SAR TEST REPORT

Equipment Under Test	:	Cellular/PCS GSM Phone
Model No.	:	LG-A270(add: A270, LGA270)
Applicant	:	LG Electronics MobileComm U.S.A., Inc.
Address of Applicant	:	10101 Old Grove Road, San Diego, CA 92131
FCC ID	:	ZNFA270
Device Category	:	Portable Device
Exposure Category	:	General Population/Uncontrolled Exposure
Date of Receipt	:	2012-01-09
Date of Test(s)	:	2012-01-09 ~ 2012-01-10
Date of Issue	:	2012-01-18
Max. SAR	:	1.11 W/kg (GSM850), 1.28 W/kg (GSM1900)

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:

Tested by	: **Robin Jung**	Robin	**2012-01-18**
Approved by	: **Charles Kim**	C. K. Kim	**2012-01-18**

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APPENDIX

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

1. General Information

1.1 Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, 435-040, Korea
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 : Sang-myung Lee
Telephone : 82-2-2033-1222
E-mail : smyung.lee@lge.com

1.3 Version of Report

Version Number	Date	Revision
00	2012-01-18	Initial issue

1.4 Description of EUT(s)

EUT Type	: Cellular/PCS GSM Phone
Model	: LG-A270
Serial Number	: 112KPWQ110009
Mode of Operation	: GSM850, PCS1900
Duty Cycle	: 8(GSM)
Body worn Accessory	: Ear Headset
Tx Frequency Range	: 824.2 ㎒ ~ 848.8 ㎒ (GSM850) 1850.2 ㎒ ~ 1909.8 ㎒ (PCS1900)
Battery Type	: 3.7 V d.c. (Lithum-ion Battery)

1.5 Operation Configuration

The device in GSM mode 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.

1.6 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 dB 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 mm.

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 mm 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.

1.7 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.

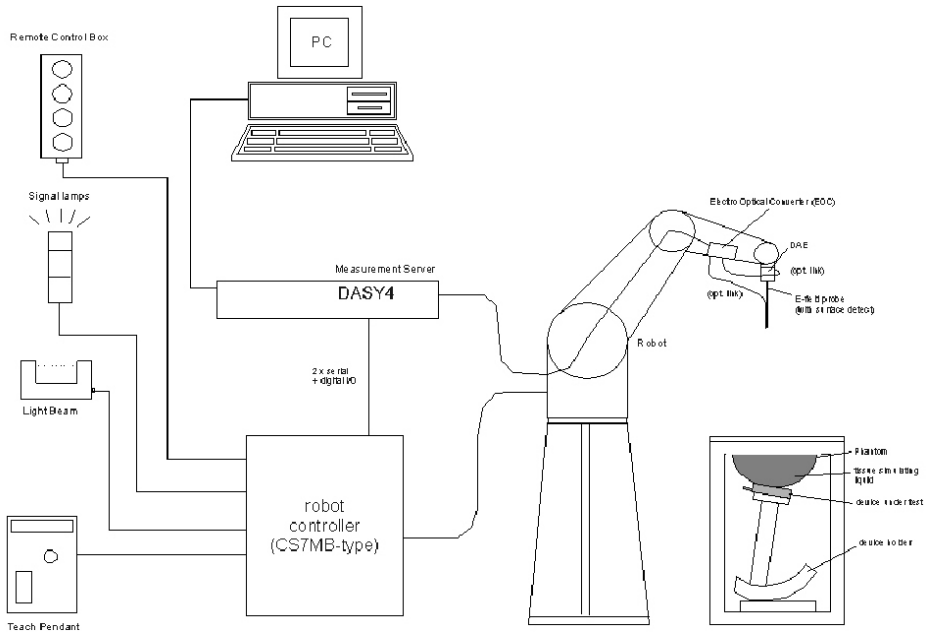


Fig a. The microwave circuit arrangement used for SAR system verification

• 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.

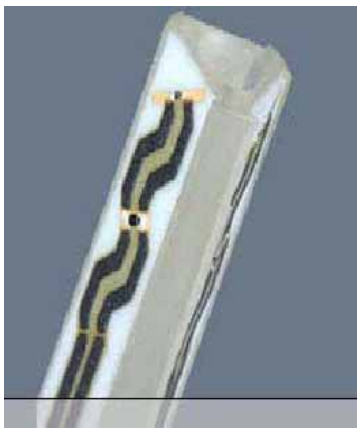
• Tissue simulating liquid mixed according to the given recipes.

• Validation dipole kits allowing to validate the proper functioning of the system.

1.8 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 MHz to 2.5 GHz In brain simulating tissue (accuracy ± 8 %)
Frequency	:	10 MHz to >6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)
Directivity	:	±0.2 dB in brain tissue (rotation around probe axis) ±0.4 dB in brain tissue (rotation normal to probe axis)
Dynamic Range	:	5 μW/g to >100 mW/g; Linearity: ±0.2 dB
Srfce. Detect	:	±0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	:	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	:	General dosimetry up to 3 GHz Compliance tests of mobile phone


ET3DV6 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

1.9 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 850 ㎒, 1900 ㎒. 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 ㎝ 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.

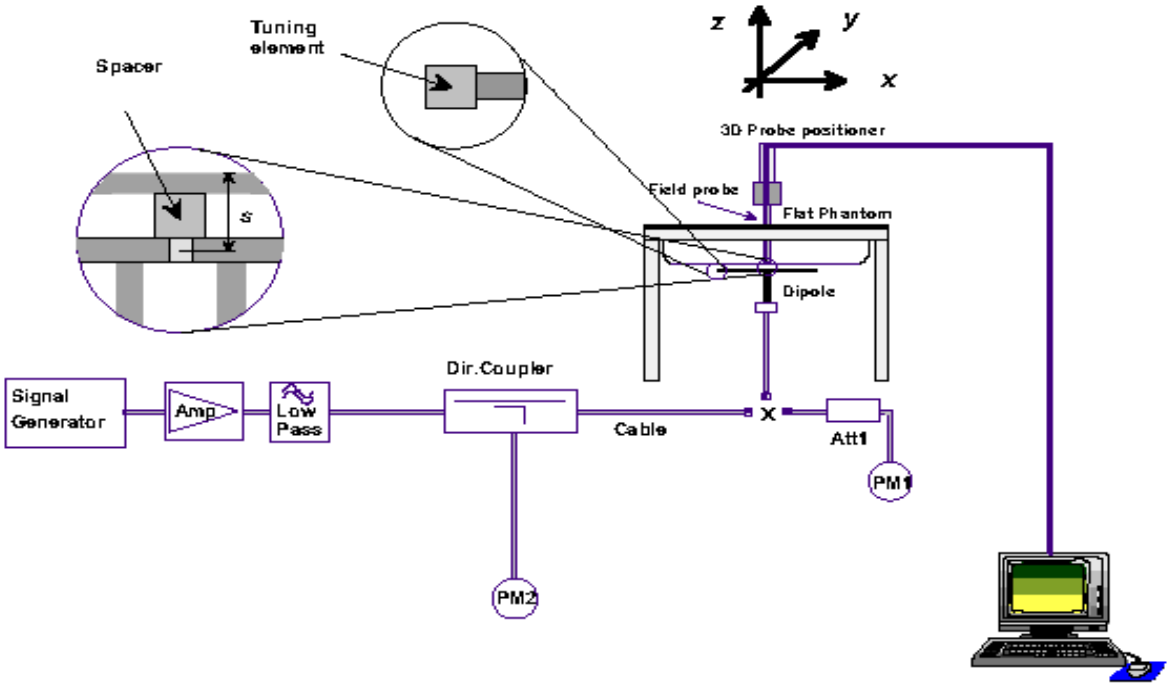


Fig b. System verification Setup Diagram

Fig c. Photo of the dipole Antenna

System Validation Results

Validation Kit	Tissue Frequency (MHz)	Tissue Type	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Measured SAR 1 g	Target SAR 1 g	Normalized SAR 1 g	Deviation (%)	Date
D835V2 S/N: 490	835	Head	22.0	22.3	0.10	**0.95 W/kg**	9.62 W/kg (1 W)	**9.50W/kg** (1 W)	**-1.25**	2012-01-09
D835V2 S/N: 490	835	Body	22.0	22.3	0.10	**0.97 W/kg**	9.84 W/kg (1 W)	**9.70 W/kg** (1 W)	**-1.42**	2012-01-09
D1900V2 S/N: 5d033	1900	Head	22.1	22.1	0.10	**3.86 W/kg**	39.4 W/kg (1 W)	**38.6 W/kg** (1 W)	**-2.03**	2012-01-10
D1900V2 S/N: 5d033	1900	Body	22.1	22.1	0.10	**4.16 W/kg**	41.3 W/kg (1 W)	**41.6 W/kg** (1 W)	**0.73**	2012-01-10

Table 1. System validation Results

1.10 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 E5071B Network Analyzer (300 ㎑ - 6 ㎓) by using a procedure detailed in Section V.

f (㎒)	Tissue type	Limits / Measured	Dielectric Parameters		
			Permittivity	Conductivity	Simulated Tissue Temp(㎒)
835	Head	Measured, 2012-01-09	**42.9**	**0.89**	22.3
		Recommended Limits	41.5	0.90	21.0 ~ 23.0
		Deviation(%)	3.37	-1.11	-
835	Body	Measured, 2012-01-09	**56.9**	**0.95**	22.3
		Recommended Limits	55.2	0.97	21.0 ~ 23.0
		Deviation(%)	3.08	-2.06	-
1900	Head	Measured, 2012-01-10	**38.6**	**1.45**	22.1
		Recommended Limits	40.0	1.40	21.0 ~ 23.0
		Deviation(%)	-3.50	3.57	-
1900	Body	Measured, 2012-01-10	**53.3**	**1.51**	22.1
		Recommended Limits	53.3	1.52	21.0 ~ 23.0
		Deviation(%)	0.00	-0.66	-

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		5200-5800
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2	78.66
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04	0.0
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	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	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	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	10.67
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7	0.0
Diethylenglycol monohexylether	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.67

Salt: 99 $^{+}$% Pure Sodium Chloride Sugar: 98 $^{+}$% Pure Sucrose

Water: De-ionized, 16 MΩ^{+} 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

1.11 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 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz 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 GHz 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 .4 RF exposure limits

1.12 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)	Δ Ω
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	835 MHz System Validation Dipole	D835V2	490	May 21, 2012
Schmid& Partner Engineering AG	1900 MHz System Validation Dipole	D1900V2	5d033	May 26, 2012
Schmid& Partner Engineering AG	Data acquisition Electronics	DAE3	479	August 29, 2012
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	E5071C	MY46111535	July 5, 2012
Agilent	Dielectric Probe Kit	85070D	2184	N/A
Agilent	Power Meter	E4419B	GB43311126	July 04, 2012
Agilent	Power Sensor	E9300H	MY41495307	September 29, 2012
			MY41495308	September 29, 2012
Agilent	Signal Generator	E4421B	MY43350132	July 05, 2012
Empower RF Systems	Power Amplifier	2001-BBS3Q7ECK	1032 D/C 0336	April 01, 2012
Empower RF Systems	Power Amplifier	2092-BBS5K8CAJ	1010	September 06, 2012
Agilent	Dual Directional Coupler	777D	50128	July 10, 2012
		778D	50454	July 06, 2012
Agilent	Directional RF Bridges	86205A	MY31402302	July 12, 2012
Microlab	LP Filter	LA-15N	N/A	October 01, 2012
		LA-30N	N/A	October 01, 2012
		LA-60N	N/A	September 29, 2012
R&S	Mobile Test Unit	CMU 200	107279	Mar 30, 2012

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

	Channel	Frequency(MHz)	Conducted Average Power(dB m)	Cable Loss (dB)
			GSM	
GSM 850 Band	128	824.2	32.90	0.4
	190	836.6	33.00	
	251	848.8	33.10	
PCS 1900 Band	512	1850.2	30.30	0.6
	661	1880.0	30.60	
	810	1909.8	30.70	

3.3 SAR Data Summary

Ambient Temperature (°C)	22.0
Liquid Temperature (°C)	22.3
Date	2012-01-09

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	-0.117	0.958	1.6
	Tilt	836.6	190	-0.041	0.462	
	Cheek	824.2	128	0.074	0.872	
	Cheek	848.8	251	-0.169	1.06	
Right Ear	Cheek	836.6	190	-0.146	1.07	
	Tilt	836.6	190	-0.073	0.471	
	Cheek	824.2	128	-0.043	1.04	
	Cheek	848.8	251	-0.121	**1.11**	

<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 ㎝.
5. 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)	22.0
Liquid Temperature (°C)	22.3
Date	2012-01-09

GSM850 Body SAR

Test Mode	EUT Position	Slot	Traffic Channel		Power Drift(dB)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
			Frequency (MHz)	Channel			
GSM	Front	1 Tx	836.6	190	-0.136	0.346	1.6
	Back	1 Tx	836.6	190	-0.058	**0.405**	

<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 ㎝.
5. 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.
6. The distance from EUT to flat phantom for testing Body SAR is 15 ㎜.

Ambient Temperature (°C)	22.1
Liquid Temperature (°C)	22.1
Date	2012-01-10

PCS1900 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	1880.0	661	-0.060	1.27	1.6
	Tilt	1880.0	661	-0.078	0.571	
	Cheek	1850.2	512	-0.060	1.22	
	Cheek	1909.8	810	-0.085	1.10	
Right Ear	Cheek	1880.0	661	0.013	**1.28**	
	Tilt	1880.0	661	0.031	0.477	
	Cheek	1850.2	512	-0.046	1.09	
	Cheek	1909.8	810	0.053	1.22	

<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 ㎝.
5. 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)	22.1
Liquid Temperature (°C)	22.1
Date	2012-01-10

PCS1900 Body SAR

Test Mode	EUT Position	Slot	Traffic Channel		Power Drift(dB)	1 g SAR (W/kg)	1 g SAR Limits (W/kg)
			Frequency (MHz)	Channel			
GSM	Front	1 Tx	1880.0	661	-0.089	0.317	1.6
	Back	1 Tx	1880.0	661	-0.105	**0.424**	

<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 ㎝.
5. 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.
6. The distance from EUT to flat phantom for testing Body SAR is 15 mm.

Appendix

List

Appendix A	DASY4 Report (Plots of the SAR Measurements)	- Validation Test (835 ㎒, 1900 ㎒) - Head Test - Body Test
Appendix B	Uncertainty Analysis	
Appendix C	Calibration Certificate	- PROBE - DAE3 - DIPOLE

Appendix A

Test Plot - DASY4 Report

850 ㎒ Validation Test_Head

Date: 2012-01-09

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

Input Power : 100 mW

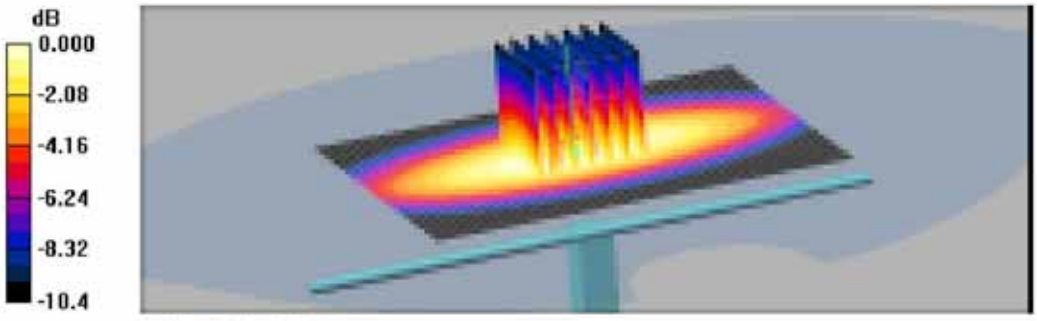
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490
Program Name: Vaildation 835 MHz_Head

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 42.9; 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 Sn479; Calibrated: 2011-08-29
- 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

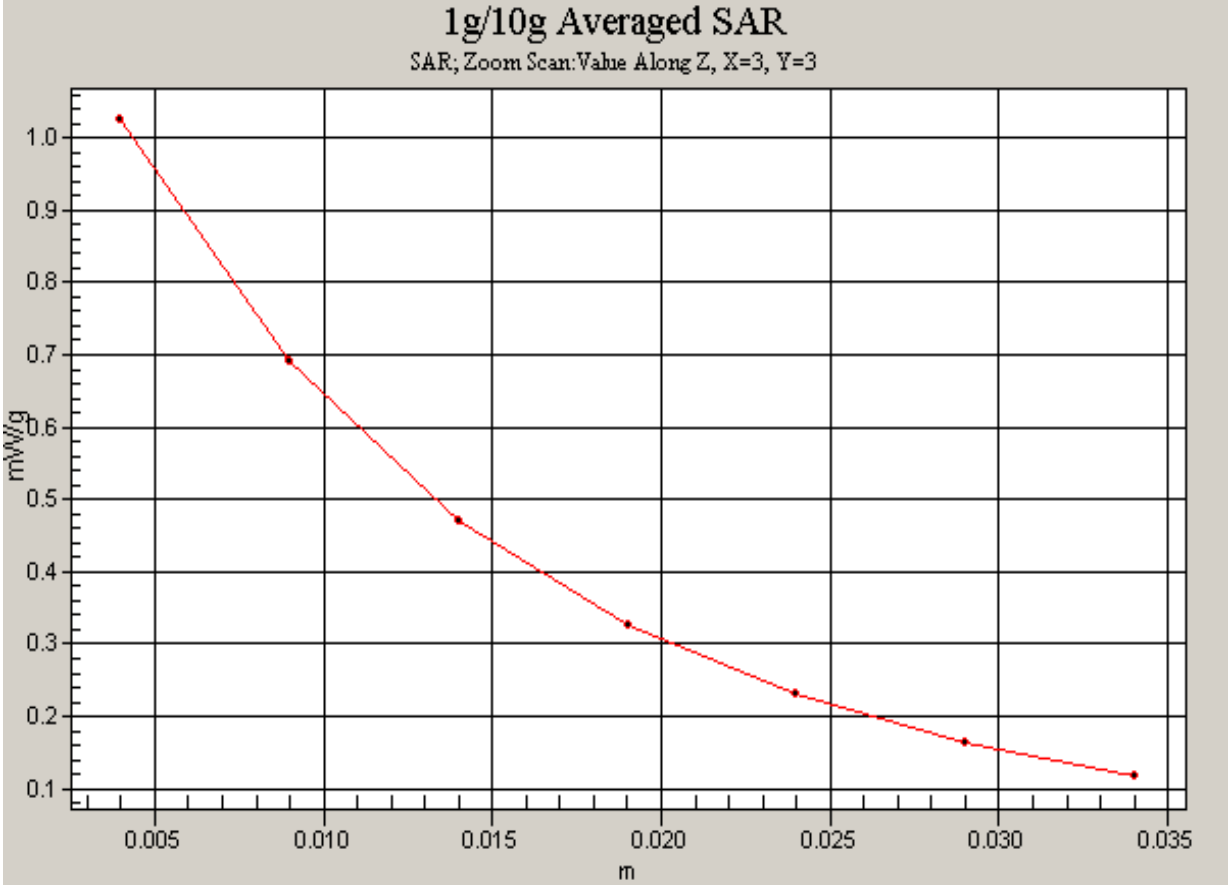
Validation 835 MHz_Head/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.02 mW/g

Validation 835 MHz_Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 35.0 V/m; Power Drift = -0.022 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.948 mW/g; SAR(10 g) = 0.617 mW/g
Maximum value of SAR (measured) = 1.02 mW/g



0 dB = 1.02mW/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

850 ㎒ Validation Test_Body

Date: 2012-01-09

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

Input Power : 100 mW

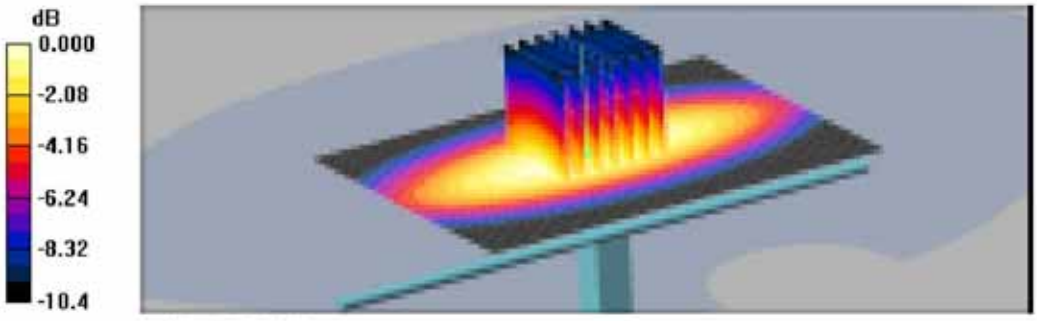
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490
Program Name: Vaildation 835 MHz_Body

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.952 mho/m; ε_r = 56.9; 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 Sn479; Calibrated: 2011-08-29
- 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

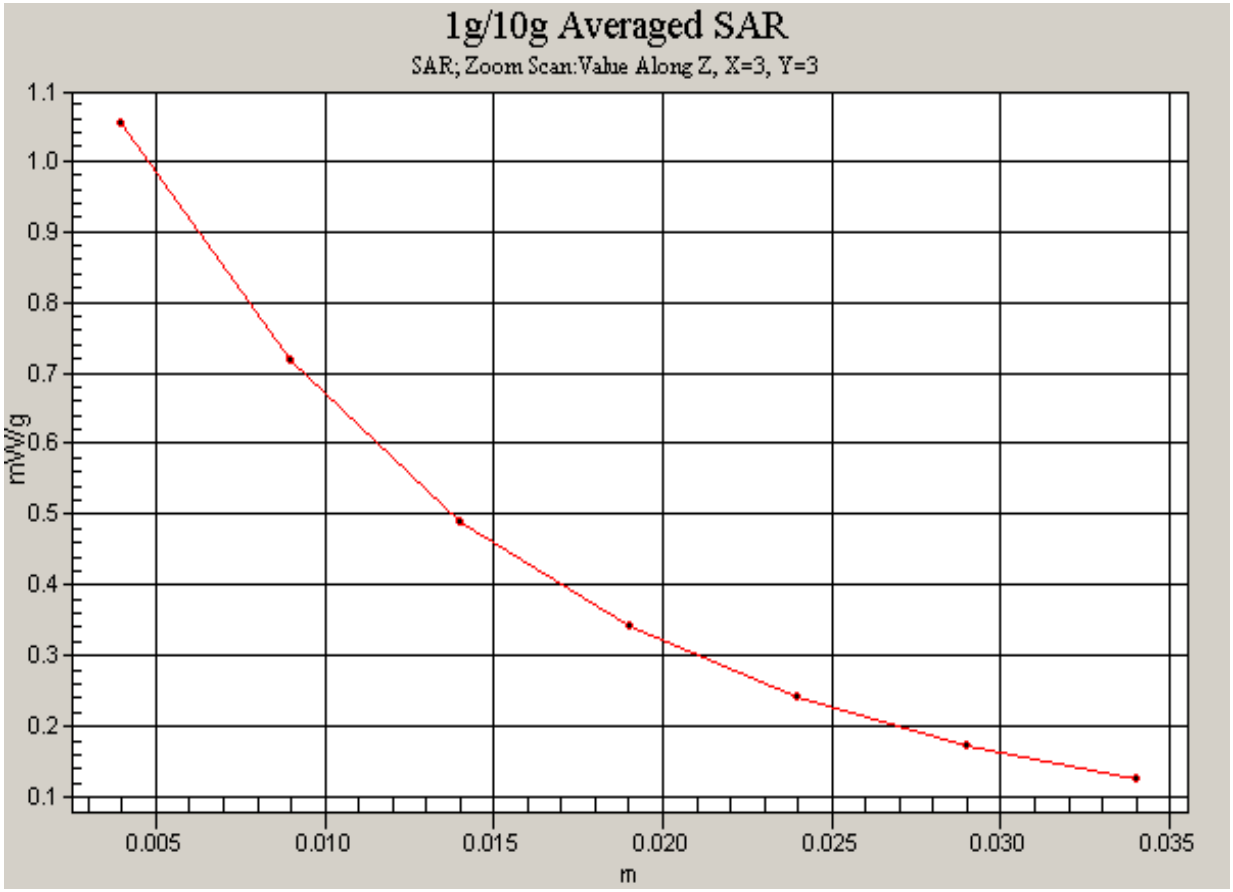
Validation 835 MHz_Body/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.04 mW/g

Validation 835 MHz_Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 34.3 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.965 mW/g; SAR(10 g) = 0.633 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
m
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

1900 ㎒ Validation Test_Head

Date: 2012-01-09

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

Input Power : 100 mW

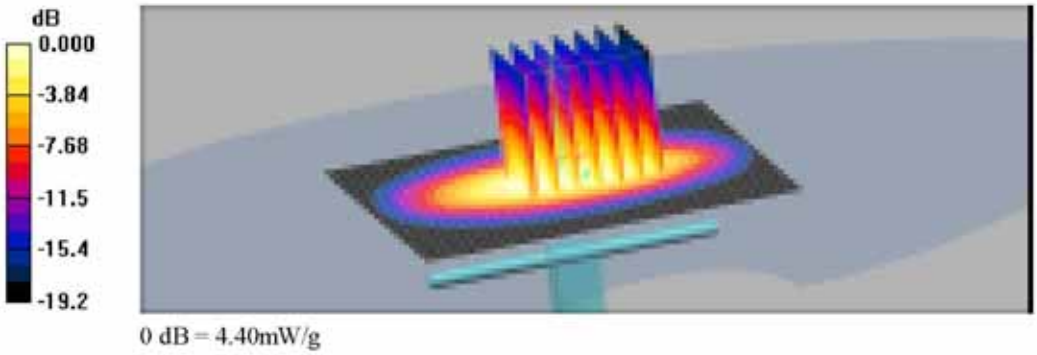
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033
Program Name: Validation 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.45 mho/m; ε_r = 38.6; 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 Sn479; Calibrated: 2011-08-29
- 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

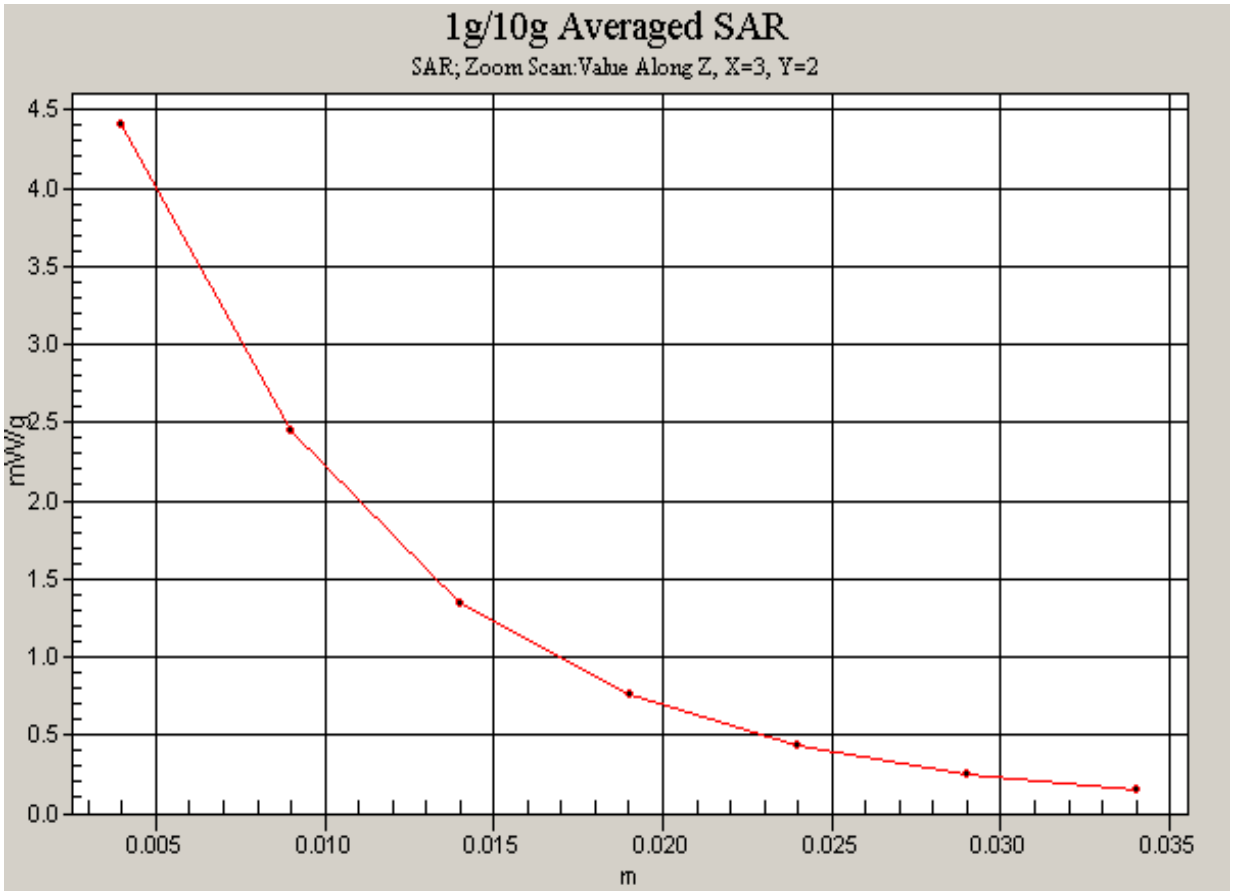
Validation 1900 MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.62 mW/g

Validation 1900 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.7 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 6.81 W/kg
SAR(1 g) = 3.86 mW/g; SAR(10 g) = 2 mW/g
Maximum value of SAR (measured) = 4.40 mW/g



0 dB = 4.40mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=2
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: 2012-01-10

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

Input Power : 100 mW

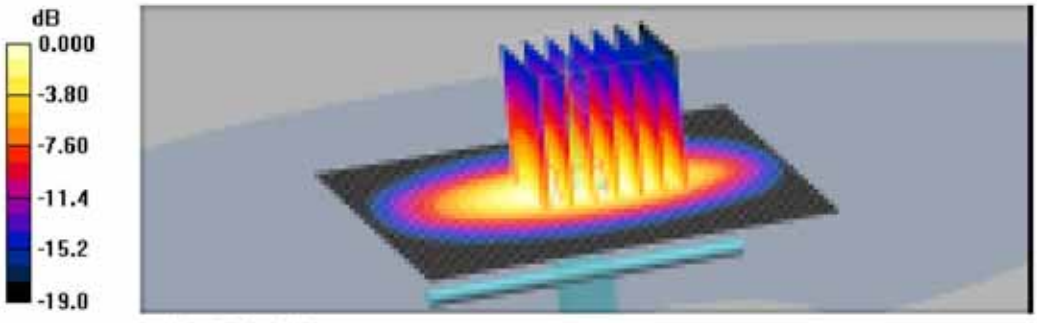
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033
Program Name: Validation 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.51 mho/m; ε_r = 53.3; 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 Sn479; Calibrated: 2011-08-29
- 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

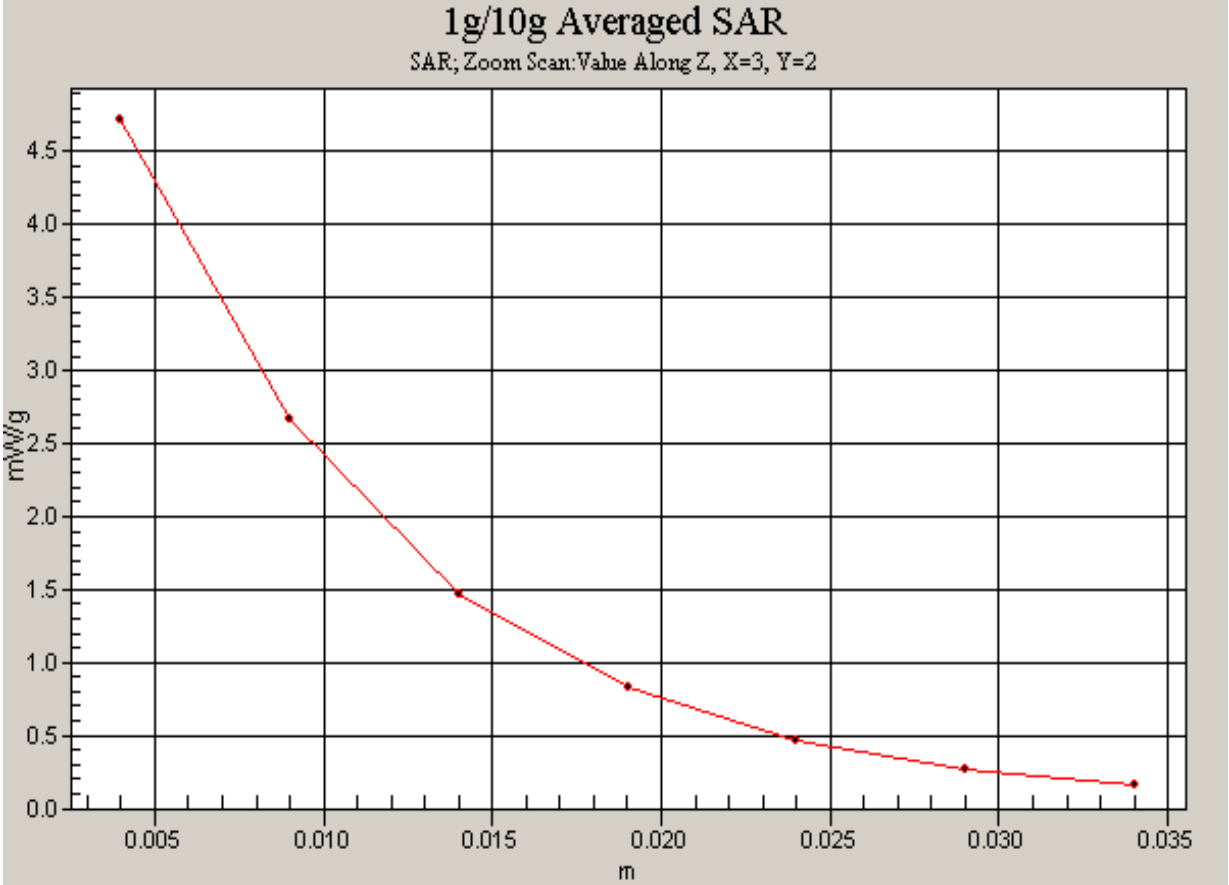
Validation 1900 MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 5.02 mW/g

Validation 1900 MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.4 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 7.08 W/kg
SAR(1 g) = 4.16 mW/g; SAR(10 g) = 2.18 mW/g
Maximum value of SAR (measured) = 4.71 mW/g



0 dB = 4.71mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=2
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

GSM850 Head SAR Test

Date: 2012-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850_LE.da4

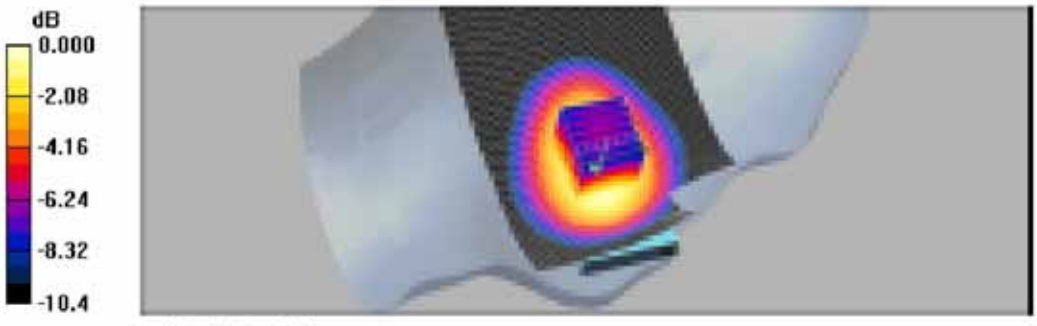
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.893 mho/m; ε_r = 42.9; 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 Sn479; Calibrated: 2011-08-29
- 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_LE_Mid_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.06 mW/g

GSM850_LE_Mid_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.1 V/m; Power Drift = -0.117 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.958 mW/g; SAR(10 g) = 0.677 mW/g
Maximum value of SAR (measured) = 1.01 mW/g



0 dB = 1.01mW/g

GSM850 Head SAR Test

Date: 2012-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850_LE.da4

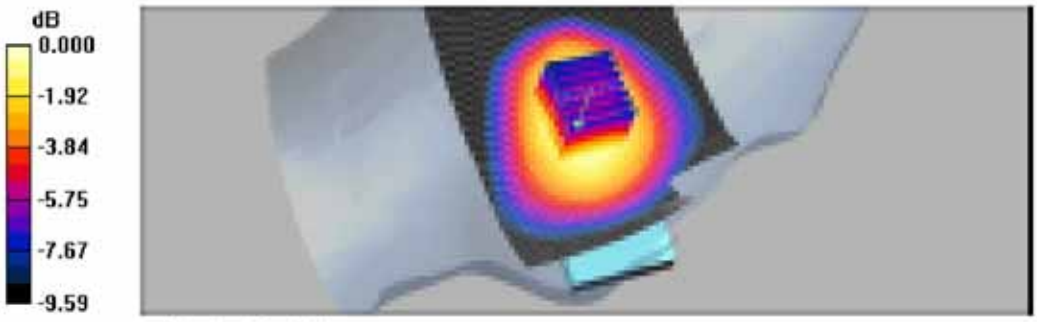
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.893 mho/m; ε_r = 42.9; 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 Sn479; Calibrated: 2011-08-29
- 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_LE_Mid_Tilt/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.502 mW/g

GSM850_LE_Mid_Tilt/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.6 V/m; Power Drift = -0.041 dB
Peak SAR (extrapolated) = 0.611 W/kg
SAR(1 g) = 0.462 mW/g; SAR(10 g) = 0.329 mW/g
Maximum value of SAR (measured) = 0.493 mW/g



0 dB = 0.493mW/g

GSM850 Head SAR Test

Date: 2012-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850_LE.da4

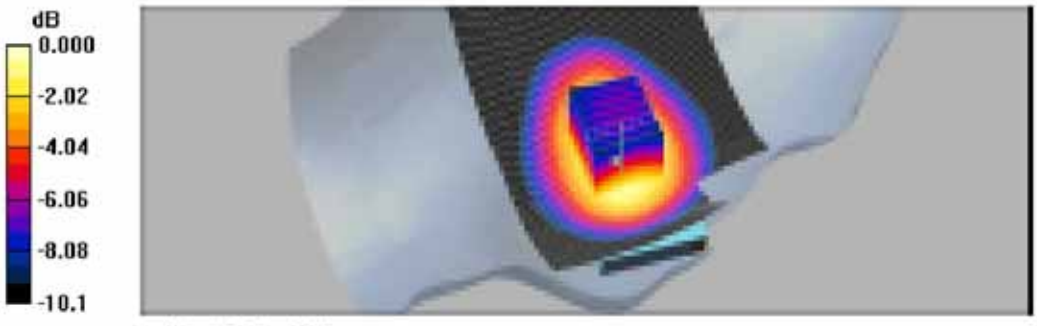
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.87 mho/m; ε_r = 43.1; 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 Sn479; Calibrated: 2011-08-29
- 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_LE_Low_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.940 mW/g

GSM850_LE_Low_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.0 V/m; Power Drift = 0.074 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.872 mW/g; SAR(10 g) = 0.616 mW/g
Maximum value of SAR (measured) = 0.934 mW/g



0 dB = 0.934mW/g

GSM850 Head SAR Test

Date: 2012-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850_LE.da4

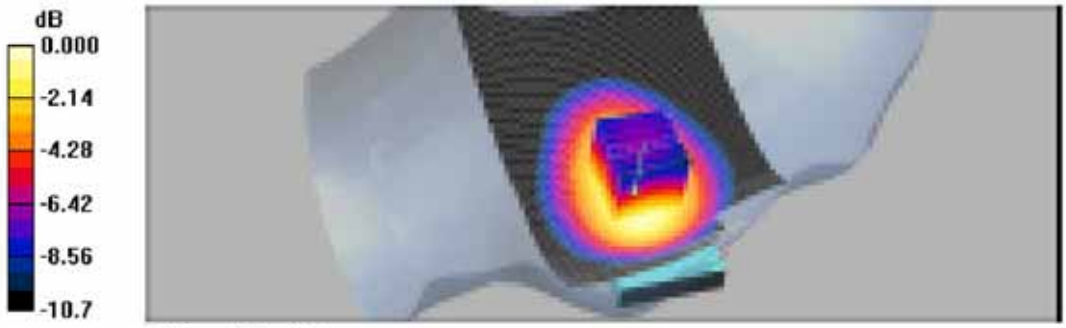
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8
Medium parameters used: f = 849 MHz; σ = 0.916 mho/m; ε_r = 42.8; 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 Sn479; Calibrated: 2011-08-29
- 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_LE_High_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.15 mW/g

GSM850_LE_High_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.3 V/m; Power Drift = -0.169 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.747 mW/g
Maximum value of SAR (measured) = 1.13 mW/g



0 dB = 1.13mW/g

GSM850 Head SAR Test

Date: 2012-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850_RE.da4

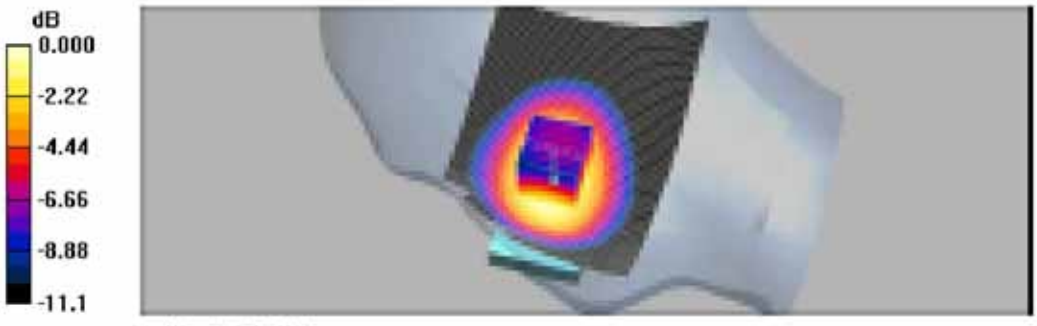
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.893 mho/m; ε_r = 42.9; 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 Sn479; Calibrated: 2011-08-29
- 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_RE_Mid_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.17 mW/g

GSM850_RE_Mid_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.7 V/m; Power Drift = -0.146 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.748 mW/g
Maximum value of SAR (measured) = 1.14 mW/g



0 dB = 1.14mW/g

GSM850 Head SAR Test

Date: 2012-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850_RE.da4

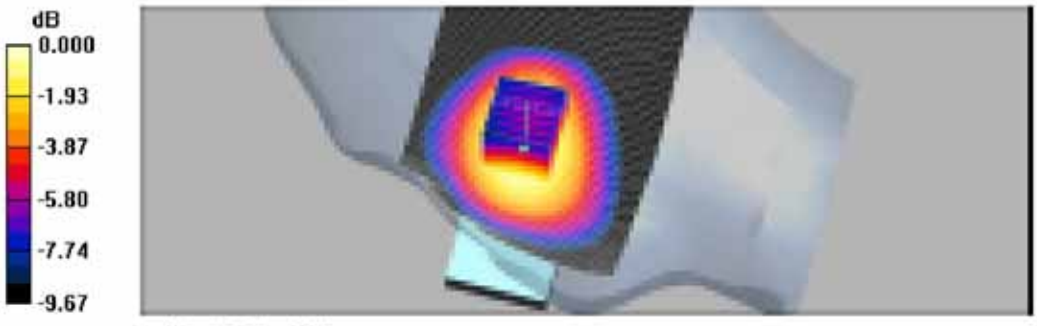
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.893 mho/m; ε_r = 42.9; 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 Sn479; Calibrated: 2011-08-29
- 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_RE_Mid_Tilt/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.504 mW/g

GSM850_RE_Mid_Tilt/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = -0.073 dB
Peak SAR (extrapolated) = 0.615 W/kg
SAR(1 g) = 0.471 mW/g; SAR(10 g) = 0.335 mW/g
Maximum value of SAR (measured) = 0.504 mW/g



0 dB = 0.504mW/g

GSM850 Head SAR Test

Date: 2012-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850_RE.da4

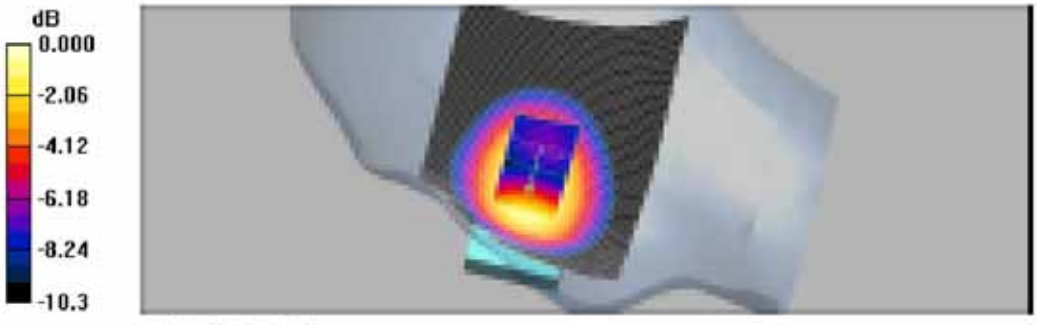
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.87 mho/m; ε_r = 43.1; 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 Sn479; Calibrated: 2011-08-29
- 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_RE_Low_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.11 mW/g

GSM850_RE_Low_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.7 V/m; Power Drift = -0.043 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.729 mW/g
Maximum value of SAR (measured) = 1.10 mW/g



0 dB = 1.10mW/g

GSM850 Head SAR Test

Date: 2012-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850_RE.da4

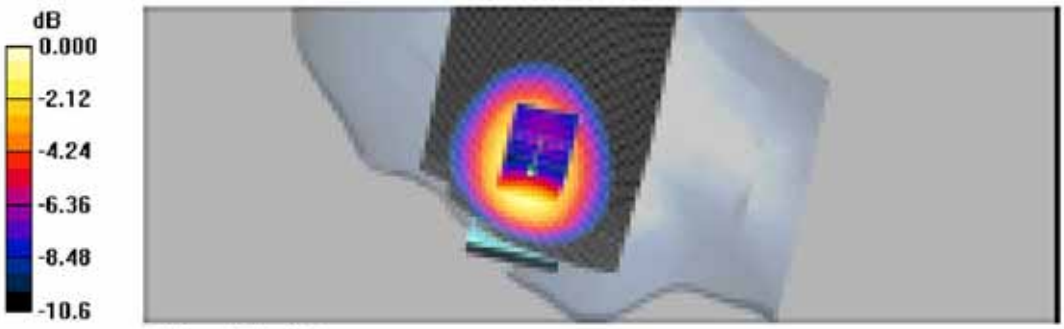
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: GSM850_Head

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8
Medium parameters used: f = 849 MHz; σ = 0.916 mho/m; ε_r = 42.8; 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 Sn479; Calibrated: 2011-08-29
- 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

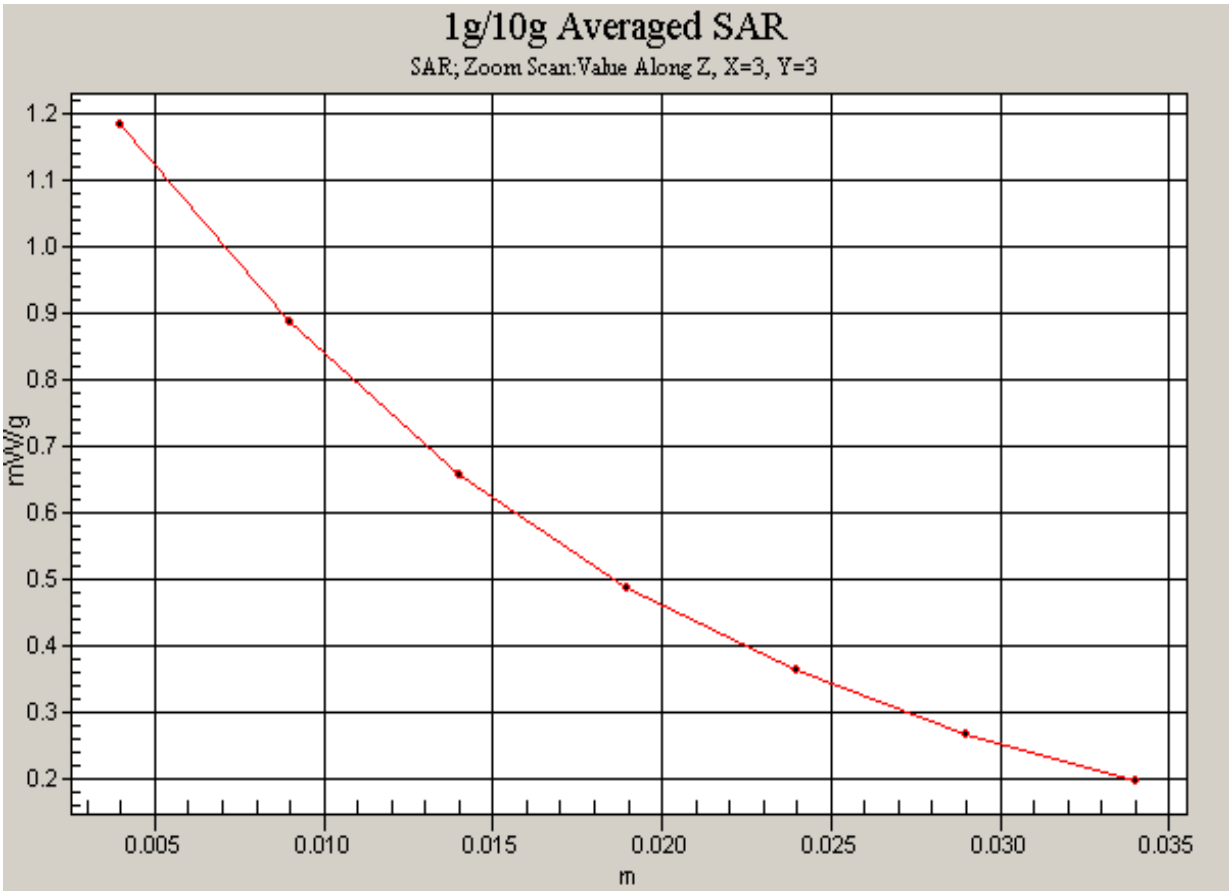
GSM850_RE_High_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.21 mW/g

GSM850_RE_High_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.7 V/m; Power Drift = -0.121 dB
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.770 mW/g
Maximum value of SAR (measured) = 1.18 mW/g



0 dB = 1.18mW/g

Z Scan


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

GSM850 Body SAR Test

Date: 2012-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850_Body_Front_1.5 cm.da4

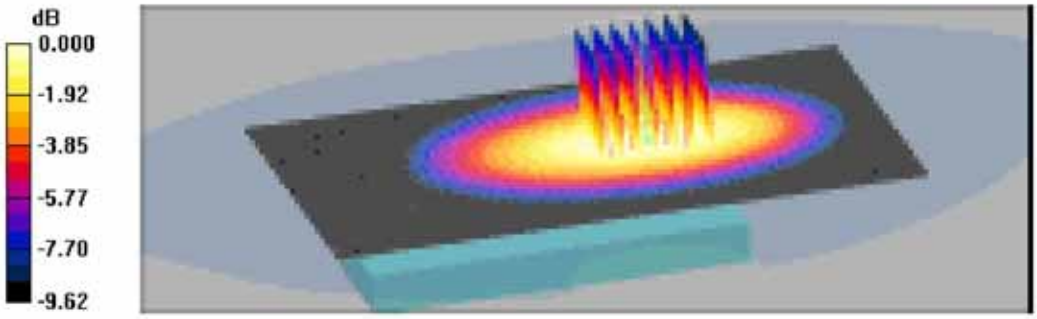
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: GSM850_Body

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.954 mho/m; ε_r = 56.9; 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 Sn479; Calibrated: 2011-08-29
- 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_Body_Front_Mid_1.5cm/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.375 mW/g

GSM850_Body_Front_Mid_1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.5 V/m; Power Drift = -0.136 dB
Peak SAR (extrapolated) = 0.456 W/kg
SAR(1 g) = 0.346 mW/g; SAR(10 g) = 0.247 mW/g
Maximum value of SAR (measured) = 0.367 mW/g



0 dB = 0.367mW/g

GSM850 Body SAR Test

Date: 2012-01-09

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: GSM850_Body_Back_1.5 cm.da4

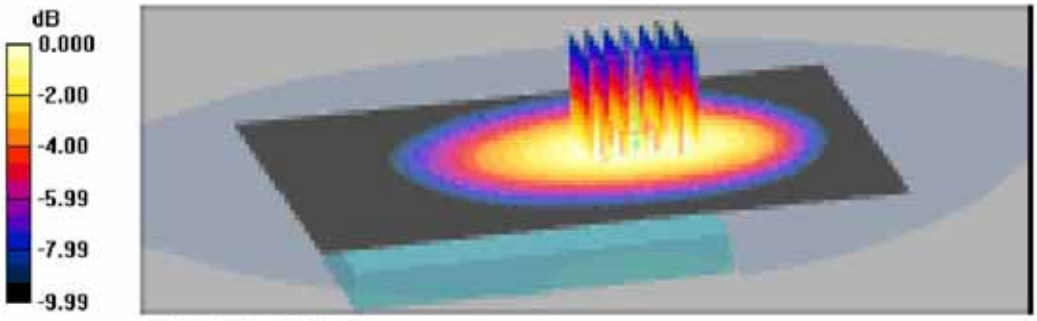
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: GSM850_Body

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.954 mho/m; ε_r = 56.9; 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 Sn479; Calibrated: 2011-08-29
- 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

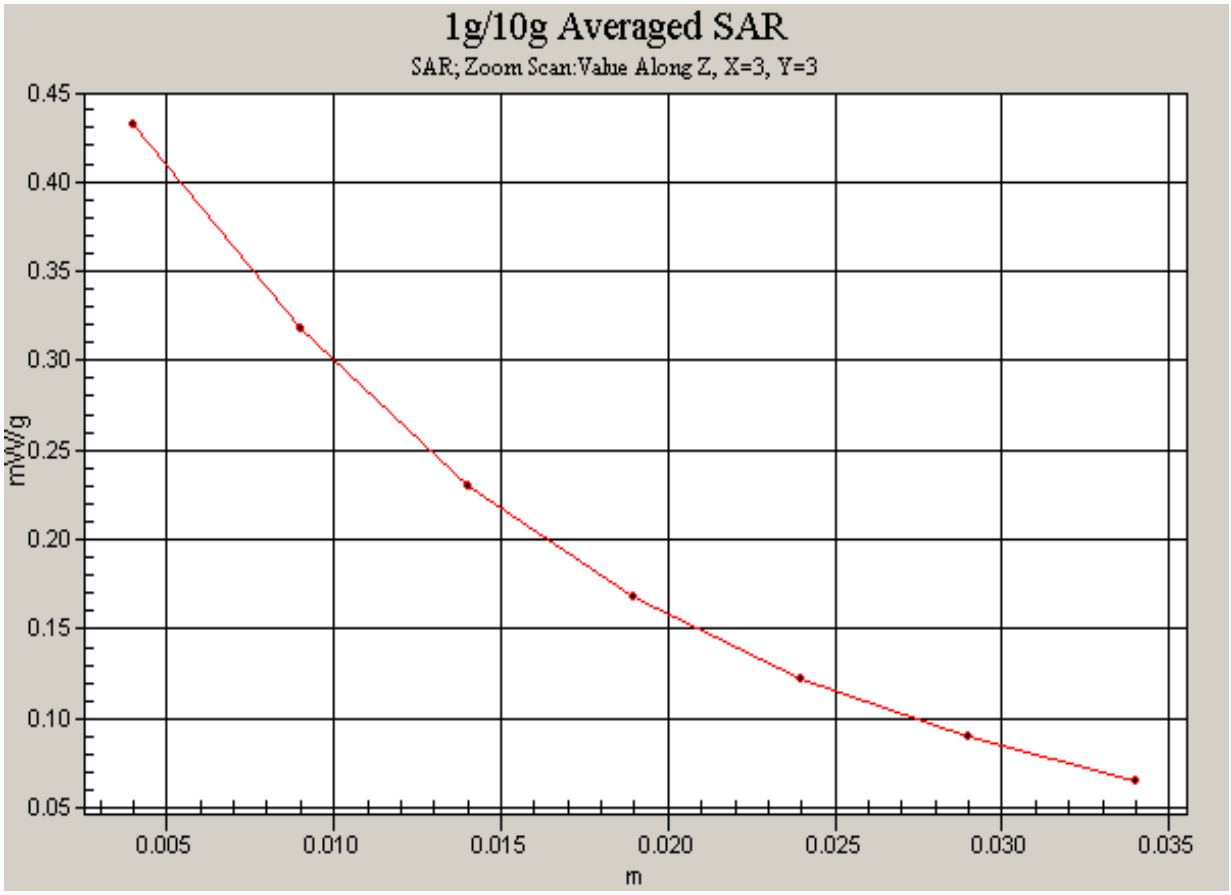
GSM850_Body_Back_Mid_1.5cm/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.434 mW/g

GSM850_Body_Back_Mid_1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.5 V/m; Power Drift = -0.058 dB
Peak SAR (extrapolated) = 0.540 W/kg
SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.286 mW/g
Maximum value of SAR (measured) = 0.431 mW/g



0 dB = 0.431mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
0.45
0.40
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

PCS1900 Head SAR Test

Date: 2012-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_LE.da4

DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: PCS1900_Head

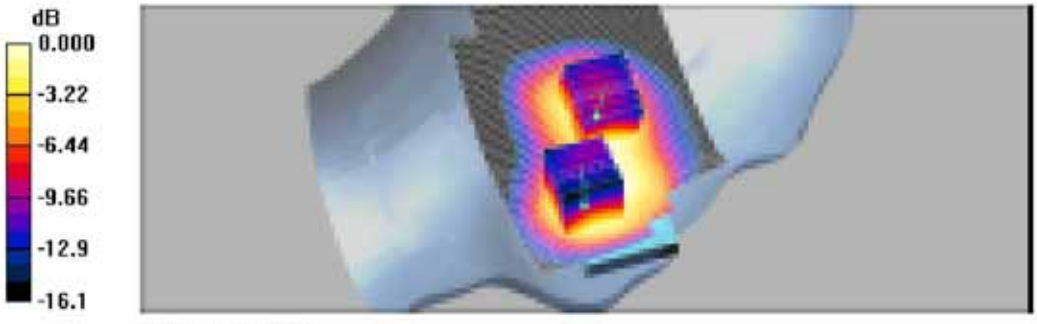
Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 38.8; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2011-08-29
- 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_LE_Mid_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.47 mW/g

PCS1900_LE_Mid_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.2 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 2.10 W/kg
SAR(1 g) = 1.27 mW/g; SAR(10 g) = 0.722 mW/g
Maximum value of SAR (measured) = 1.39 mW/g

PCS1900_LE_Mid_Cheek/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.2 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.904 mW/g; SAR(10 g) = 0.543 mW/g
Maximum value of SAR (measured) = 1.01 mW/g



0 dB = 1.01mW/g

PCS1900 Head SAR Test

Date: 2012-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_LE.da4

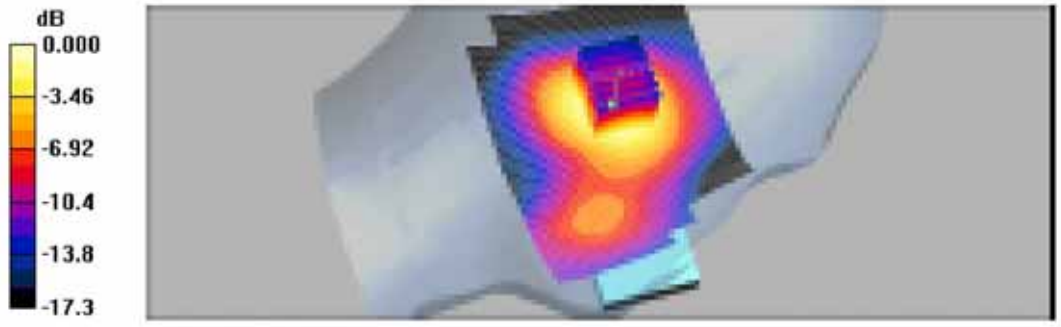
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 38.8; 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 Sn479; Calibrated: 2011-08-29
- 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_LE_Mid_Tilt/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.684 mW/g

PCS1900_LE_Mid_Tilt/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.4 V/m; Power Drift = -0.078 dB
Peak SAR (extrapolated) = 0.849 W/kg
SAR(1 g) = 0.571 mW/g; SAR(10 g) = 0.340 mW/g
Maximum value of SAR (measured) = 0.627 mW/g



0 dB = 0.627mW/g

PCS1900 Head SAR Test

Date: 2012-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_LE.da4

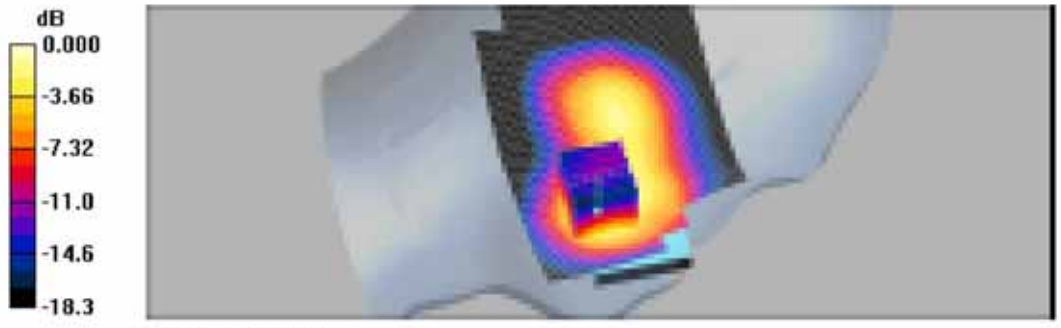
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.4 mho/m; ε_r = 38.8; 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 Sn479; Calibrated: 2011-08-29
- 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_LE_Low_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.40 mW/g

PCS1900_LE_Low_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.3 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 2.01 W/kg
SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.679 mW/g
Maximum value of SAR (measured) = 1.34 mW/g



0 dB = 1.34mW/g

PCS1900 Head SAR Test

Date: 2012-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_LE.da4

DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: PCS1900_Head

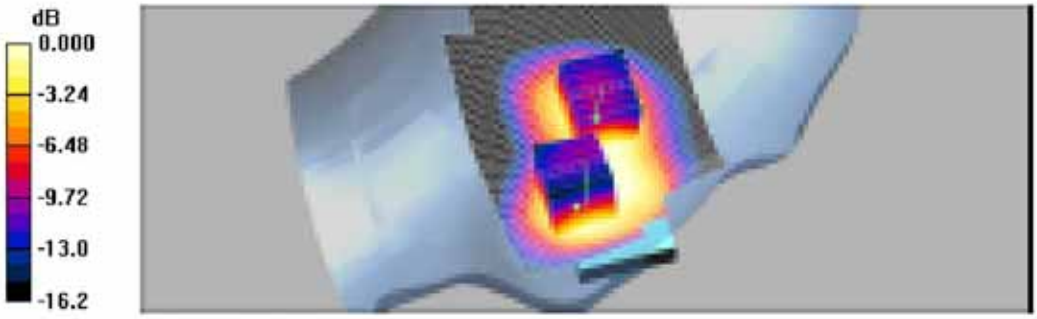
Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1910 MHz; σ = 1.46 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ET3DV6 - SN1782; ConvF(4.95, 4.95, 4.95); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2011-08-29
- 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_LE_High_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.26 mW/g

PCS1900_LE_High_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.0 V/m; Power Drift = -0.085 dB
Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.622 mW/g
Maximum value of SAR (measured) = 1.22 mW/g

PCS1900_LE_High_Cheek/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.0 V/m; Power Drift = -0.085 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.729 mW/g; SAR(10 g) = 0.438 mW/g
Maximum value of SAR (measured) = 0.810 mW/g



0 dB = 0.810mW/g

PCS1900 Head SAR Test

Date: 2012-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_RE.da4

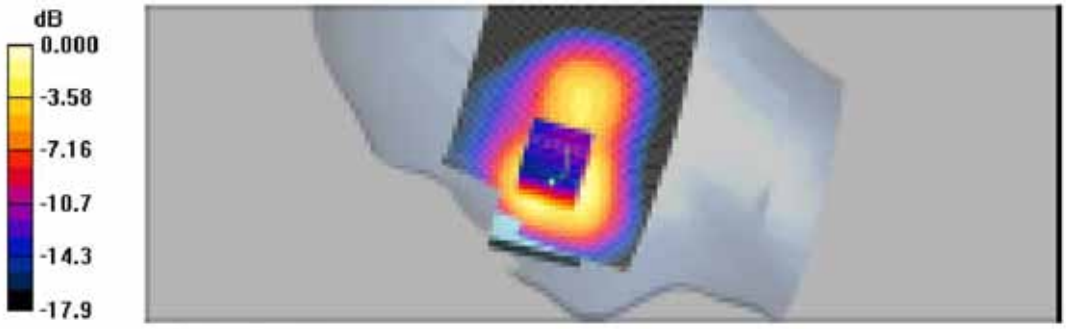
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 38.8; 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 Sn479; Calibrated: 2011-08-29
- 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

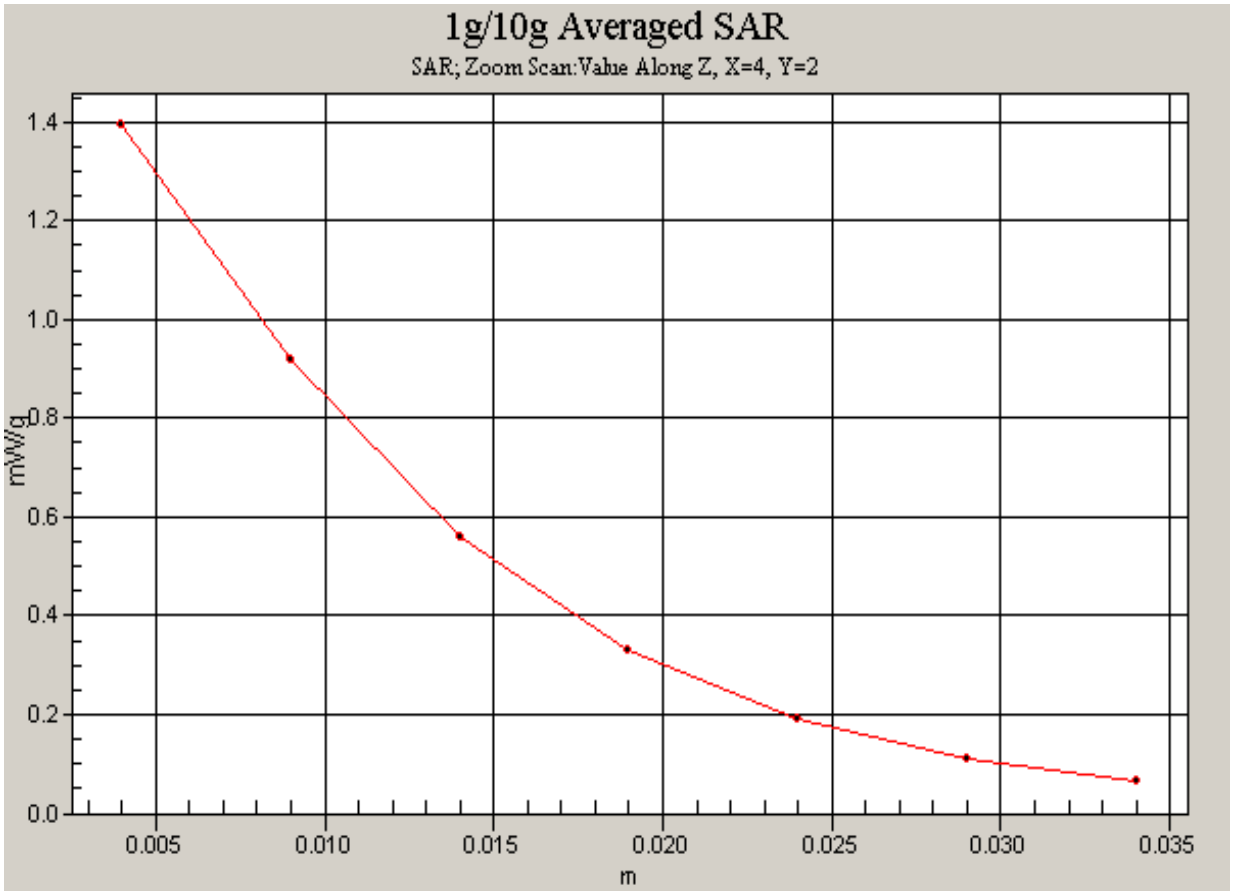
PCS1900_RE_Mid_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.52 mW/g

PCS1900_RE_Mid_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.9 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 2.00 W/kg
SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.759 mW/g
Maximum value of SAR (measured) = 1.39 mW/g



0 dB = 1.39mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=4, Y=2
mW/g
m
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.005
0.010
0.015
0.020
0.025
0.030
0.035

PCS1900 Head SAR Test

Date: 2012-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_RE.da4

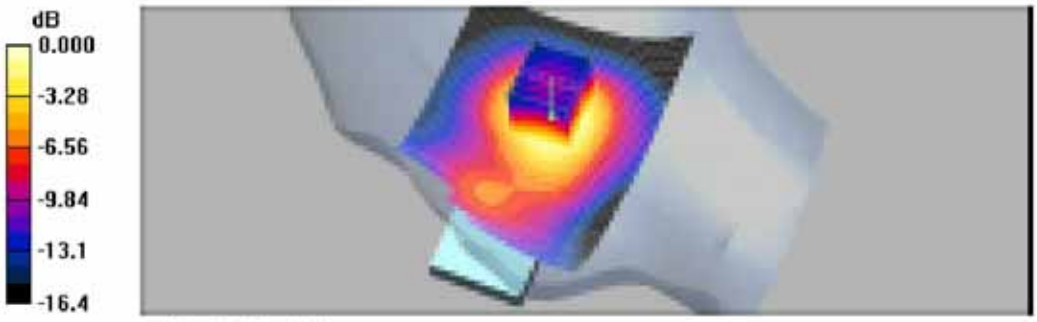
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1880 MHz; σ = 1.43 mho/m; ε_r = 38.8; 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 Sn479; Calibrated: 2011-08-29
- 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_RE_Mid_Tilt/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.559 mW/g

PCS1900_RE_Mid_Tilt/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.0 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 0.675 W/kg
SAR(1 g) = 0.477 mW/g; SAR(10 g) = 0.291 mW/g
Maximum value of SAR (measured) = 0.524 mW/g



0 dB = 0.524mW/g

PCS1900 Head SAR Test

Date: 2012-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_RE.da4

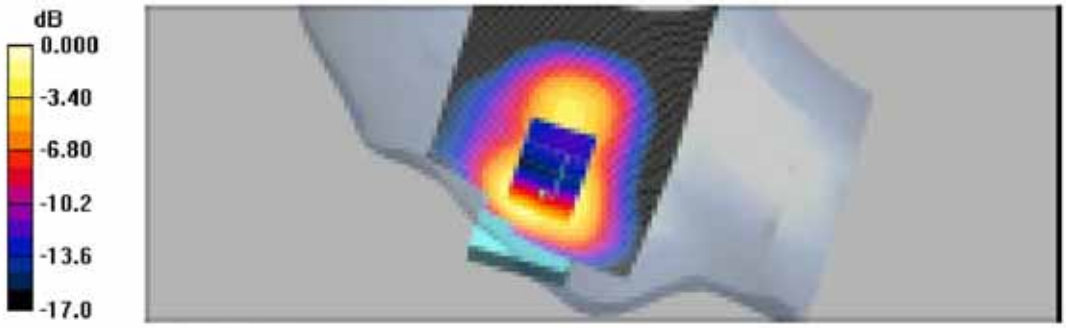
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.4 mho/m; ε_r = 38.8; 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 Sn479; Calibrated: 2011-08-29
- 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_RE_Low_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.33 mW/g

PCS1900_RE_Low_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.651 mW/g
Maximum value of SAR (measured) = 1.21 mW/g



0 dB = 1.21mW/g

PCS1900 Head SAR Test

Date: 2012-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_RE.da4

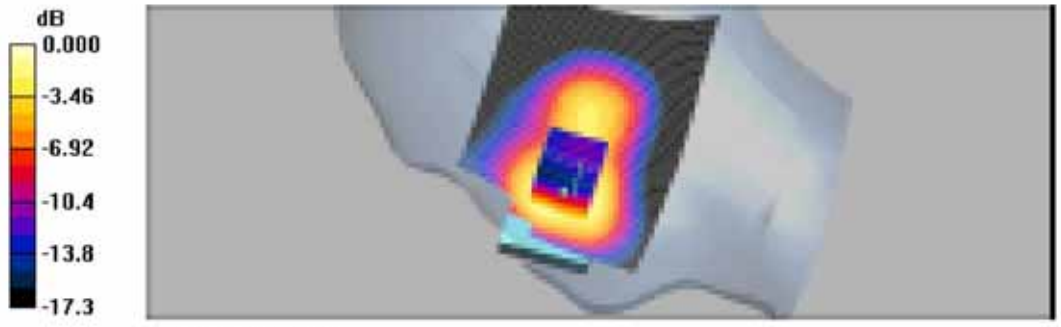
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: PCS1900_Head

Communication System: PCS 1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1910 MHz; σ = 1.46 mho/m; ε_r = 38.5; 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 Sn479; Calibrated: 2011-08-29
- 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_RE_High_Cheek/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.45 mW/g

PCS1900_RE_High_Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = 0.053 dB
Peak SAR (extrapolated) = 1.81 W/kg
SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.726 mW/g
Maximum value of SAR (measured) = 1.34 mW/g



0 dB = 1.34mW/g

PCS1900 Body SAR Test

Date: 2012-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Body_Front_1.5 cm.da4

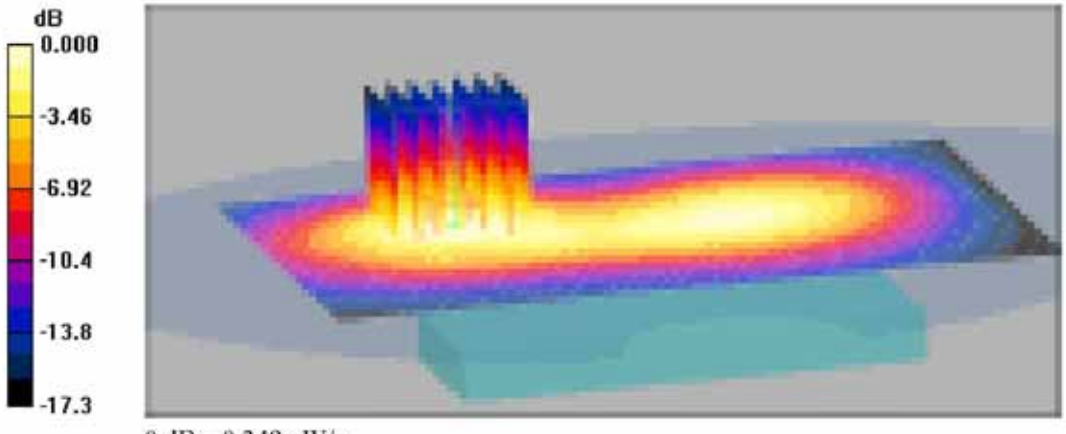
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: PCS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1880 MHz; σ = 1.49 mho/m; ε_r = 53.4; 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 Sn479; Calibrated: 2011-08-29
- 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_Body_Front_Mid_1.5cm/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.339 mW/g

PCS1900_Body_Front_Mid_1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.0 V/m; Power Drift = -0.089 dB
Peak SAR (extrapolated) = 0.530 W/kg
SAR(1 g) = 0.317 mW/g; SAR(10 g) = 0.178 mW/g
Maximum value of SAR (measured) = 0.348 mW/g



0 dB = 0.348mW/g

PCS1900 Body SAR Test

Date: 2012-01-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
File Name: PCS1900_Body_Back_1.5 cm.da4

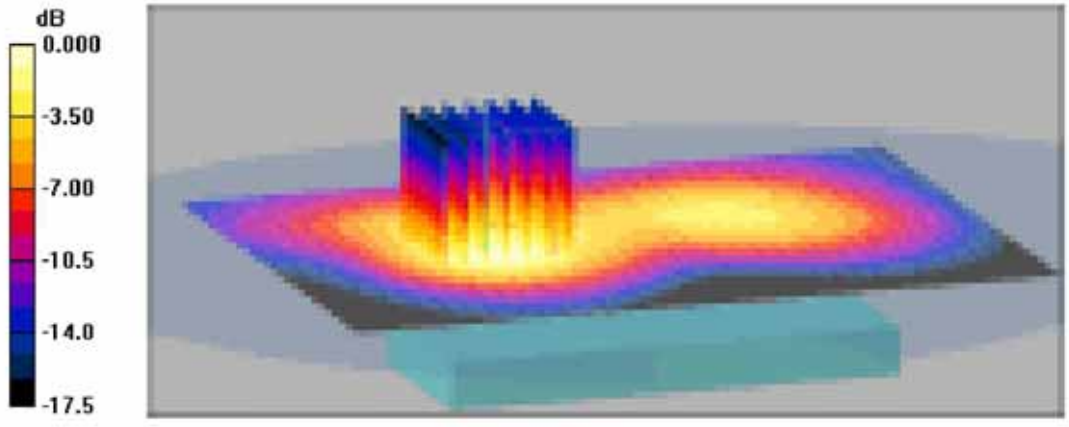
DUT: LG-A270; Type: Mobile Phone; Serial: 112KPWQ110009
Program Name: PCS1900_Body

Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1880 MHz; σ = 1.49 mho/m; ε_r = 53.4; 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 Sn479; Calibrated: 2011-08-29
- 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

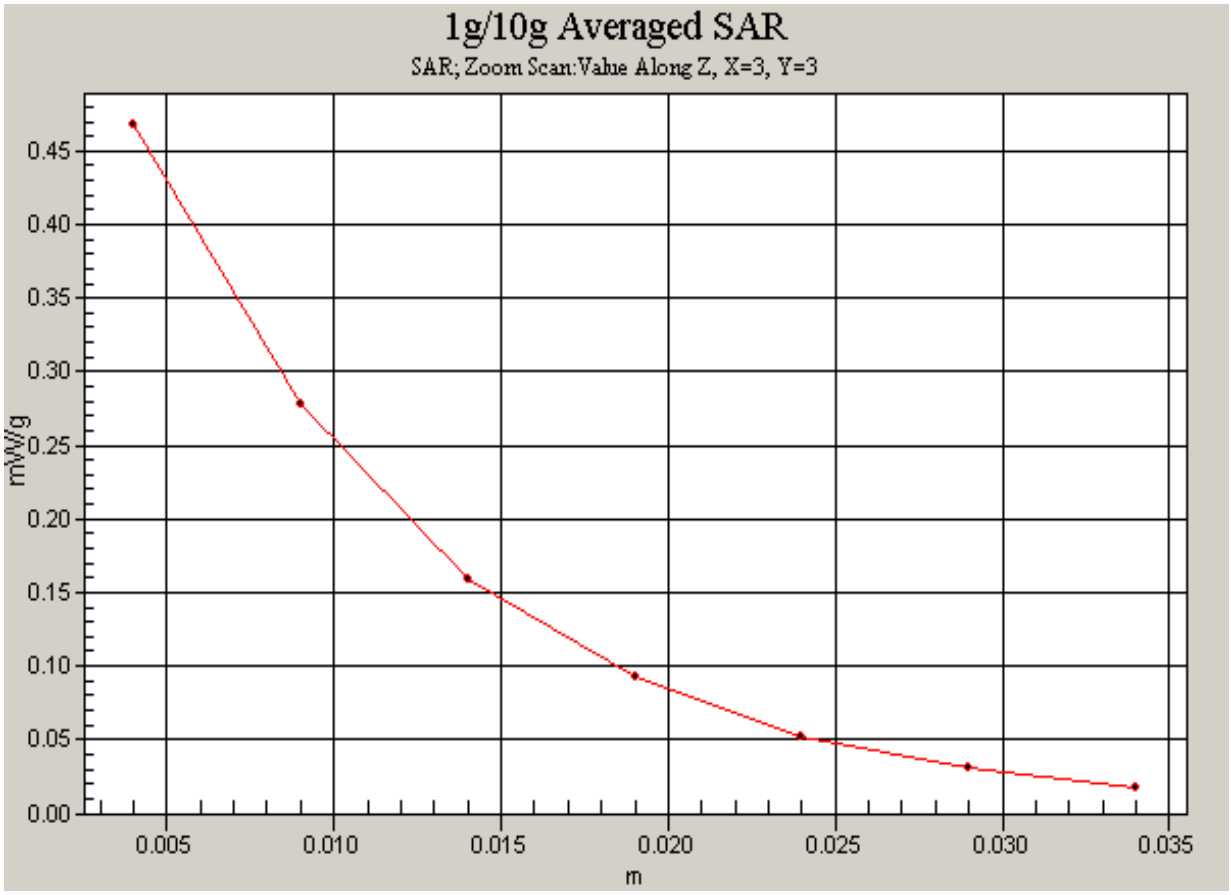
PCS1900_Body_Back_Mid_1.5cm/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.485 mW/g

PCS1900_Body_Back_Mid_1.5cm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.3 V/m; Power Drift = -0.105 dB
Peak SAR (extrapolated) = 0.682 W/kg
SAR(1 g) = 0.424 mW/g; SAR(10 g) = 0.244 mW/g
Maximum value of SAR (measured) = 0.467 mW/g



0 dB = 0.467mW/g

Z Scan


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=3
mW/g
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.005
0.010
0.015
0.020
0.025
0.030
0.035
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 (ET3DV6)

- DAE 3

- 835 ㎒ / 1900 ㎒

- PROBE Calibration Certificate (ET3DV6)

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

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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. 217-01368)	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:	Jelon 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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Accredited by the Swiss Accreditation Service (SAS) **Accreditation No.: SCS 108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

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 ($\mu V/(V/m)^2$)[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

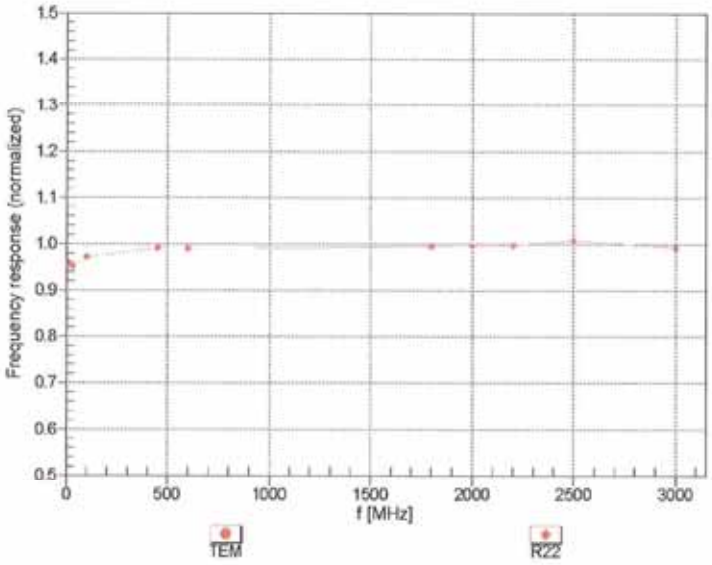
Calibration Parameter Determined in Body Tissue Simulating Media

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.

ET3DV6– SN:1782 April 14, 2011

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

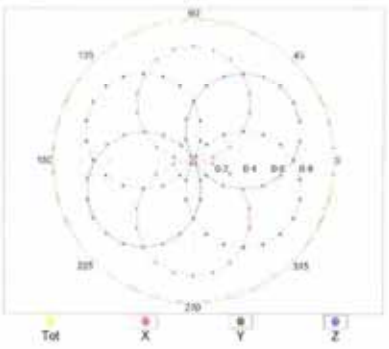


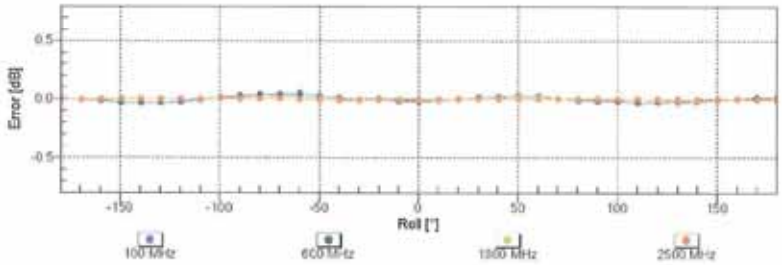
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

f=1800 MHz,R22

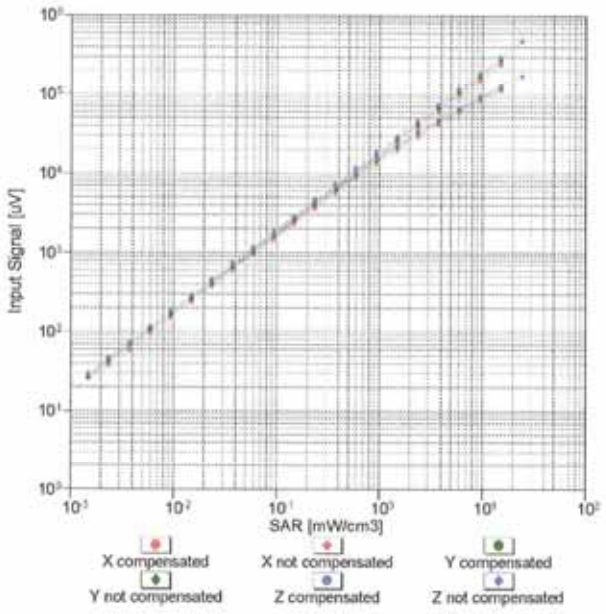


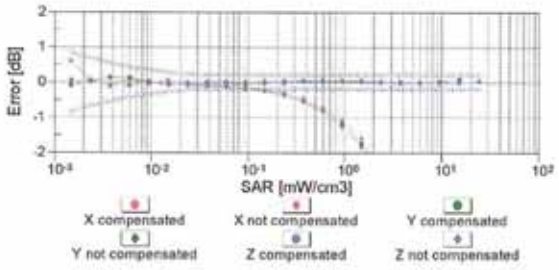


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6– SN:1782 April 14, 2011

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



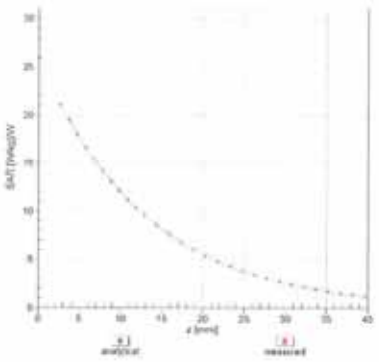


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

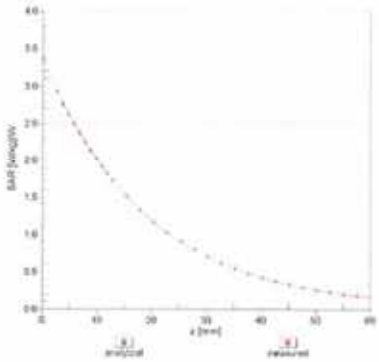
ET3DV6– SN:1782 April 14, 2011

Conversion Factor Assessment

f = 1750 MHz,WGLS R22 (H_convF)

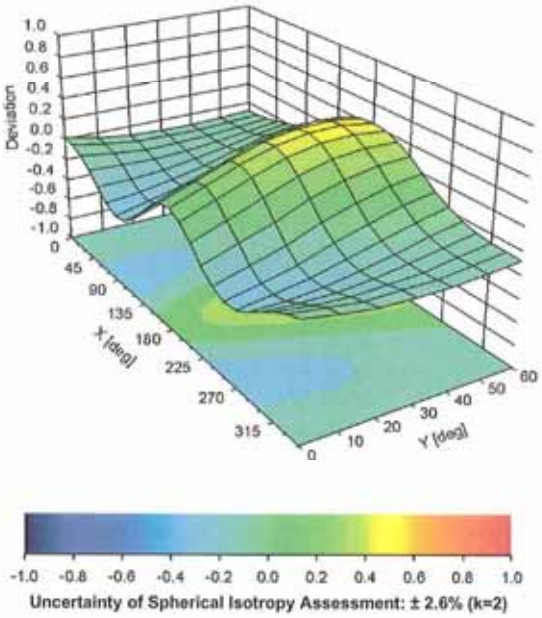


f = 835 MHz,WGLS R9 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: 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

-DAE 3 Calibration Certificate

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client Dymstec

Certificate No: DAE3-479_Aug11

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 BJ - SN: 479
Calibration procedure(s)	QA CAL-06.v23 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	August 29, 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
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-10 (No:10376)	Sep-11
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	08-Jun-11 (in house check)	In house check: Jun-12

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

Issued: August 29, 2011

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

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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	403.335 ± 0.1% (k=2)	404.663 ± 0.1% (k=2)	404.429 ± 0.1% (k=2)
Low Range	3.96166 ± 0.7% (k=2)	3.96051 ± 0.7% (k=2)	3.96781 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	71.5 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200001.1	-1.15	-0.00
Channel X	+ Input	20000.71	0.51	0.00
Channel X	- Input	-19997.07	2.83	-0.01
Channel Y	+ Input	199999.0	-2.17	-0.00
Channel Y	+ Input	19994.57	-5.43	-0.03
Channel Y	- Input	-20001.85	-2.15	0.01
Channel Z	+ Input	200000.9	0.60	0.00
Channel Z	+ Input	19997.56	-3.14	-0.02
Channel Z	- Input	-19999.90	0.80	-0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	1999.8	-0.23	-0.01
Channel X	+ Input	199.86	0.16	0.08
Channel X	- Input	-200.29	-0.39	0.19
Channel Y	+ Input	1999.7	-0.29	-0.01
Channel Y	+ Input	199.31	-0.69	-0.35
Channel Y	- Input	-201.78	-1.78	0.89
Channel Z	+ Input	1999.9	-0.21	-0.01
Channel Z	+ Input	199.27	-0.63	-0.32
Channel Z	- Input	-200.76	-0.76	0.38

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	18.40	16.77
	- 200	-15.99	-17.76
Channel Y	200	7.13	6.81
	- 200	-8.07	-8.70
Channel Z	200	-7.24	-7.73
	- 200	6.67	6.51

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	1.88	-1.20
Channel Y	200	2.40	-	4.80
Channel Z	200	1.65	-1.03	-

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	15757	16312
Channel Y	16204	17522
Channel Z	15654	16295

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	0.03	-1.50	3.01	0.68
Channel Y	-0.72	-2.15	0.78	0.66
Channel Z	-0.59	-1.29	0.70	0.38

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 MHz Dipole Calibration Certificate

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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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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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

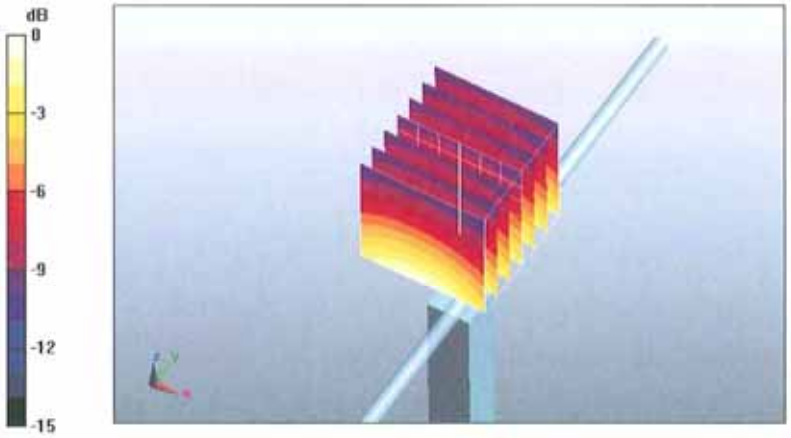
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490

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:

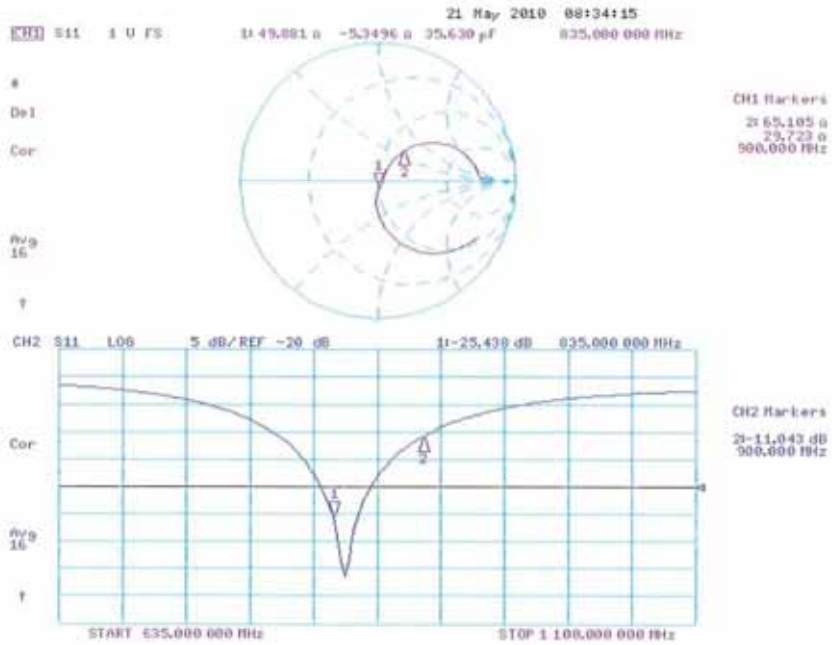
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0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

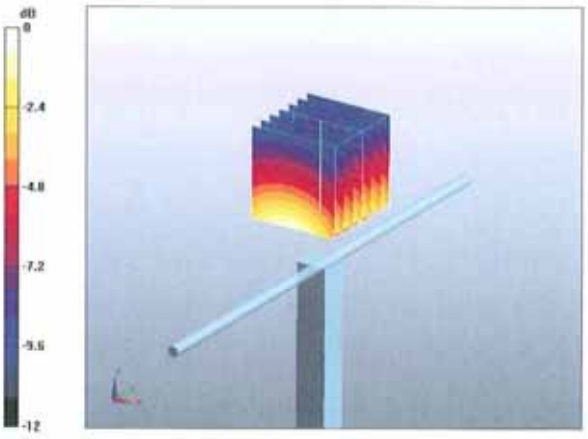
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:490

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:

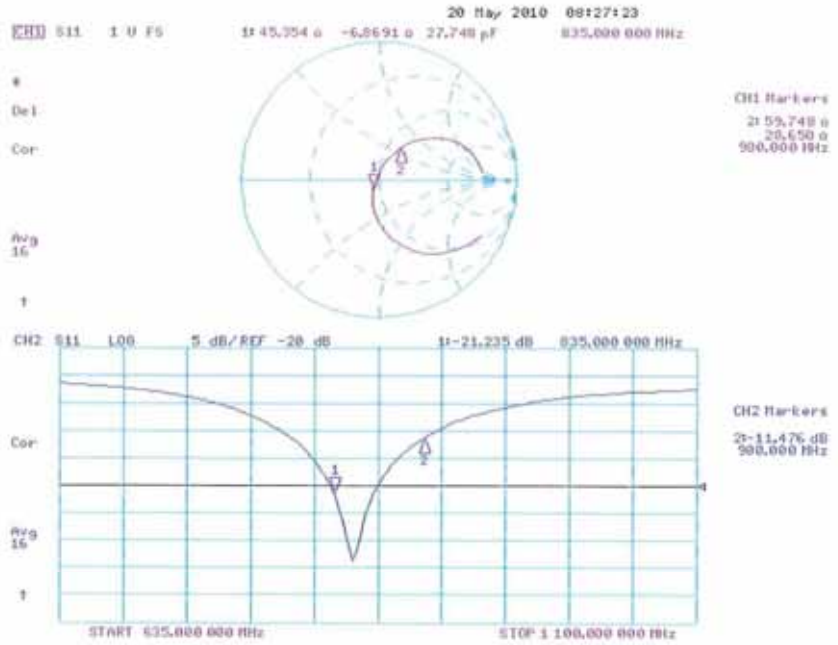
- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0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

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

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

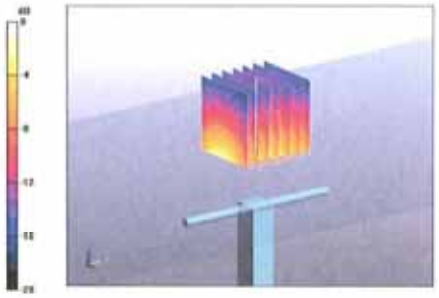
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033

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:

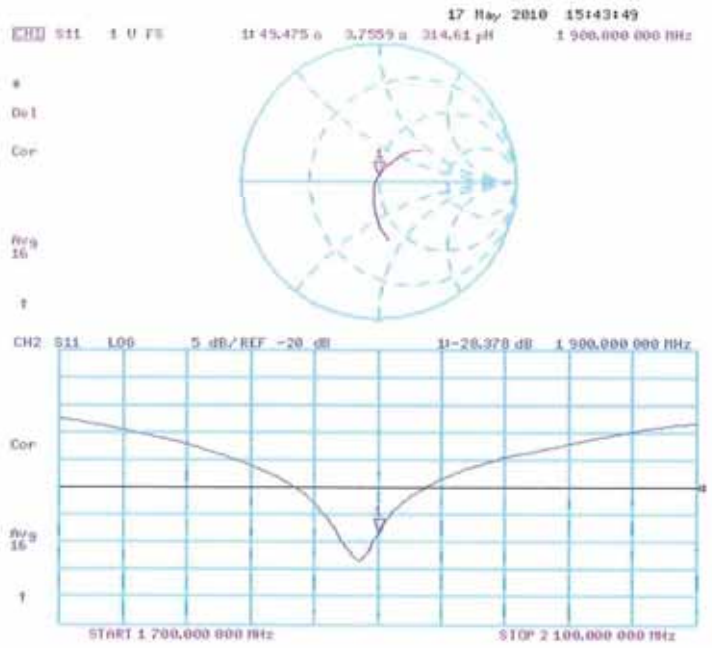
- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version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

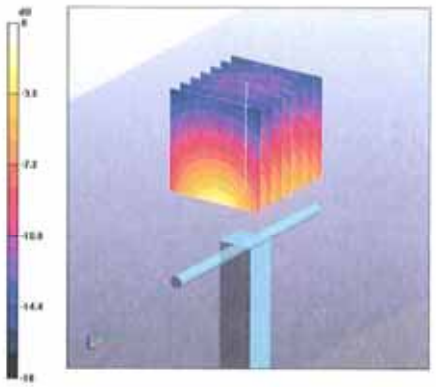
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d033

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:

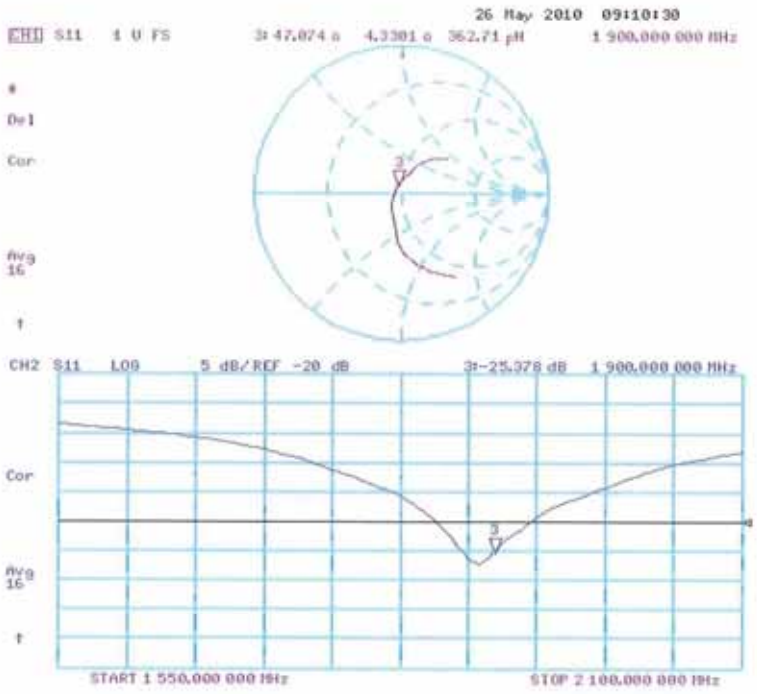
- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version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



-THE END-