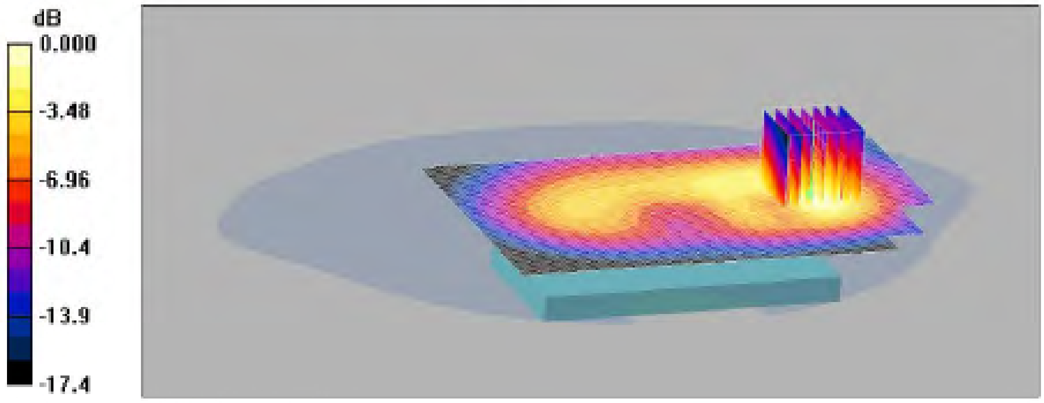
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: GPRS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.075
Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.34, 4.34, 4.34); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

GPRS1900 Rear_Mid/Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.339 mW/g

GPRS1900 Rear_Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.10 V/m; Power Drift = -0.092 dB
Peak SAR (extrapolated) = 0.474 W/kg
SAR(1 g) = 0.304 mW/g; SAR(10 g) = 0.177 mW/g
Maximum value of SAR (measured) = 0.332 mW/g



0 dB = 0.332mW/g

WLAN Head SAR Test

Date: 2012-04-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: WLAN_11b_Left Touch_1Mbps_High.da4

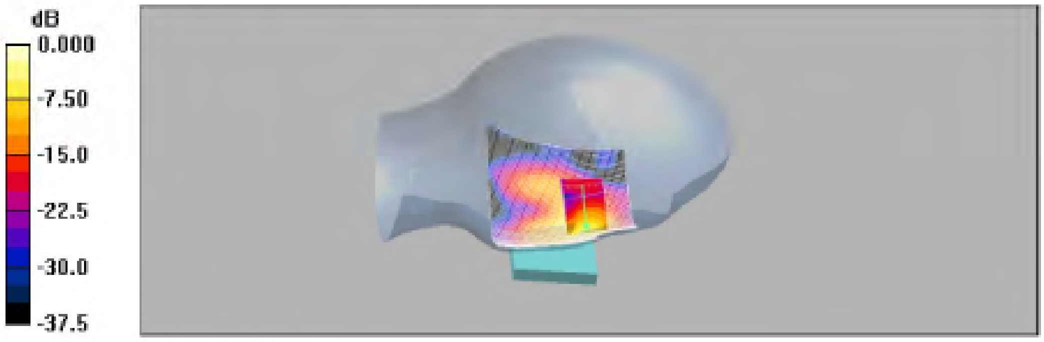
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: WLAN 11b_Head

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.81 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(4.4, 4.4, 4.4); Calibrated: 2011-05-20
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN 11b_Left Touch_High_1Mbps/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.415 mW/g

WLAN 11b_Left Touch_High_1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.20 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 0.675 W/kg
SAR(1 g) = 0.270 mW/g; SAR(10 g) = 0.110 mW/g
Maximum value of SAR (measured) = 0.379 mW/g



0 dB = 0.379mW/g

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: WLAN_11b_Left Tilt_1Mbps_High.da4

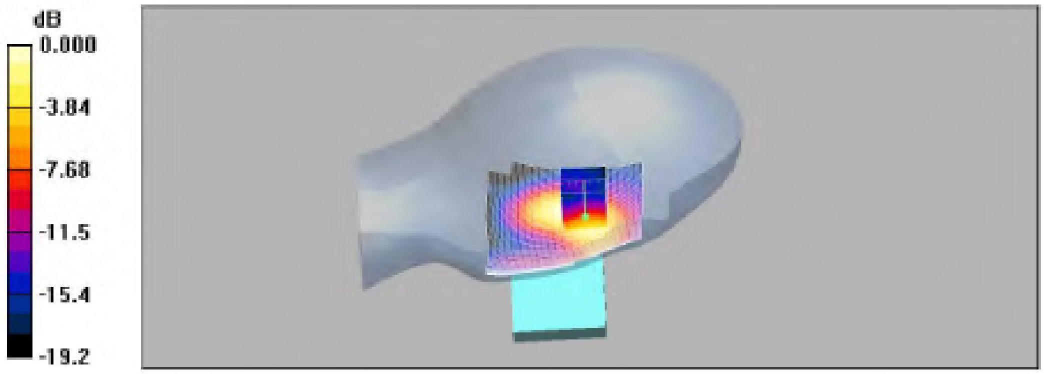
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: WLAN 11b_Head

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.81 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN 11b_Left Tilt_High_1Mbps/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.084 mW/g

WLAN 11b_Left Tilt_High_1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.85 V/m; Power Drift = 0.001 dB
Peak SAR (extrapolated) = 0.134 W/kg
SAR(1 g) = 0.075 mW/g; SAR(10 g) = 0.041 mW/g
Maximum value of SAR (measured) = 0.083 mW/g



0 dB = 0.083mW/g

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: WLAN_11b_Right Touch_1Mbps_High.da4

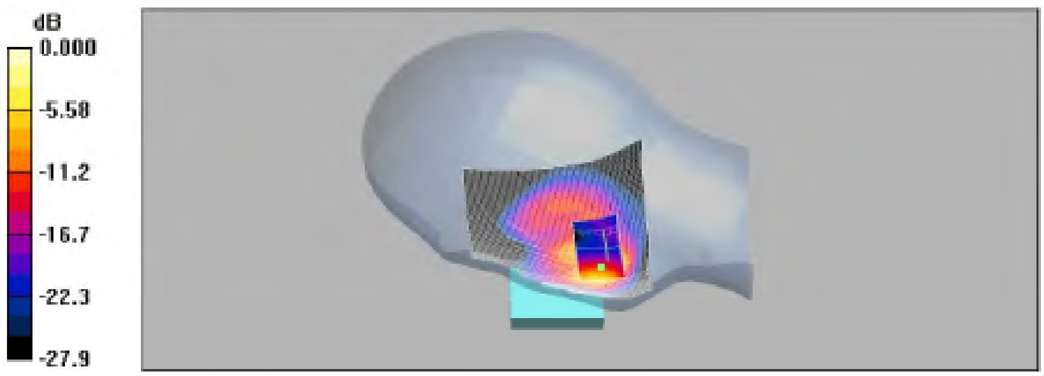
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: WLAN 11b_Head

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.81 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

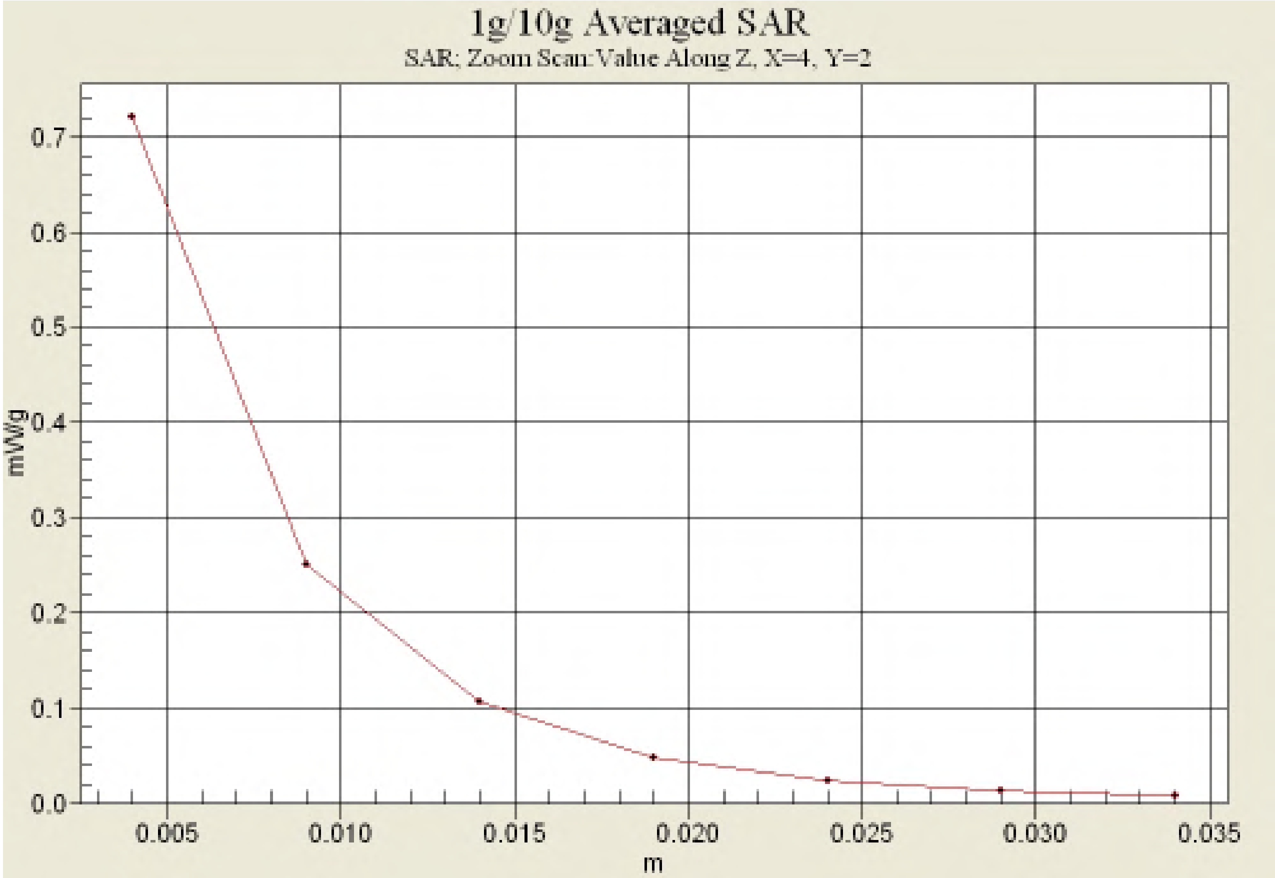
WLAN 11b_Right Touch_High_1Mbps/Area Scan (81x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.570 mW/g

WLAN 11b_Right Touch_High_1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.96 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 2.21 W/kg
SAR(1 g) = 0.581 mW/g; SAR(10 g) = 0.202 mW/g
Maximum value of SAR (measured) = 0.721 mW/g



0 dB = 0.721mW/g

Z-Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=4, Y=2
mW/g
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: WLAN_11b_Right Tilt_1Mbps_High.da4

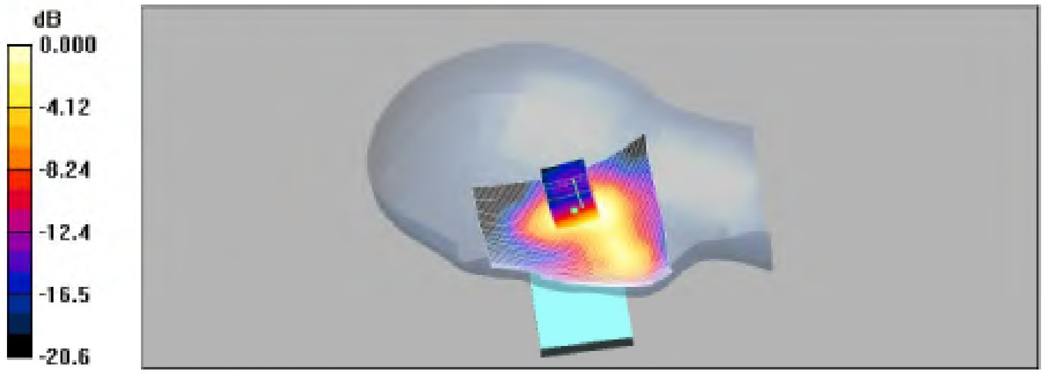
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: WLAN 11b_Head

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.81 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN 11b_Right Tilt_High_1Mbps/Area Scan (81x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.085 mW/g

WLAN 11b_Right Tilt_High_1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.48 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.127 W/kg
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.037 mW/g
Maximum value of SAR (measured) = 0.075 mW/g



0 dB = 0.075mW/g

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: WLAN_11b_Right Touch_1Mbps_Low.da4

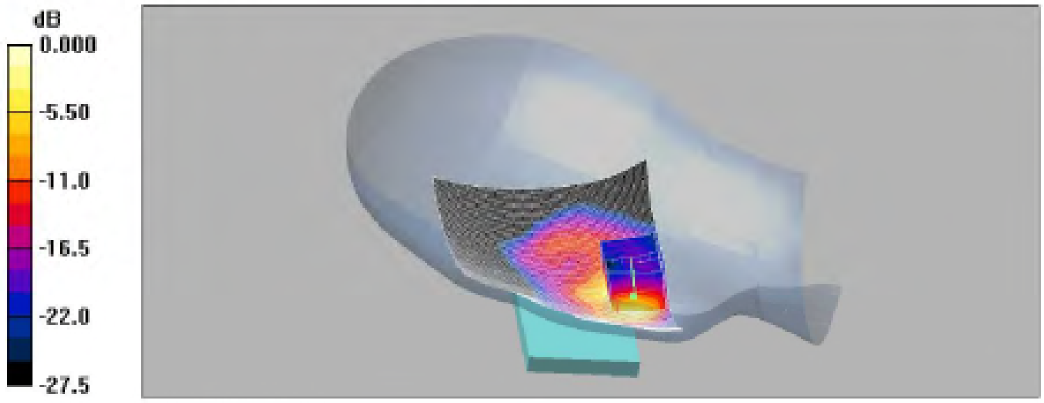
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: WLAN 11b_Head

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.75 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN 11b_Right Touch_Low_1Mbps/Area Scan (81x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.346 mW/g

WLAN 11b_Right Touch_Low_1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.09 V/m; Power Drift = 0.138 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 0.390 mW/g; SAR(10 g) = 0.135 mW/g
Maximum value of SAR (measured) = 0.448 mW/g



0 dB = 0.448mW/g

Date: 2012-03-24

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: WLAN_11b_Right Touch_1Mbps_Mid.da4

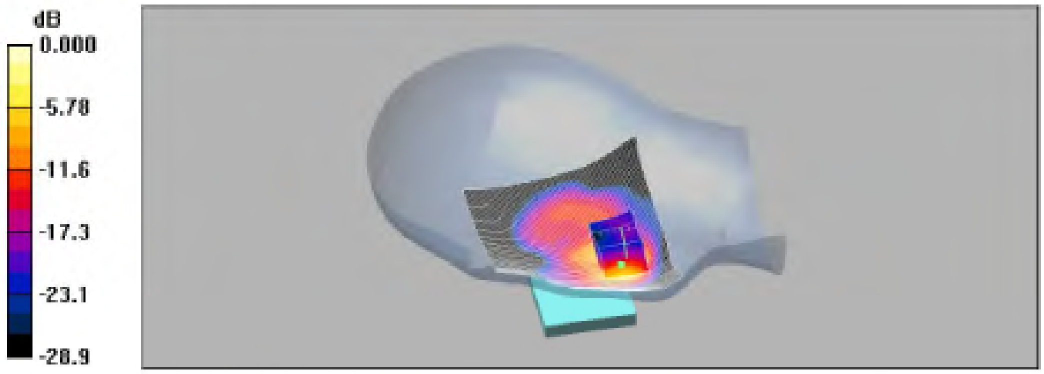
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: WLAN 11b_Head

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.78 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.37, 4.37, 4.37); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM with CRP_2011(left); Type: SAM; Serial: TP-1645
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN 11b_Right Touch_Mid_1Mbps/Area Scan (81x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.539 mW/g

WLAN 11b_Right Touch_Mid_1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.59 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 2.05 W/kg
SAR(1 g) = 0.531 mW/g; SAR(10 g) = 0.185 mW/g
Maximum value of SAR (measured) = 0.655 mW/g



0 dB = 0.655mW/g

WLAN Body SAR Test

Date: 2012-03-23

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: WLAN_11b_1Mbps_Front High.da4

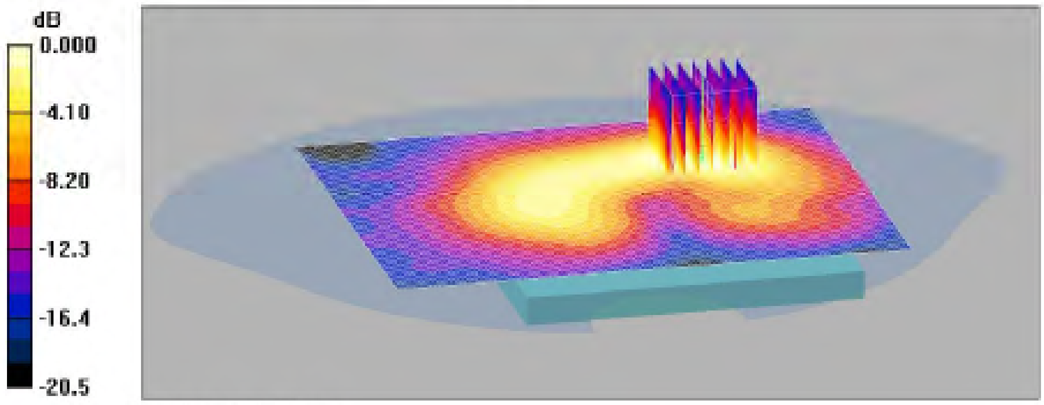
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: WLAN_Body

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 2 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(3.94, 3.94, 3.94); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11b_Front_1Mbps High/Area Scan (91x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.041 mW/g

WLAN_11b_Front_1Mbps High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.85 V/m; Power Drift = 0.062 dB
Peak SAR (extrapolated) = 0.100 W/kg
SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.020 mW/g
Maximum value of SAR (measured) = 0.042 mW/g



0 dB = 0.042mW/g

Date: 2012-03-23

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: WLAN_11b_1Mbps_Rear High.da4

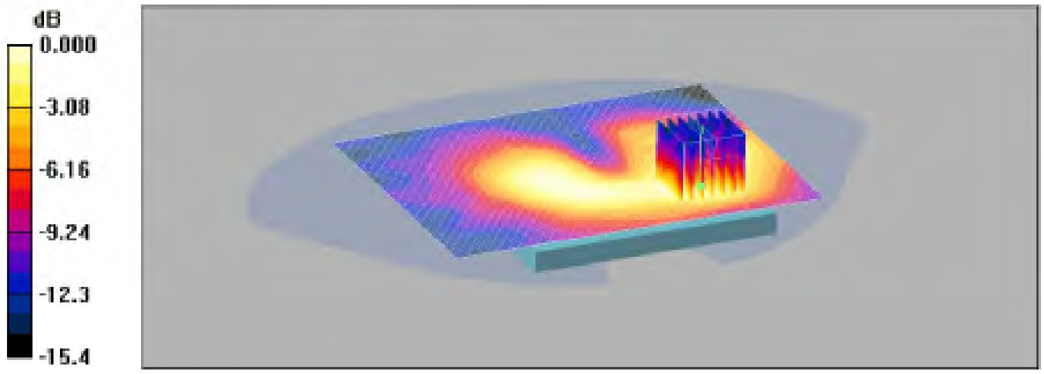
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: WLAN_Body

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; $\sigma = 2$ mho/m; $\varepsilon_r = 52.8$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(3.94, 3.94, 3.94); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11b_Rear_1Mbps High/Area Scan (91x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.020 mW/g

WLAN_11b_Rear_1Mbps High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.59 V/m; Power Drift = -0.165 dB
Peak SAR (extrapolated) = 0.045 W/kg
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.010 mW/g
Maximum value of SAR (measured) = 0.020 mW/g



0 dB = 0.020mW/g

Date: 2012-03-23

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: WLAN_11b_1Mbps_Front Low.da4

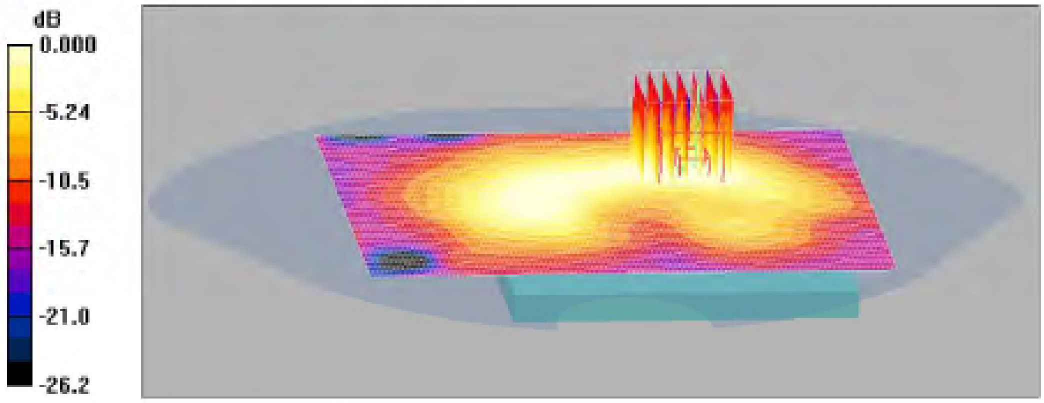
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: WLAN_Body

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.93 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(3.94, 3.94, 3.94); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11b_Front_1Mbps Low/Area Scan (91x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.025 mW/g

WLAN_11b_Front_1Mbps Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.29 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 0.063 W/kg
SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.013 mW/g
Maximum value of SAR (measured) = 0.026 mW/g



0 dB = 0.026mW/g

Date: 2012-04-16

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: WLAN_11b_1Mbps_Front Mid.da4

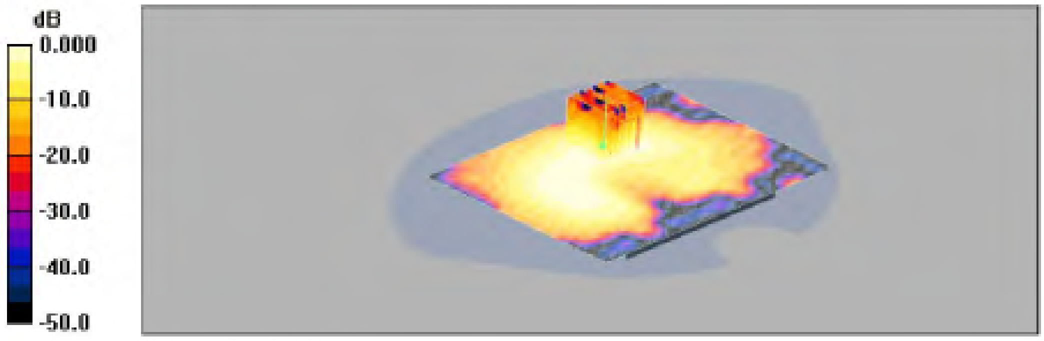
DUT: LG-C205; Type: Cellular/PCS GSM/GPRS Phone with Bluetooth and WLAN ; Serial: 202KPGS137023
Program Name: WLAN_Body

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.96 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3068; ConvF(4.28, 4.28, 4.28); Calibrated: 2011-05-20
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: SAM MIC #2000-93 with CRP_Right; Type: SAM MIC #2000-93; Serial: TP-1300
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

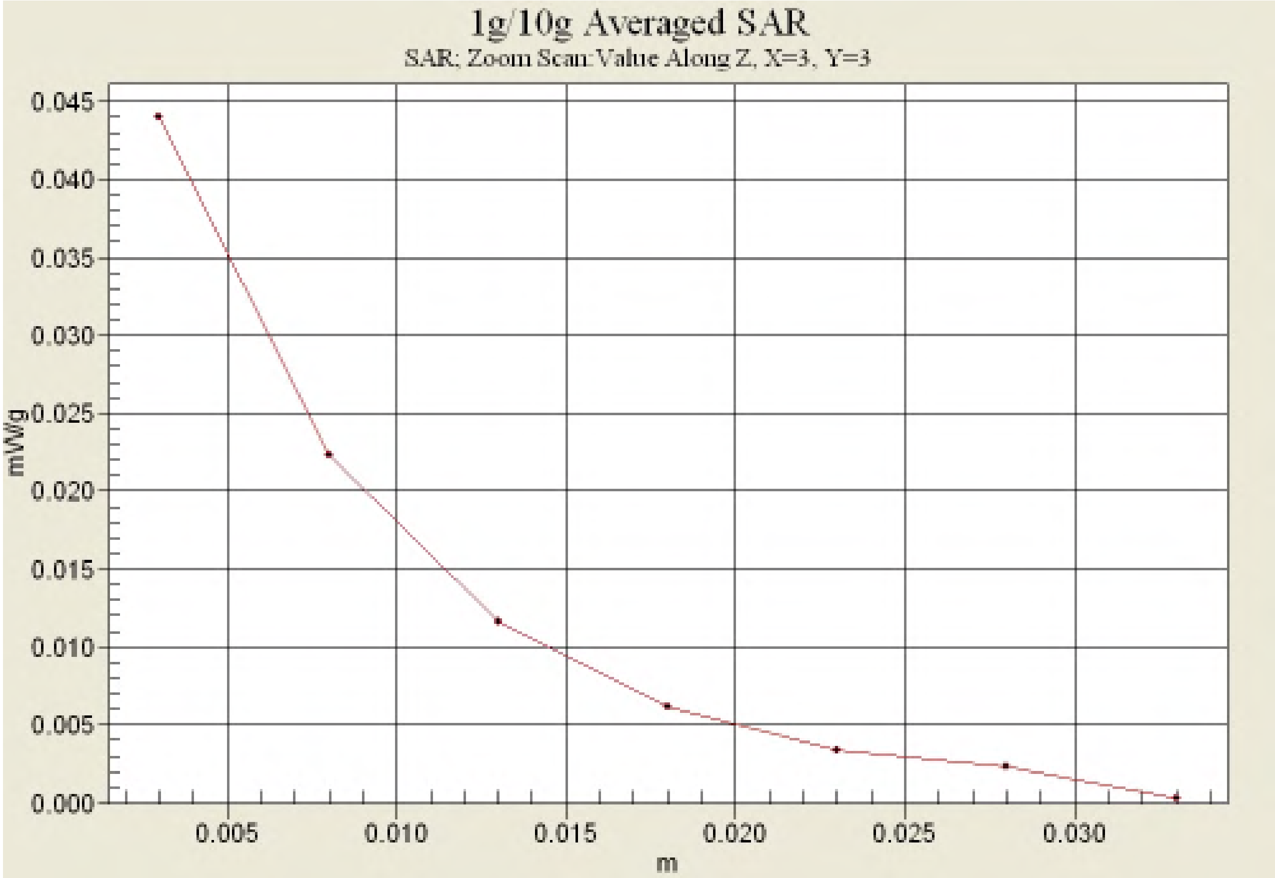
WLAN_11b_Front_1Mbps Mid/Area Scan (91x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.042 mW/g

WLAN_11b_Front_1Mbps Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.49 V/m; Power Drift = -0.077 dB
Peak SAR (extrapolated) = 0.070 W/kg
SAR(1 g) = 0.035 mW/g; SAR(10 g) = 0.018 mW/g
Maximum value of SAR (measured) = 0.044 mW/g



0 dB = 0.044mW/g

Z-Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
0.045
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
0.005
0.010
0.015
0.020
0.025
0.030
m

Appendix B

Uncertainty Analysis

a	b	c	d	e = f(d,k)	g	I = cxg/e	k
Uncertainty Component	Section in P1528	Tol (%)	Prob . Dist.	Div.	Ci (1g)	1g ui (%)	Vi (Veff)
Probe calibration	E.2.1	6.3	N	1	1	6.30	∞
Axial isotropy	E.2.2	0.5	R	1.73	0.71	0.20	∞
hemispherical isotropy	E.2.2	2.6	R	1.73	0.71	1.06	∞
Boundary effect	E.2.3	0.8	R	1.73	1	0.46	∞
Linearity	E.2.4	0.6	R	1.73	1	0.35	∞
System detection limit	E.2.5	0.25	R	1.73	1	0.14	∞
Readout electronics	E.2.6	0.3	N	1	1	0.30	∞
Response time	E.2.7	0	R	1.73	1	0.00	∞
Integration time	E.2.8	2.6	R	1.73	1	1.50	∞
RF ambient Condition –Noise	E.6.1	3	R	1.73	1	1.73	∞
RF ambient Condition – reflections	E.6.1	3	R	1.73	1	1.73	∞
Probe positioning– mechanical tolerance	E.6.2	1.5	R	1.73	1	0.87	∞
Probe positioning– with respect to phantom	E.6.3	2.9	R	1.73	1	1.67	∞
Max. SAR evaluation	E.5.2	1	R	1.73	1	0.58	∞
Test sample positioning	E.4.2	4.75	N	1	1	4.75	9
Device holder uncertainty	E.4.1	3.6	N	1	1	3.60	∞
Output power variation –SAR drift measurement	6.62	5	R	1.73	1	2.89	∞
Phantom uncertainty (shape and thickness tolerances)	E.3.1	4	R	1.73	1	2.31	∞
Liquid conductivity – deviation from target values	E.3.2	5	R	1.73	0.64	1.85	∞
Liquid conductivity – measurement uncertainty	E.3.2	1.58	N	1	0.64	1.01	5
Liquid permittivity – deviation from target values	E.3.3	5	R	1.73	0.6	1.73	∞
Liquid permittivity – measurement uncertainty	E.3.3	1.54	N	1	0.6	0.92	5
Combined standard uncertainty				RSS		10.53	216
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		21.06	

Appendix C

Calibration Certificate

- PROBE

- DAE

- 835 ㎒, 1900 ㎒ 2450 ㎒ DIPOLE

- PROBE Calibration Certificate

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Engineering AG
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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **SGS (Dymstec)**

Certificate No: **ET3-1782_Apr11**

CALIBRATION CERTIFICATE

Object: ET3DV6 - SN:1782

Calibration procedure(s): QA CAL-01.v7, QA CAL-12.v6, QA CAL-23.v4, QA CAL-25.v3
Calibration procedure for dosimetric E-field probes

Calibration date: April 14, 2011

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	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41495277	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	23-Apr-10 (No. DAE4-654_Apr10)	Apr-11
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: April 14, 2011

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	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* are numerical linearization parameters in dB assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media.
- *VR:* VR is the validity range of the calibration related to the average diode voltage or DAE voltage in mV.
- *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 ET3DV6

SN:1782

Manufactured: April 15, 2003
Calibrated: April 14, 2011

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

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1782

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m)^2)[A]	2.07	1.66	1.92	± 10.1 %
DCP (mV)[B]	96.4	96.6	97.6	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	111.1	±1.9 %
			Y	0.00	0.00	1.00	141.0	
			Z	0.00	0.00	1.00	145.1	

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: ET3DV6 - SN:1782

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	6.89	6.89	6.89	0.21	2.29	± 13.4 %
835	41.5	0.90	6.22	6.22	6.22	0.88	1.63	± 12.0 %
1750	40.1	1.37	5.14	5.14	5.14	0.57	2.53	± 12.0 %
1900	40.0	1.40	4.95	4.95	4.95	0.58	2.54	± 12.0 %
2450	39.2	1.80	4.37	4.37	4.37	0.80	1.93	± 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: ET3DV6- SN:1782

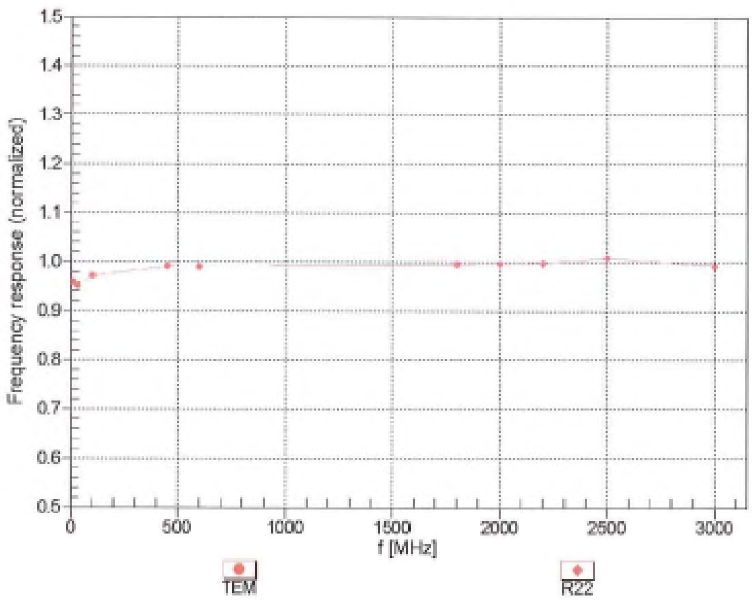
Calibration Parameter Determined in Body Tissue Simulating Media

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	7.49	7.49	7.49	0.16	2.34	± 13.4 %
835	55.2	0.97	6.03	6.03	6.03	0.85	1.72	± 12.0 %
1750	53.4	1.49	4.54	4.54	4.54	0.64	2.70	± 12.0 %
1900	53.3	1.52	4.34	4.34	4.34	0.63	2.57	± 12.0 %
2450	52.7	1.95	3.94	3.94	3.94	0.99	1.21	± 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

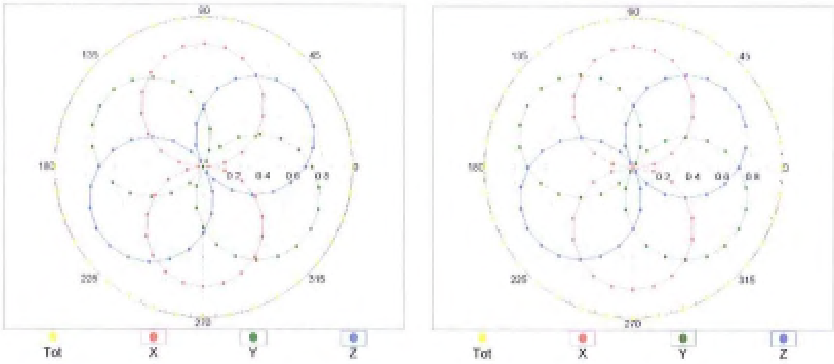
(TEM-Cell:ifi110 EXX, Waveguide: R22)

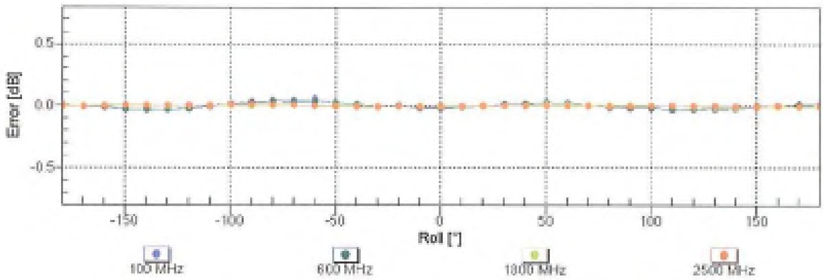


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (φ), ϑ = 0°

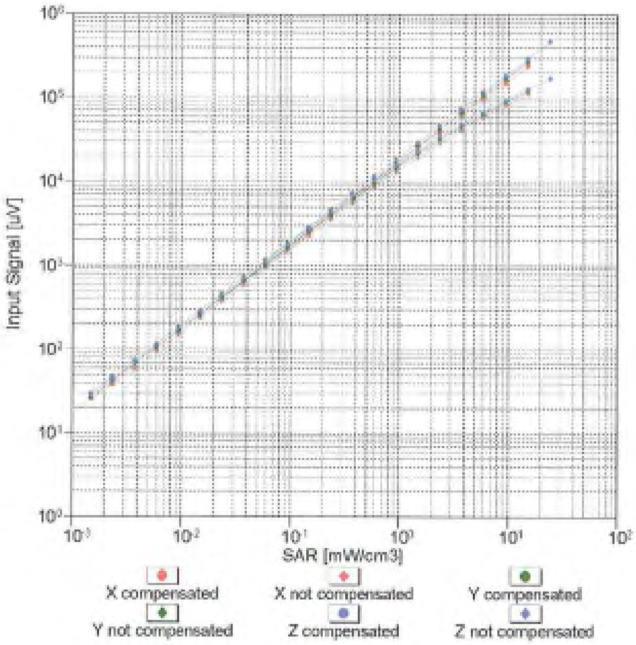
f=600 MHz,TEM f=1800 MHz,R22

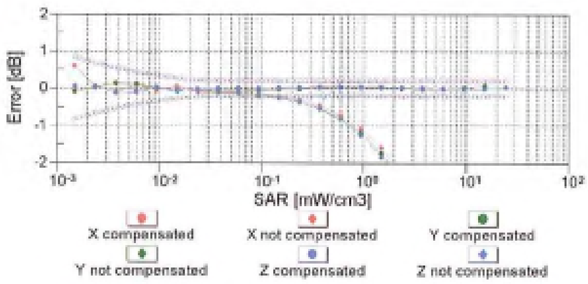




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

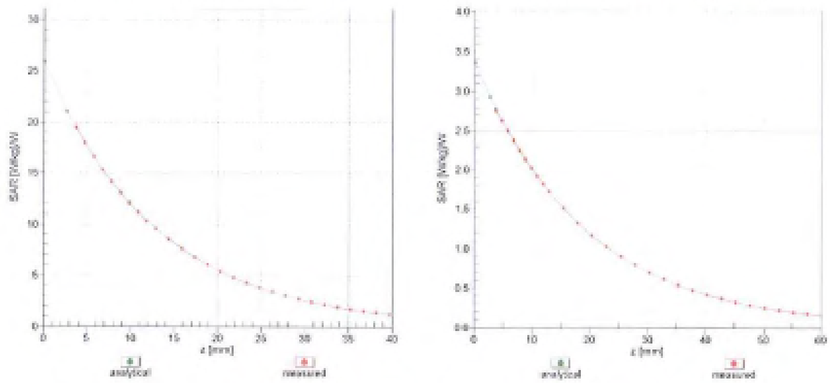




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

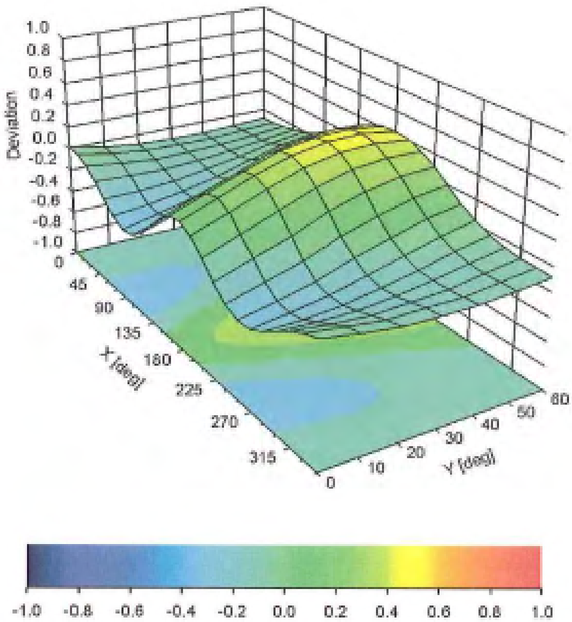
ET3DV6– SN:1782 April 14, 2011

Conversion Factor Assessment



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: ET3DV6 - SN:1782

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
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	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

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Accreditation No.: **SCS 108**

Client **Nemko (Dymstec)**

Certificate No: **ES3-3068_May11**

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3068
Calibration procedure(s)	QA CAL-01.v7, QA CAL-23.v4, QA CAL-25.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	May 20, 2011

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	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: May 23, 2011

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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	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* are numerical linearization parameters in dB assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media.
- *VR:* VR is the validity range of the calibration related to the average diode voltage or DAE voltage in mV.
- *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:3068

Manufactured: December 14, 2004
Calibrated: May 20, 2011

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3068

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.31	1.30	1.08	± 10.1 %
DCP (mV)[B]	102.0	99.0	101.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	111.6	±2.7 %
			Y	0.00	0.00	1.00	117.5	
			Z	0.00	0.00	1.00	102.0	

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: ES3DV3 - SN:3068

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)
835	41.5	0.90	6.06	6.06	6.06	1.00	1.00	± 12.0 %
1900	40.0	1.40	5.01	5.01	5.01	1.00	1.06	± 12.0 %
2450	39.2	1.80	4.40	4.40	4.40	0.85	1.16	± 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:3068

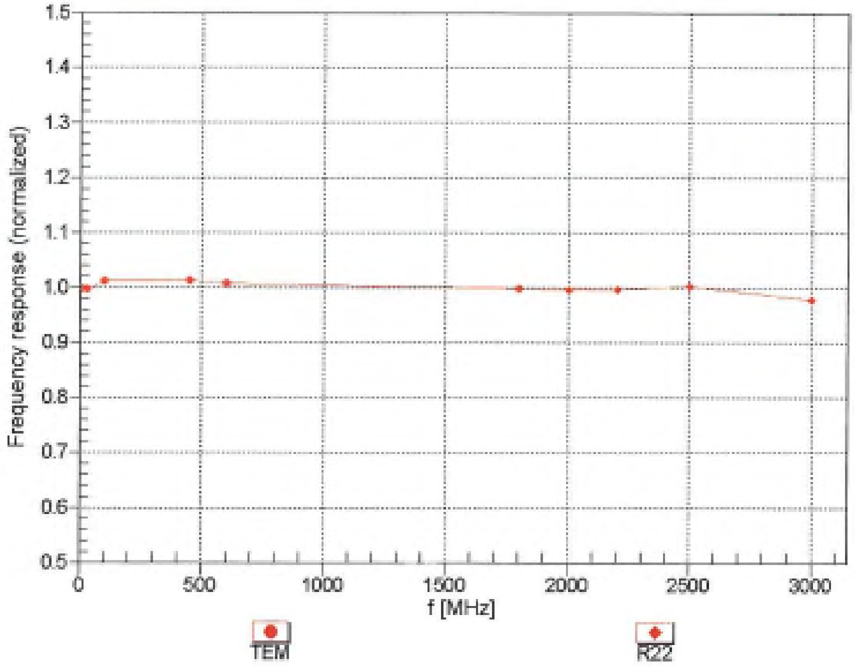
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	55.2	0.97	6.02	6.02	6.02	1.00	1.00	± 12.0 %
1900	53.3	1.52	4.78	4.78	4.78	0.78	1.37	± 12.0 %
2450	52.7	1.95	4.28	4.28	4.28	0.85	1.17	± 12.0 %
2600	52.5	2.16	4.11	4.11	4.11	0.85	1.20	± 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.

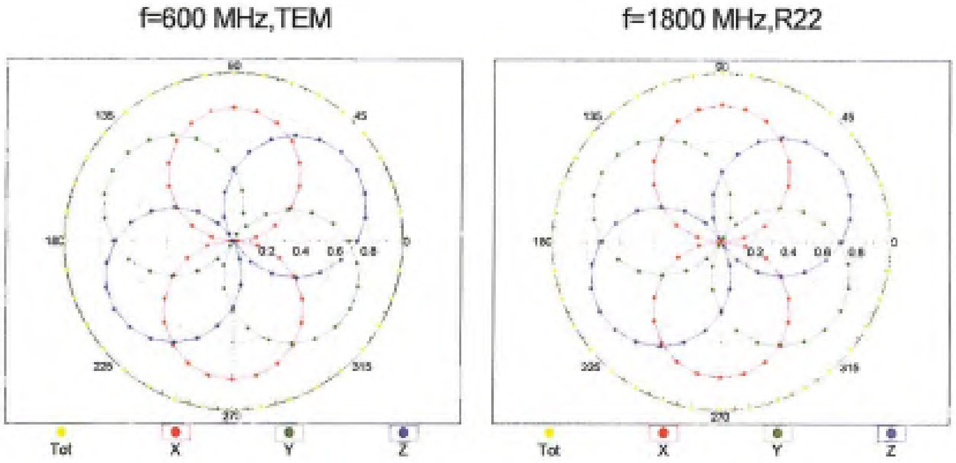
Frequency Response of E-Field

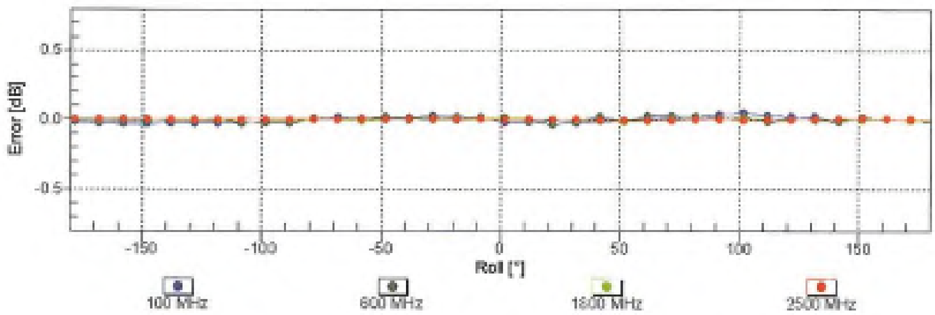
(TEM-Cell:ifi110 EXX, Waveguide: R22)



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

Receiving Pattern (ϕ), $\vartheta = 0°$

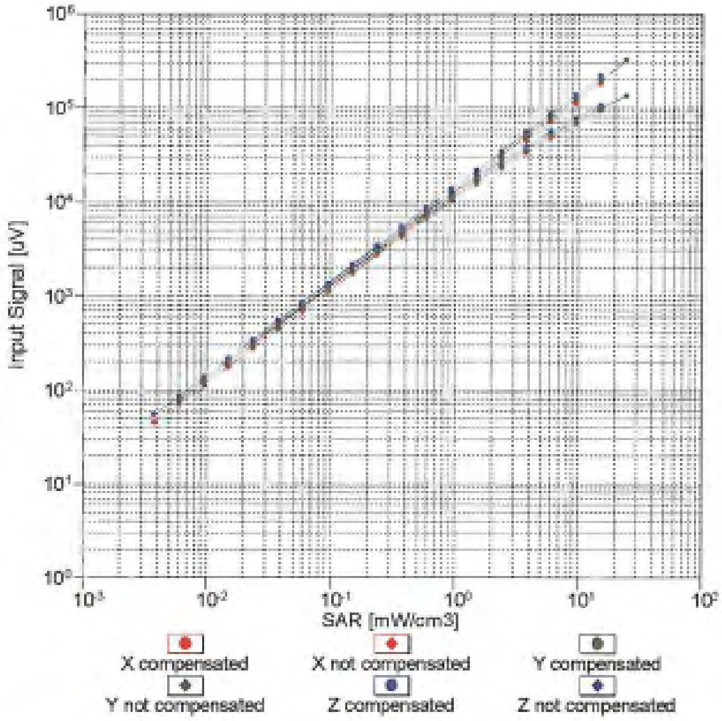


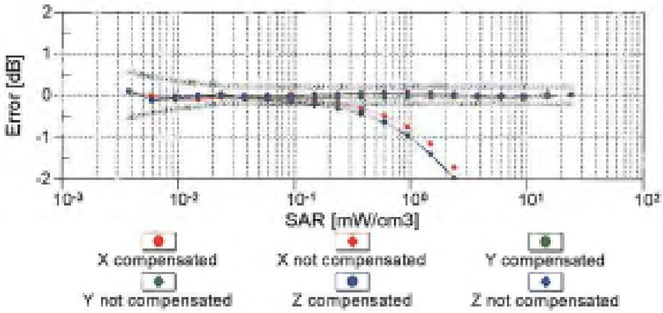


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

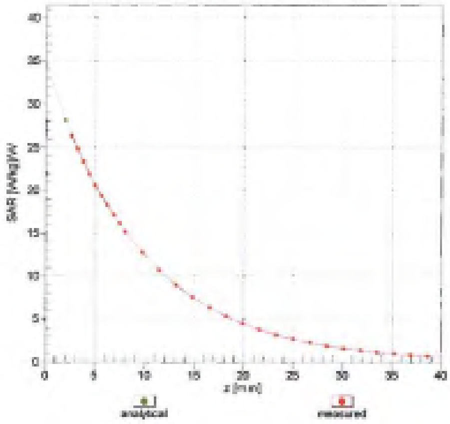
(TEM cell , f = 900 MHz)

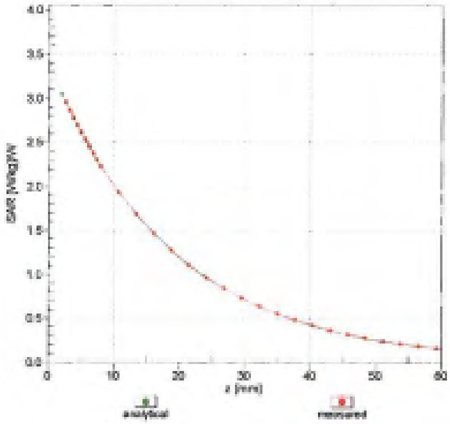




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

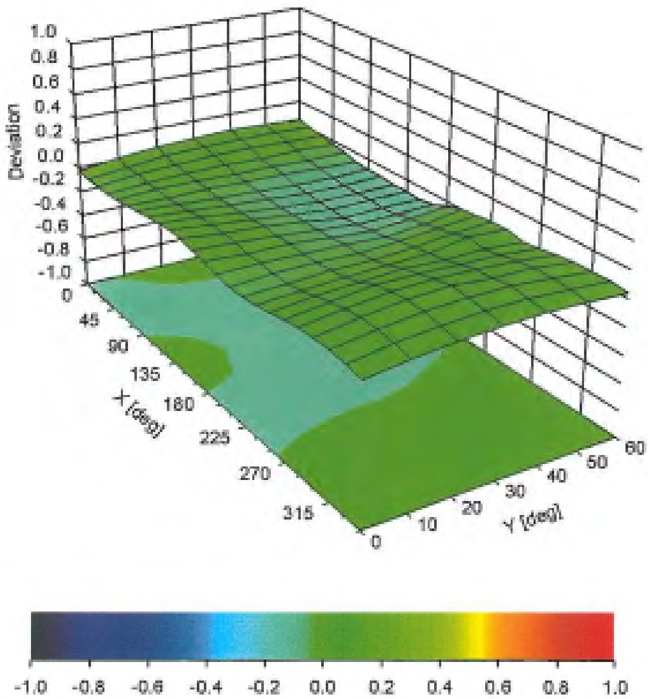
Conversion Factor Assessment





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: ES3DV3 - SN:3068

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
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

-DAE Calibration Certificate

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Accreditation No.: **SCS 108**

Client **SGS (Dymstec)**

Certificate No: **DAE3-567_Jan12**

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 567
Calibration procedure(s)	QA CAL-06.v24 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	January 20, 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
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-11 (No:11450)	Sep-12
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V2.1	SE UWS 053 AA 1001	05-Jan-12 (in house check)	In house check: Jan-13

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Technician	
Approved by:	Fin Bomholt	R&D Director	i.V.

Issued: January 20, 2012

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

Calibration Laboratory of
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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	404.763 ± 0.1% (k=2)	404.411 ± 0.1% (k=2)	404.499 ± 0.1% (k=2)
Low Range	3.95035 ± 0.7% (k=2)	3.97119 ± 0.7% (k=2)	3.95014 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	7.5 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199998.82	3.53	0.00
Channel X	+ Input	20005.03	4.17	0.02
Channel X	- Input	-19996.67	3.44	-0.02
Channel Y	+ Input	199997.37	2.30	0.00
Channel Y	+ Input	19999.48	-1.11	-0.01
Channel Y	- Input	-19998.88	1.52	-0.01
Channel Z	+ Input	199994.27	-0.68	-0.00
Channel Z	+ Input	20001.19	0.52	0.00
Channel Z	- Input	-19995.78	4.48	-0.02

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	1999.73	-1.35	-0.07
Channel X	+ Input	200.29	-1.35	-0.67
Channel X	- Input	-197.22	0.97	-0.49
Channel Y	+ Input	1999.97	-1.02	-0.05
Channel Y	+ Input	200.82	-0.73	-0.36
Channel Y	- Input	-198.58	-0.24	0.12
Channel Z	+ Input	2000.13	-0.92	-0.05
Channel Z	+ Input	200.68	-0.79	-0.39
Channel Z	- Input	-199.26	-0.95	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	6.01	1.84
	- 200	-13.55	-1.50
Channel Y	200	-1.13	-2.89
	- 200	1.36	1.24
Channel Z	200	4.36	4.11
	- 200	-5.92	-6.33

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	-	-2.44	-2.08
Channel Y	200	7.42	-	-1.51
Channel Z	200	5.84	8.06	-

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	16326	15742
Channel Y	16161	15582
Channel Z	15953	16228

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	0.24	-1.71	1.46	0.53
Channel Y	-0.13	-2.46	1.09	0.49
Channel Z	-0.85	-2.00	0.31	0.42

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

- 835 ㎒ Dipole Calibration Certificate

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Accreditation No.: **SCS 108**

Client **SGS KES (Dymstec)**

Certificate No: **D835V2-490_May10**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 490
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	May 21, 2010

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	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	02-Mar-10 (No. DAE4-601_Mar10)	Mar-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

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

Issued: May 21, 2010

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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.

Measurement Conditions

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

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
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	41.7 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature during test	(22.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.42 mW / g
SAR normalized	normalized to 1W	9.68 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.62 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 mW / g
SAR normalized	normalized to 1W	6.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.29 mW /g ± 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	54.2 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.49 mW / g
SAR normalized	normalized to 1W	10.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.84 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.63 mW / g
SAR normalized	normalized to 1W	6.52 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.47 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.9 Ω - 5.3 jΩ
Return Loss	- 25.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.4 Ω - 6.9 jΩ
Return Loss	- 21.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.381 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.
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	May 19, 2003

DASY5 Validation Report for Head TSL

Date/Time: 21.05.2010 10:57:47

Test Laboratory: SPEAG, Zurich, Switzerland

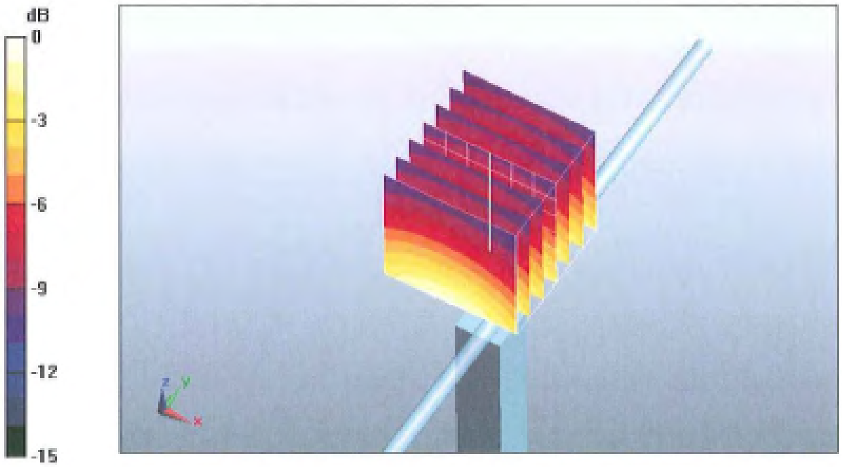
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; σ = 0.91 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

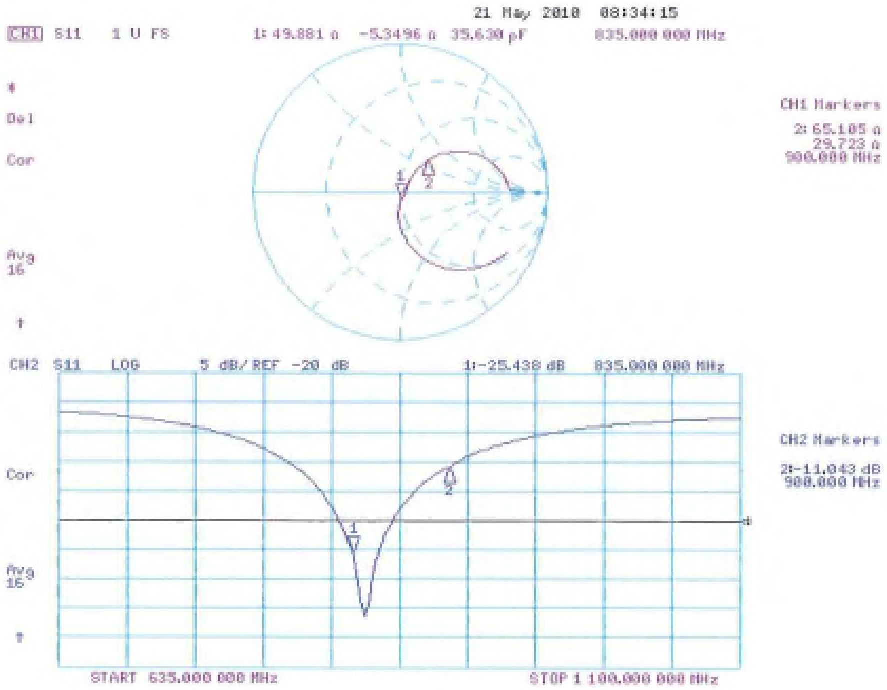
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.1 V/m; Power Drift = 0.00869 dB
Peak SAR (extrapolated) = 3.6 W/kg
SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 2.8 mW/g



0 dB = 2.8mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 20.05.2010 10:28:20

Test Laboratory: SPEAG, Zurich, Switzerland

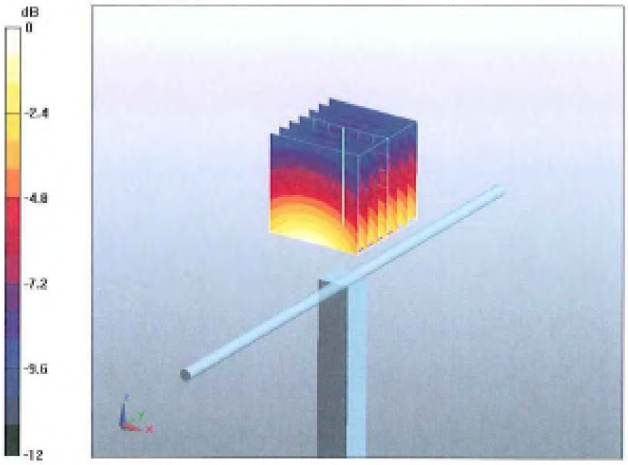
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

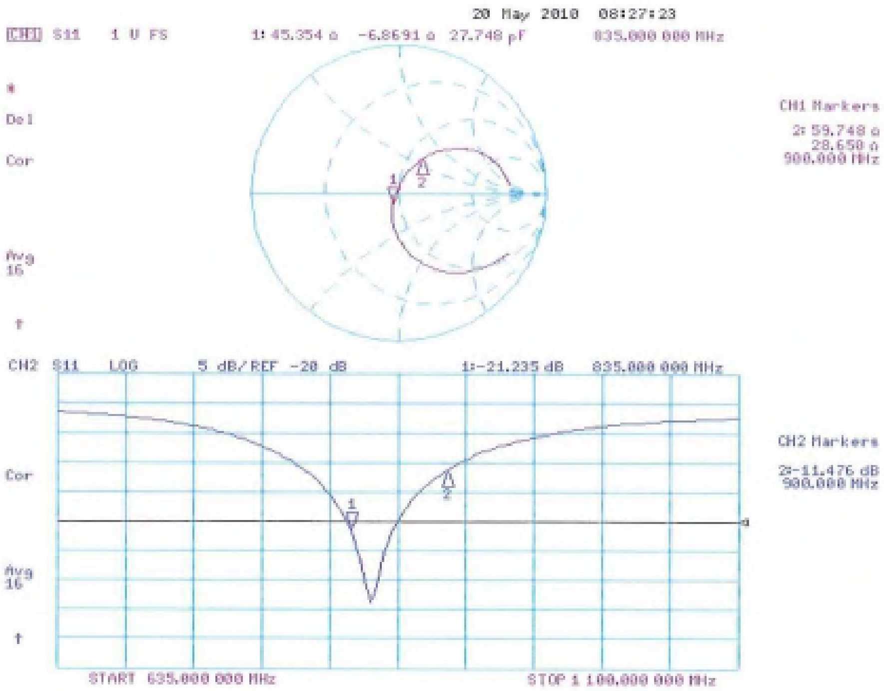
- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

Pin250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.1 V/m; Power Drift = 0.000723 dB
Peak SAR (extrapolated) = 3.65 W/kg
SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.63 mW/g
Maximum value of SAR (measured) = 2.89 mW/g



0 dB = 2.89mW/g

Impedance Measurement Plot for Body TSL



- 1900 ㎒ Dipole Calibration Certificate

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Accreditation No.: **SCS 108**

Client **SGS KES (Dymstec)**

Certificate No: **D1900V2-5d033_May10**

CALIBRATION CERTIFICATE

Object: D1900V2 - SN: 5d033

Calibration procedure(s): QA CAL-05.v7
Calibration procedure for dipole validation kits

Calibration date: May 26, 2010

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	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	02-Mar-10 (No. DAE4-601_Mar10)	Mar-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

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

Issued: May 27, 2010

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Certificate No: D1900V2-5d033_May10 Page 1 of 9

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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.

Measurement Conditions

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

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
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	39.7 ± 6 %	1.41 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.90 mW / g
SAR normalized	normalized to 1W	39.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.4 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.15 mW / g
SAR normalized	normalized to 1W	20.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.5 mW /g ± 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	54.1 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature during test	(21.8 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.3 mW / g
SAR normalized	normalized to 1W	41.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**41.3 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.50 mW / g
SAR normalized	normalized to 1W	22.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.5 Ω + 3.8 jΩ
Return Loss	- 28.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.1 Ω + 4.3 jΩ
Return Loss	- 25.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.205 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.
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	March 17, 2003

DASY5 Validation Report for Head TSL

Date/Time: 17.05.2010 15:51:21

Test Laboratory: SPEAG, Zurich, Switzerland

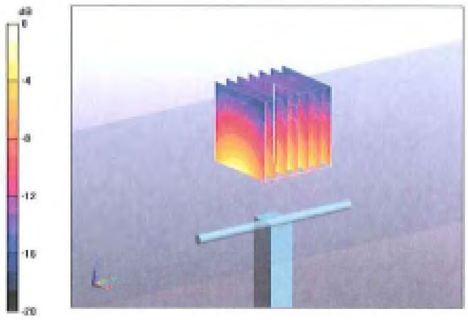
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL U11 BB
Medium parameters used: f = 1900 MHz; σ = 1.41 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

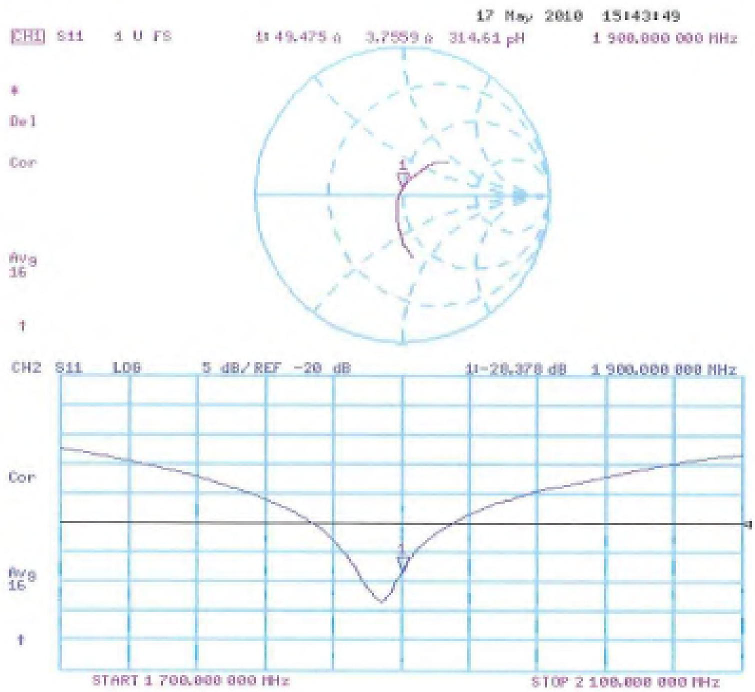
- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.4 V/m; Power Drift = 0.00578 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 9.9 mW/g; SAR(10 g) = 5.15 mW/g
Maximum value of SAR (measured) = 12.4 mW/g



0 dB = 12.4mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 26.05.2010 15:04:02

Test Laboratory: SPEAG, Zurich, Switzerland

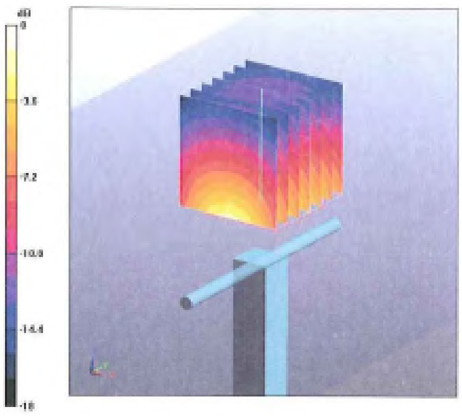
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL U11 BB
Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

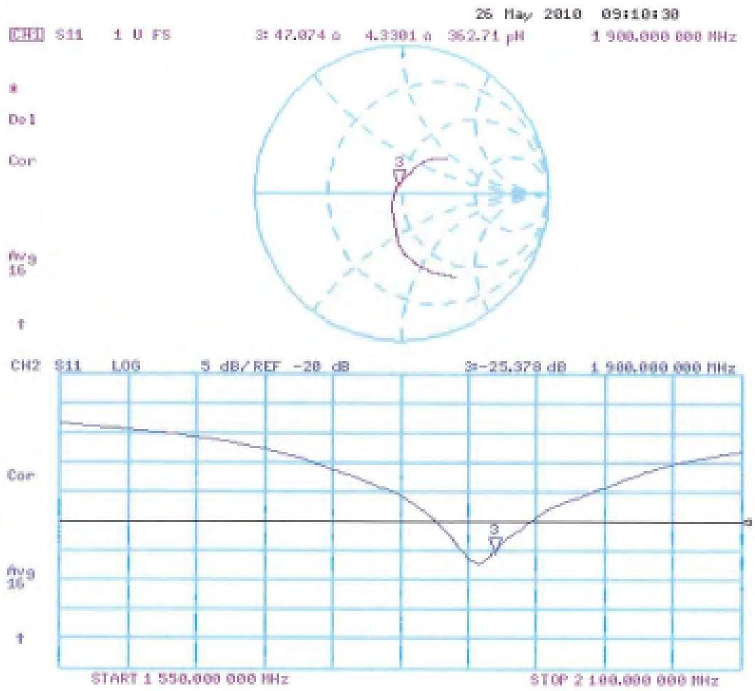
- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.2 V/m; Power Drift = -0.00657 dB
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.5 mW/g
Maximum value of SAR (measured) = 12.9 mW/g



0 dB = 12.9mW/g

Impedance Measurement Plot for Body TSL



- 2450 ㎒ Dipole Calibration Certificate

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Accreditation No.: **SCS 108**

Client **SGS (Dymstec)**

Certificate No: **D2450V2-734_May10**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 734
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	May 27, 2010

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	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	02-Mar-10 (No. DAE4-601_Mar10)	Mar-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	D. Iliev
Approved by:	Katja Pokovic	Technical Manager	[signature]

Issued: May 27, 2010

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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.

Measurement Conditions

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

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
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	39.0 ± 6 %	1.76 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.8 mW / g
SAR normalized	normalized to 1W	51.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**51.7 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.03 mW / g
SAR normalized	normalized to 1W	24.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.2 mW /g ± 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	53.6 ± 6 %	1.97 mho/m ± 6 %
Body TSL temperature during test	(21.8 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.4 mW / g
SAR normalized	normalized to 1W	53.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**53.5 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.31 mW / g
SAR normalized	normalized to 1W	25.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**25.2 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.8 Ω + 3.2 jΩ
Return Loss	- 26.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.8 Ω + 4.4 jΩ
Return Loss	- 27.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.153 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.
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	May 07, 2003

DASY5 Validation Report for Head TSL

Date/Time: 25.05.2010 14:48:31

Test Laboratory: SPEAG, Zurich, Switzerland

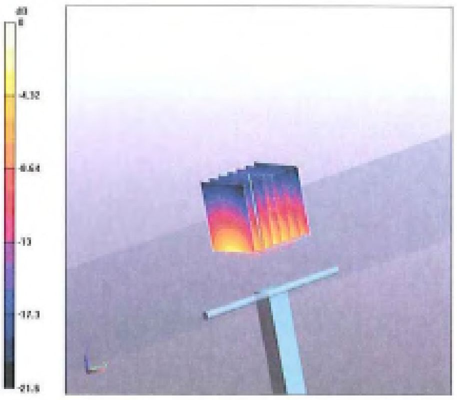
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:734

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U11 BB
Medium parameters used: f = 2450 MHz; σ = 1.76 mho/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

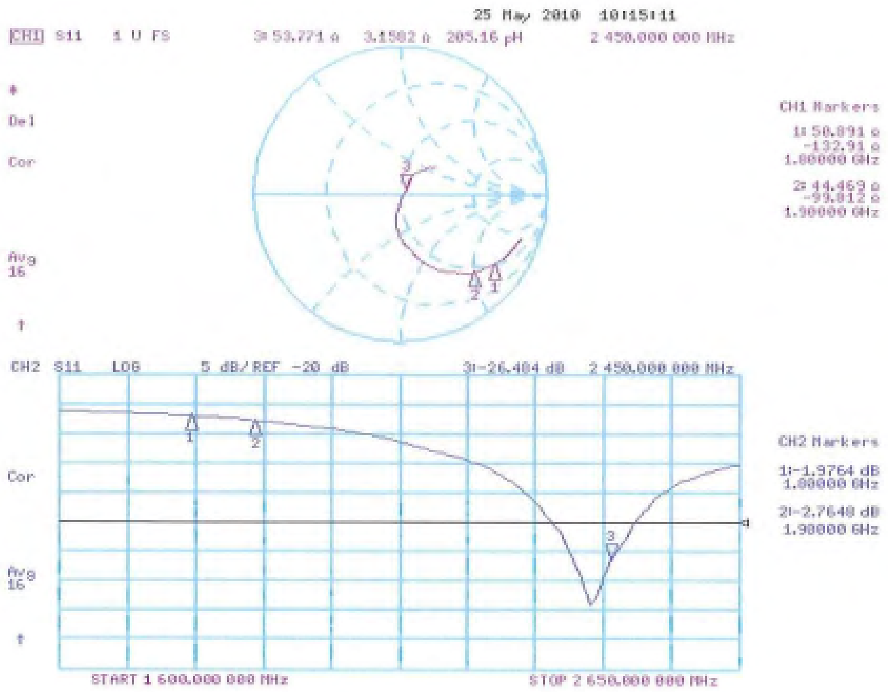
- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.2 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 26.1 W/kg
SAR(1 g) = 12.8 mW/g; SAR(10 g) = 6.03 mW/g
Maximum value of SAR (measured) = 16.7 mW/g



0 dB = 16.7mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 27.05.2010 10:14:45

Test Laboratory: SPEAG, Zurich, Switzerland

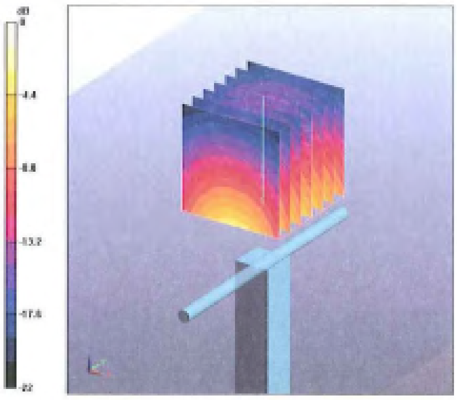
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:734

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: MSL U11 BB
Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 53.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

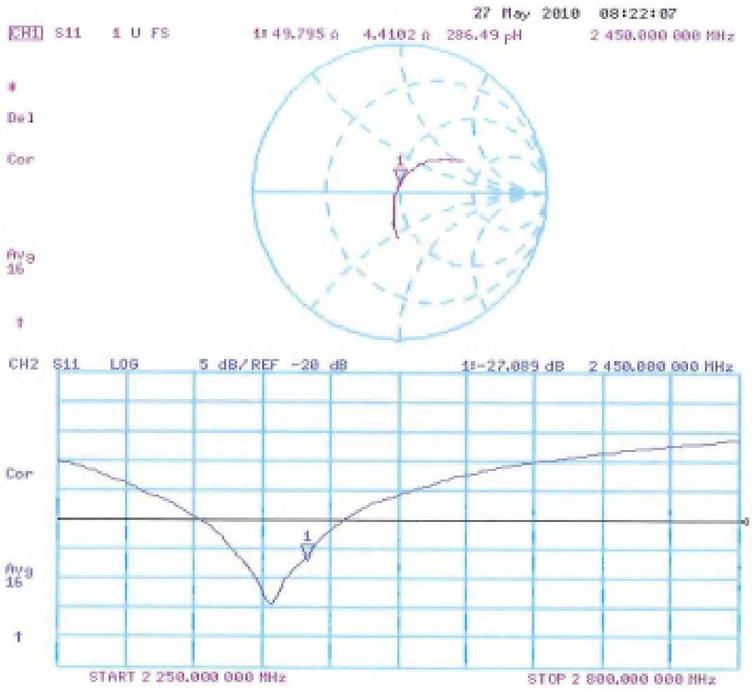
- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 61

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.7 V/m; Power Drift = -0.030 dB
Peak SAR (extrapolated) = 27.3 W/kg
SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.31 mW/g
Maximum value of SAR (measured) = 17.4 mW/g



0 dB = 17.4mW/g

Impedance Measurement Plot for Body TSL



-THE END-