SGS-CSTC Standards Technical Services Co., Ltd.

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CE SAR TEST REPORT

Application No.:	SZEM1305002156RF
Applicant:	Guangzhou Shiyuan Electronics Co.,Ltd
Manufacturer:	Guangzhou Shiyuan Electronics Co.,Ltd
Product Name:	Tablet PC
Model No.(EUT):	PMP7280C3G_WH_DUO(Tested)&PMP7280C3G_BK_DUO&PMP7280C3GUK_BK_DUO&PMP7280C3GUK_WH_DUO&PMP5880D&P891&P892&PMP7280C3G_DUO
Standards:	EN62311 ; IEC62209-1; IEC62209-2 Ed.1
Date of Receipt:	2013-05-06
Date of Test:	2013-05-06 to 2013-05-07
Date of Issue:	2013-05-08
Test Result :	**PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives.

Authorized Signature:

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

2 Test Summary

Frequency Band	Test position	Test mode	Test ch. /Freq.	Max average SAR10-g(W/kg)	Conducted power(dBm)	SAR limit (W/kg)	verdict
GSM900	Body	GPRS 4TS	124/914.8	0.044	33.09	2.0	PASS
GSM1800	Body	GPRS 4TS	885/1784.8	0.071	29.63	2.0	PASS
WCDMA Band VIII	Body	RMC	2788/897.6	0.035	24.94	2.0	PASS
WCDMA Band I	Body	RMC	9612/1922.4	**0.078**	24.17	2.0	PASS
WIFI	Body	802.11b	13/2472	0.043	13.80	2.0	PASS

Remark: The maximum SAR value of **Body** is **0.078**W/kg, the power of Bluetooth is less than 20mW and deemed to comply EN 62311 based on EN 62479.

3 Contents

4 General Information

4.1 Details of Applicant

Name:	Guangzhou Shiyuan Electronics Co.,Ltd
Address:	4F,192 Kezhu Road,Guangzhou Science Park,Guangdong
Telephone:	13600038673
Contact:	Lin Shidong
Email:	linshidong@cvte.cn

4.2 Details of Manufacturer

Name:	Guangzhou Shiyuan Electronics Co.,Ltd
Address:	4F,192 Kezhu Road,Guangzhou Science Park,Guangdong

4.3 General Description of EUT

Product Name:	Tablet PC		
Model Name:	PMP7280C3G_WH_DUO & PMP7280C3G_BK_DUO & PMP7280C3GUK_BK_DUO & PMP7280C3GUK_WH_DUO& PMP5880D&P891&P892&PMP7280C3G_DUO		
Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
Final Hardware Version	V1.4		
Final Software Version	PMP7280C3G.20130502.V2.0.4		
Normal Voltage:	DC 5V; BAT 3.7V		
Low Voltage:	DC 4.7V; BAT 3.3V		
High Voltage:	DC 5.5V; BAT 4.2V		
Battery Type:	Li Battary:4600mAh		
Antenna Type	Inner Antenna		
Frequency Bands	Band	Tx (MHz)	Rx(MHz)
	GSM900	880~915	925~960
	DCS 1800	1710~1785	1805~1880
	WCDMA 900	880 - 915	925 – 960
	WCDMA 2100	1920~1980	2110~2170
	WIFI	2412~2472	2412~2472
Modulation Mode	GMSK / QPSK		
Power Class	GSM 900	4	
	DCS 1800	1	
	WCDMA 900	3	
	WCDMA 2100	3	
Serial Number	NA		
Remark:	ModelNo.:PMP7280C3G_WH_DUO&PMP7280C3G_BK_DUO&PMP7280C3G UK_BK_DUO&PMP7280C3GUK_WH_DUO& PMP5880D&P891&P892&PMP7280C3G_DUO Only the model PMP7280C3G_WH_DUO was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with only difference being model number and the color.		

4.4 Description of Support Units

The EUT has been tested independently.

4.5 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab
No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China 518057
Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**
  CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.
- **VCCI**
  The 3m Semi-anechoic chamber, Full-anechoic Chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197, G-416, T-1153 and C-2383 respectively.
- **FCC – Registration No.: 556682**
  SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.
- **Industry Canada (IC)**
  The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1.

4.7 Deviation from Standards

None.

4.8 Abnormalities from Standard Conditions

None.

4.9 Other Information Requested by the Customer

None

4.10Test Standards

The Equipment under Test (EUT) has been tested at SGS's (own or subcontracted) laboratories according to EN62311:2008 & IEC 62209-1:2005 & IEC 62209-2 Ed.1

The following table summarizes the specific reference documents such as harmonized standards or test specifications which were used for testing as SGS's (own or subcontracted) laboratories.

Identity	Document Title	Version
EN62311	Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)	2008
IEC 62209-1	Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)	2005
IEC 62209-2	Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices – Human models, Instrumentation, and Procedures - Part 2: Procedure to determine the specific absorption rate (SAR) for mobile wireless communication devices used in close proximity to the human body (frequency range of 300 MHz to 6 GHz)	Ed.1
EN62479	Assessment of the compliance of low power electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (10 MHz -300 GHz)	2010
1999/519/EC	COUNCIL RECOMMENDATION of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)	1999

Human Exposure	Uncontrolled Environment General Population
Spatial Peak SAR(Brain)	2.0 W/Kg (averaged over a mass of 10g)

Table 1： RF Exposure Limits

Notes: Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.

4.11 Measurement Uncertainty

Measurements and results are all in compliance with the standards listed in section 12 of this report. All measurements and results are recorded and maintained at the laboratory performing the tests and measurement uncertainties are taken into account when comparing measurements to pass/ fail criteria. The

Expanded uncertainty (95% CONFIDENCE INTERVAL) is **20.63%**.

a	b	c	d	e = f(d,k)	g	i = C*g/e	K
Uncertainty Component	**Section in 62209-1**	**Tol (%)**	**Prob . Dist.**	**Div.**	**Ci (10g)**	**10g ui (%)**	**Vi (Veff)**
Probe calibration	7.2.1	6.3	N	1	1	6.3	∞
Axial isotropy	7.2.1.2	0.5	R	$\sqrt{3}$	$(1-Cp)^{1/2}$	0.20	∞
hemispherical isotropy	7.2.1.2	2.6	R	$\sqrt{3}$	$\sqrt{Cp}$	1.06	∞
Boundary effect	7.2.1.5	0.8	R	$\sqrt{3}$	1	0.46	∞
Linearity	7.2.1.3	0.6	R	$\sqrt{3}$	1	0.35	∞
System detection limit	7.2.1.4	0.25	R	$\sqrt{3}$	1	0.15	∞
Readout electronics	7.2.1.6	0.3	N	1	1	0.3	∞
Response time	7.2.1.7	0	R	$\sqrt{3}$	1	0	∞
Integration time	7.2.1.8	2.6	R	$\sqrt{3}$	1	1.5	∞
RF ambient Condition -Noise	7.2.3.6	3	R	$\sqrt{3}$	1	1.73	∞
RF ambient Condition - reflections	7.2.3.6	3	R	$\sqrt{3}$	1	1.73	∞
Probe positioning- mechanical tolerance	7.2.2.1	1.5	R	$\sqrt{3}$	1	0.87	∞
Probe positioning- with respect to phantom	7.2.2.3	2.9	R	$\sqrt{3}$	1	1.67	∞
Max. SAR evaluation	7.2.4	1	R	$\sqrt{3}$	1	0.58	∞
Test sample positioning	7.2.2.4	4	N	1	1	4	9
Device holder uncertainty	7.2.2.4.2	3.6	N	1	1	3.6	∞
Output power variation -SAR drift measurement	7.2.3.5	5	R	$\sqrt{3}$	1	2.89	∞
Phantom uncertainty (shape and thickness tolerances)	7.2.2.2	4	R	$\sqrt{3}$	1	2.31	∞
Liquid conductivity - deviation from target values	7.2.3.3	5	R	$\sqrt{3}$	0.43	1.24	∞
Liquid conductivity - measurement uncertainty	7.2.3.3	4	N	1	0.43	1.72	5

Liquid permittivity - deviation from target values	7.2.3.4	5	R	$\sqrt{3}$	0.49	1.41	∞
Liquid permittivity - measurement uncertainty	7.2.3.4	4	N	1	0.49	1.96	5
Combined standard uncertainty				RSS		10.32	334
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		**20.63**	

Table 1： Measurement Uncertainty

5 Equipments Used during Test

5.1 SPEAG DASY4

Test Platform	SPEAG DASY4 Professional
Location	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab
Manufacture	SPEAG
Description	SAR Test System (Frequency range 300MHz-3GHz) 835, 900, 1800, 1900, 2000, 2450 frequency band
Software Reference	DASY4: V4.7 Build 80 SEMCAD: V1.8 Build 186

Hardware Reference

	Model	Equipment	Serial Number	Calibration Date	Due date of calibration
☒	Robot	RX90L	F03/5V32A1/A01	NA	NA
☒	Twin Phantom	SAM 1	TP-1283	NA	NA
☒	Flat Phantom	ELI 5.0	1128	NA	NA
☒	DAE	DAE4	569	2012-11-27	2013-11-26
☒	E-Field Probe	ES3DV3	3088	2012-11-26	2013-11-25
☒	Validation Kits	D900V2	184	2012-11-26	2013-11-25
☒	Validation Kits	D1800V2	2d070	2012-11-27	2013-11-26
☒	Validation Kits	D2000V2	1017	2012-11-26	2013-11-25
☒	Validation Kits	D2450V2	733	2012-11-26	2013-11-25
☒	Agilent Network Analyzer	E5071B	MY42100549	2013-04-16	2014-04-15
☒	RF Bi-Directional Coupler	ZABDC20-252H-N+	NA	2013-04-16	2014-04-15
☒	Agilent Signal Generator	E4438C	MY42082326	2013-04-03	2014-04-02
☒	Mini-Circuits Preamplifier	ZHL-42	D041905	2013-04-12	2014-04-11
☒	Agilent Power Meter	E4416A	GB41292095	2013-04-16	2014-04-15
☒	Agilent Power Sensor	8481H	MY41091234	2013-04-16	2014-04-15
☒	R&S Power Sensor	NRP-Z92	100025	2013-04-16	2014-04-15
☒	R&S Universal Radio Communication Tester	CMU200	103633	2013-04-05	2014-04-04

5.2 The SAR Measurement System

A photograph of the SAR measurement System is given in F-1.

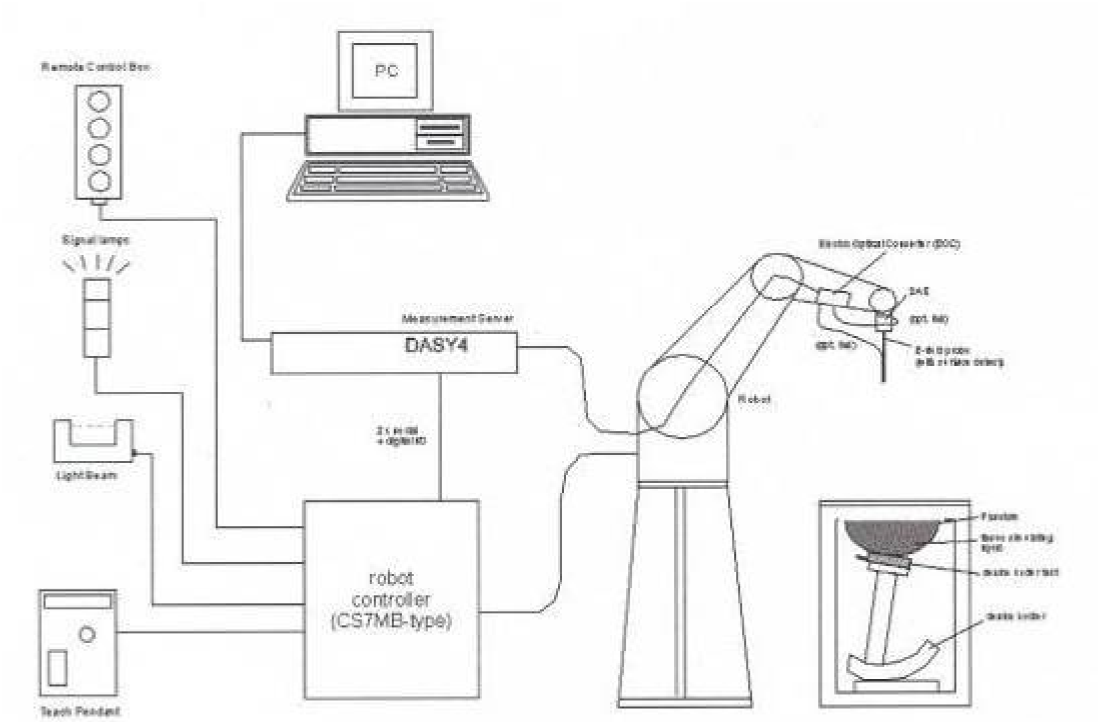
This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (Speag Dasy 4 professional system). A Model ES3DV3 3088 E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

The DASY4 system for performing compliance tests consists of the following items:
A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software .An arm extension for accommodation the data acquisition electronics (DAE).

A dosimetric 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.

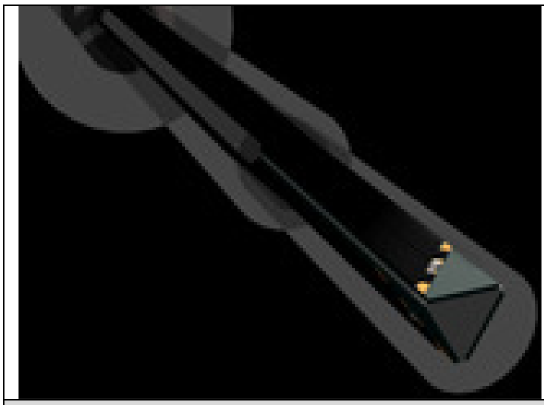
The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.



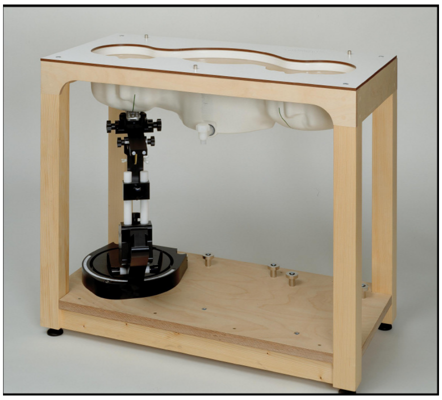
F-1. SAR System Configuration

- 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 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 left-hand, right-hand and Body Worn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

5.3 Isotropic E-field Probe ES3DV3

	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

5.4 SAM Twin Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
Dimensions (incl.WoodenSupport)	Length: 1000 mm Width: 500 mm Height: adjustable feet	
Filling Volume	approx. 25 liters	
Wooden Support	SPEAG standard phantom table	

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. 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 evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.

5.5 ELI Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)	
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)	
Shell Thickness	2.0 ± 0.2 mm (bottom plate)	
Dimensions	Major axis: 600 mm Minor axis: 400 mm	
Filling Volume	approx. 30 liters	
Wooden Support	SPEAG standard phantom table	

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.

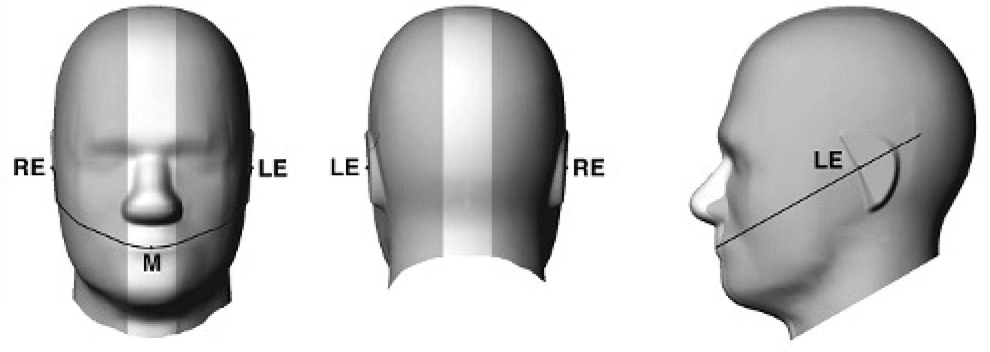
5.6 Device Holder for Transmitters

F-2. Device Holder for Transmitters

- The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source in 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. An accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions, in which the devices must be measured, are defined by the standards.
- The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centres for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
- The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity ε =3 and loss tangent δ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

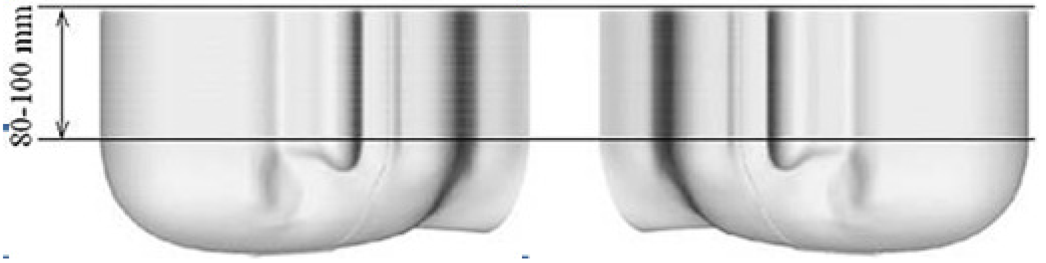
6 Description of Test Position

6.1 SAM Phantom Shape

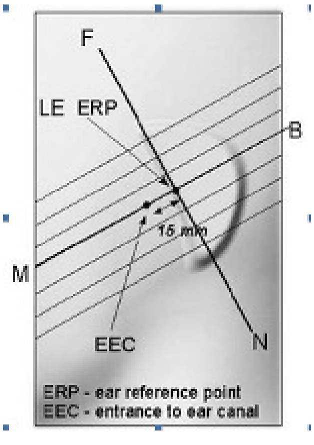


F-3. front, back, and side views of SAM (model for the phantom shell). Full-head model is for illustration purposes only-procedures in this recommended practice are intended primarily for the phantom setup.

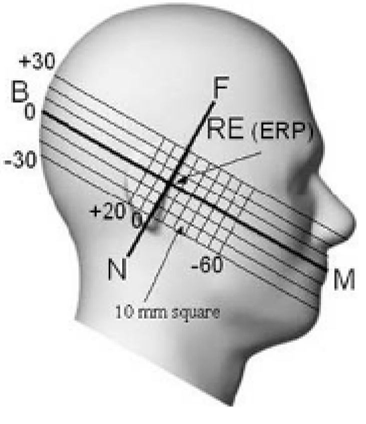
Note: The center strip including the nose region has a different thickness tolerance.



F-4. Sagittally bisected phantom with extended perimeter (shown placed on its side as used for SAR measurements)

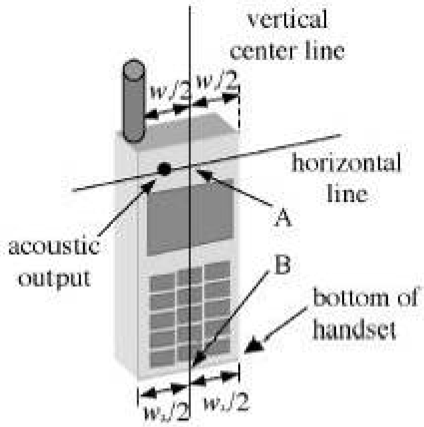


F-5. Close-up side view of phantom,showing the ear region, N-F and B-M lines, and seven cross-sectional plane locations

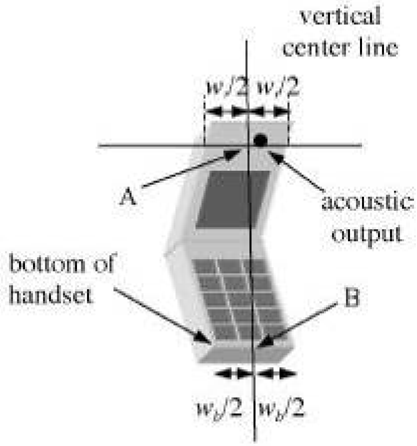


F-6. Side view of the phantom showing relevant markings and seven cross-sectional plane locations

6.2 EUT constructions



F-7. Handset vertical and horizontal reference lines-“fixed case”



F-8. Handset vertical and horizontal reference lines-“clam-shell case”

6.3 Definition of the “cheek” position

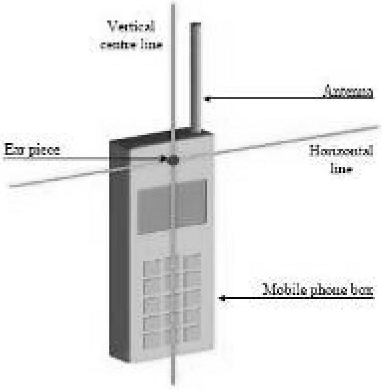
a) Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom ("initial position"). While maintaining the device in this plane, align the vertical centre line with the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

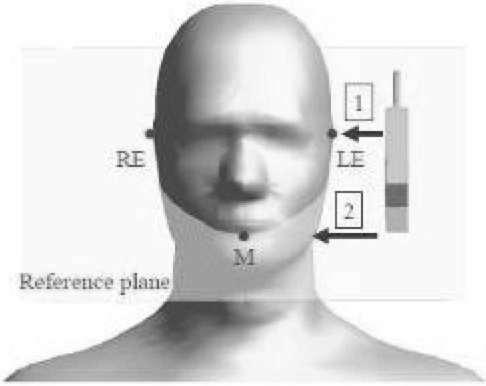
b) Translate the mobile phone box towards the phantom with the ear piece aligned with the line LE-RE until telephone touches the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the box until any point on the front side is in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

6.4 Definition of the “tilted” position

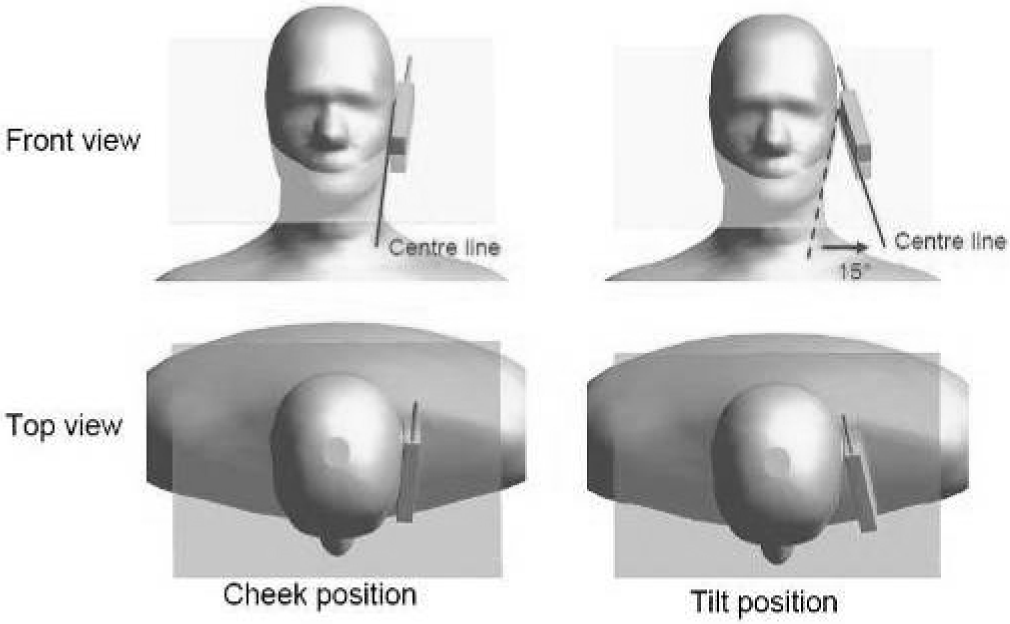
a) Position the device in the “cheek” position described above;

b) While maintaining the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.





F-9. Definition of the reference lines and points, on the phone and on the phantom and initial position



F-10. “Cheek” and “tilt” positions of the mobile phone on the left side

7 SAR System Verification Procedure

7.1 Tissue Simulate Liquid

7.1.1 Recipes for Tissue Simulate Liquid

The bellowing tables give the recipes for tissue simulating liquids to be used in different frequency bands

Ingredients (% by weight)	Frequency (MHz)									
	450		835		900		1800-2000		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	40.30	50.75	40.30	50.75	55.24	70.17	55.00	68.63
Salt (NaCl)	3.95	1.49	1.38	0.94	1.38	0.94	0.31	0.39	0.2	0
Sucrose	56.32	46.78	57.90	48.21	57.90	48.21	0	0	0	0
HEC	0.98	0.52	0.24	0	0.24	0	0	0	0	0
Bactericide	0.19	0.05	0.18	0.10	0.18	0.10	0	0	0	0
DGBE	0	0	0	0	0	0	44.45	29.44	44.80	31.37
Salt: 99^{+}% Pure Sodium Chloride; Sucrose: 98^{+}% Pure Sucrose; Water: De-ionized, 16 $M\Omega^{+}$ resistivity; HEC: Hydroxyethyl Cellulose; DGBE: 99^{+}% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]										

Table 2： Recipe of Tissue Simulate Liquid

7.1.2 Measurement for Tissue Simulate Liquid

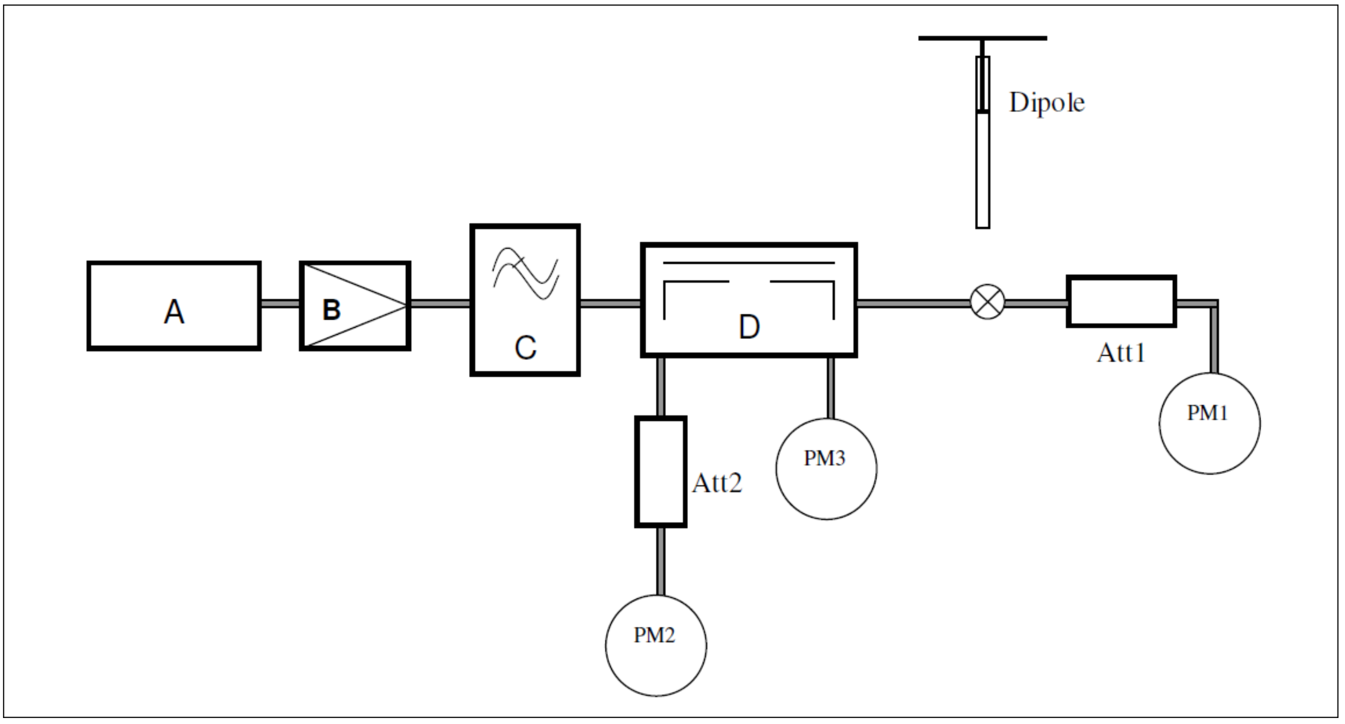
The dielectric properties for this Tissue Simulate Liquids were measured by using the Agilent Model 85070D Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with Agilent E5071B Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in Table 1.For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±2℃.

Target Frequency (MHz)	Target Tissue Head (±5%)		Measured Tissue Head		Measured Date	Liquid Temp. (℃)
	ε r	σ (S/m)	ε r	σ (S/m)		
900	41.5 (39.43~43.56)	0.97 (0.92~1.02)	40.01	0.97	2013/5/6	22
1800	40 (38~42)	1.4 (1.33~1.47)	39.88	1.46	2013/5/6	22
2000	40 (38~42)	1.4 (1.33~1.47)	39.59	1.41	2013/5/7	22
2450	39.2 (37.24~41.16)	1.8 (1.71~1.89)	39.10	1.74	2013/5/7	22

Table 3： Measurement result of Tissue electric parameters

7.2 SAR System Validation

The microwave circuit arrangement for system verification is sketched in F-13. 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. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the table C-1 (A power level of 250mw was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range 22℃, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



F-11. the microwave circuit arrangement used for SAR system verification

A. Agilent E4438C Signal Generator

B. Mini-Circuit ZHL-42 Preamplifier

C. Mini-Circuit VLF-2500+ Low Pass Filter

D. Mini-Circuits ZABDC20-252H-N+ Bi-DIR Coupling

PM1. Power Sensor NRP-Z92

PM2. Agilent Model E4416A Power Meter

PM3. Power Sensor NRP-Z92

7.2.1 Summary System Validation Results

Validation Kit		Target SAR (normalized to 1w) (±10%)		Measured SAR (normalized to 1w)		Measured date	Liquid Temp. (℃)
		1-g(W/kg)	10-g(W/kg)	1-g(W/kg)	10-g(W/kg)		
D900V2	Head	10.5 (9.45~11.55)	6.73 (6.06~7.40)	10.64	6.92	2013/5/6	22
D1800V2	Head	37.3 (33.57~41.03)	19.7 (17.73~21.67)	40.40	19.92	2013/5/6	22
D2000V2	Head	40.1 (36.09~44.11)	20.9 (18.81~22.99)	40.80	20.24	2013/5/7	22
D2450V2	Head	52.7 (47.43~57.97)	24.8 (22.32~27.28)	54.40	24.32	2013/5/7	22

Table 4： SAR System Validation Result

7.2.2 Detailed System Validation Results

Date/Time: 2013-5-6 8:35:47

Test Laboratory: SGS-SAR Lab

System Performance Check 900 MHz Head

DUT: Dipole 900 MHz; Type: D900V2; Serial: 184

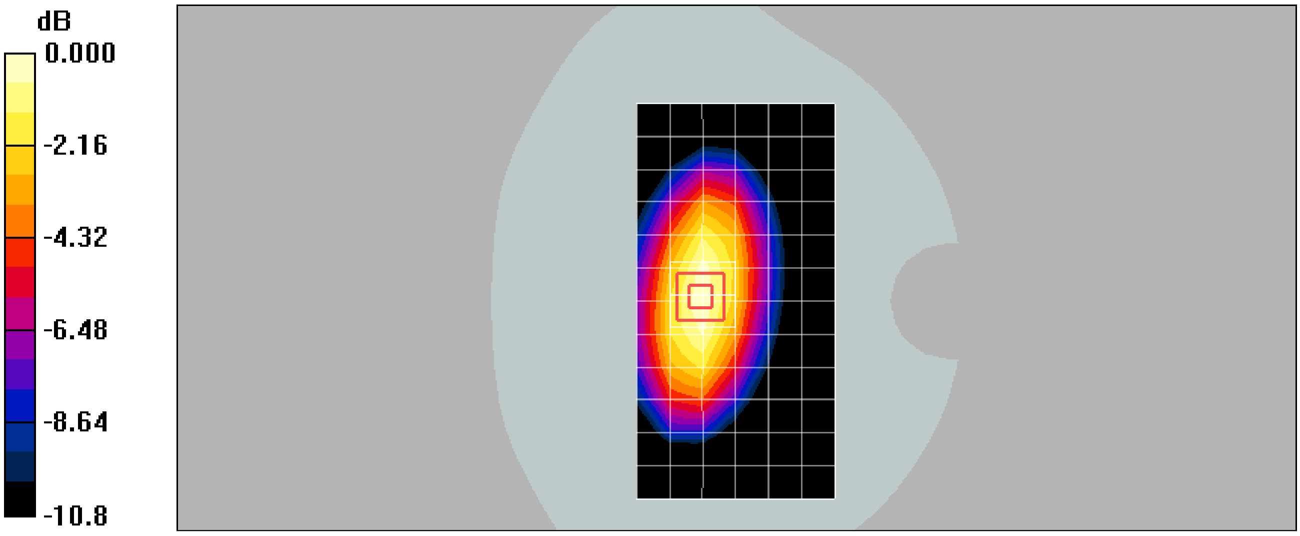
Communication System: CW; Frequency: 900 MHz;Duty Cycle: 1:1
Medium: HSL900 Medium parameters used: f = 900 MHz; σ = 0.971 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=15mm, Pin=250mW/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.86 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 48.2 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 3.92 W/kg
SAR(1 g) = 2.66 mW/g; SAR(10 g) = 1.73 mW/g
Maximum value of SAR (measured) = 2.90 mW/g



0 dB = 2.90mW/g

Date/Time: 2013-5-6 16:15:47

Test Laboratory: SGS-SAR Lab

System Performance Check 1800 MHz Head

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: 2d070

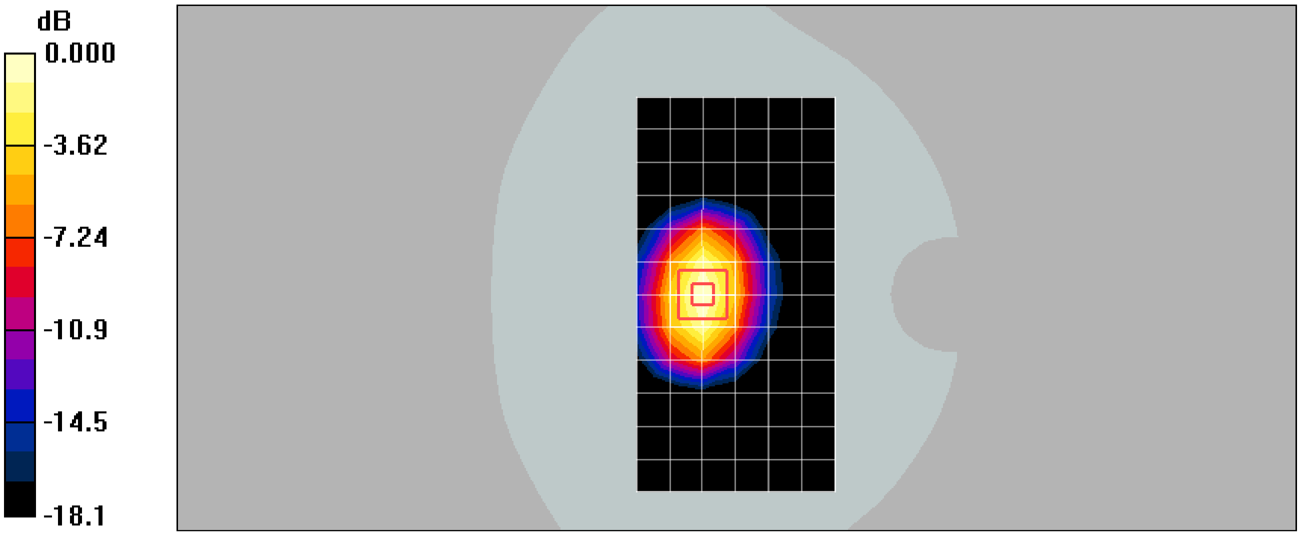
Communication System: CW; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium: HSL1800 Medium parameters used: f = 1800 MHz; σ = 1.49 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.12, 5.12, 5.12); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 12.4 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 69.8 V/m; Power Drift = -0.052 dB
Peak SAR (extrapolated) = 20.6 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 98mW/g
Maximum value of SAR (measured) = 11.9 mW/g



0 dB = 11.9mW/g

Date/Time: 2013-5-7 8:32:17

Test Laboratory: SGS-SAR Lab

System Performance Check 2000 MHz Head

DUT: Dipole 2000 MHz; Type: D2000V2; Serial: 1017

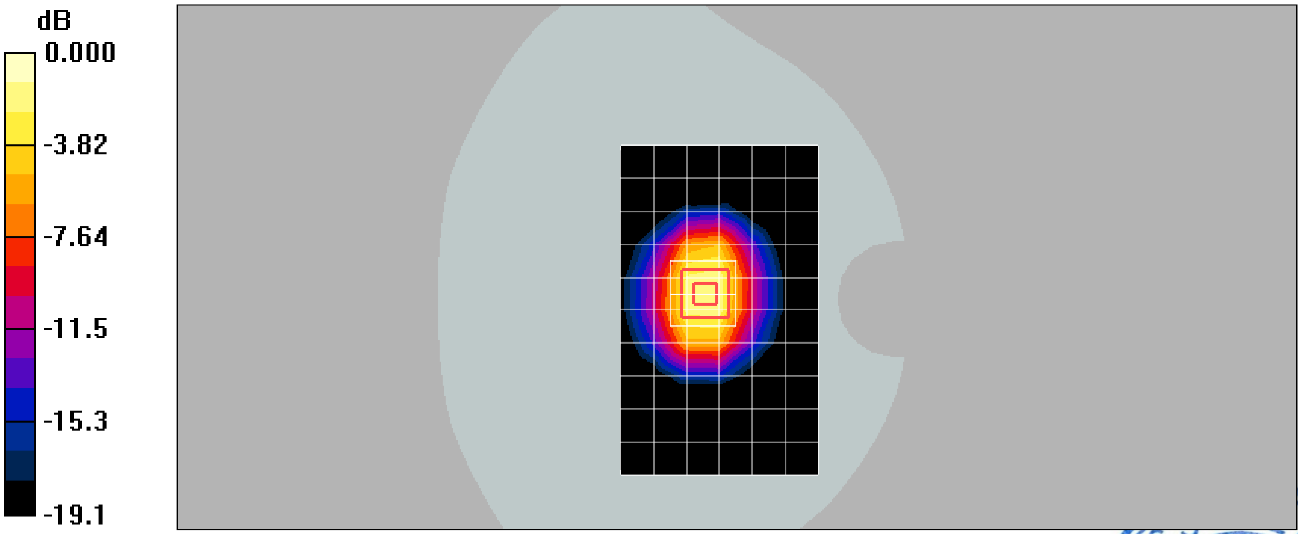
Communication System: CW; Frequency: 2000 MHz;Duty Cycle: 1:1
Medium: HSL2000 Medium parameters used: f = 2000 MHz; σ = 1.41 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.93, 4.93, 4.93); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 7.88 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.8 V/m; Power Drift = 0.091 dB
Peak SAR (extrapolated) = 20.3 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.06 mW/g
Maximum value of SAR (measured) = 11.5 mW/g



0 dB = 11.5mW/g

Date/Time: 2013-5-7 11:50:47

Test Laboratory: SGS-SAR Lab

System Performance Check 2450MHz Head

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 733

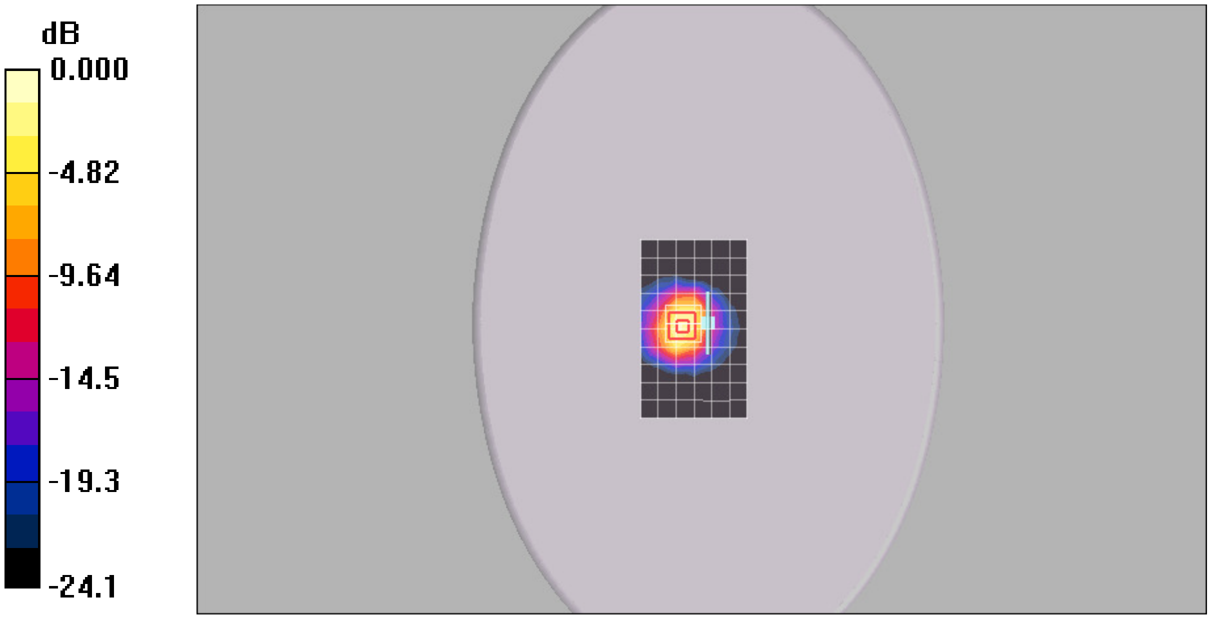
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL2450 Medium parameters used: f = 2450 MHz; σ = 1.74 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.24, 4.24, 4.24); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: ELI V5.0; Type: ELI; Serial: 1128
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 12.6 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.7 V/m; Power Drift = 0.183 dB
Peak SAR (extrapolated) = 30.5 W/kg
SAR(1 g) = 13.6 mW/g; SAR(10 g) = 6.08 mW/g
Maximum value of SAR (measured) = 15.4 mW/g



0 dB = 15.4mW/g

8 Test results and Measurement Data

8.1 Operation Configurations

8.1.1 GSM Test Configuration

SAR tests for GSM 900 and GSM 1800, a communication link is set up with a base station by air link. Using CMU200 the power lever is set to “5”and “0” in SAR of GSM 900 and GSM 1800. The tests in the band of GSM 900 and GSM 1800 are performed in the mode of GPRS/EGPRS function. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. The EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink, and at most 4 timeslots in downlink, the maximum total timeslot is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

8.1.1 WCDMA Test Configuration

1) RMC
As the SAR body tests for WCDMA Band I and Band VIII, we established the radio link through call processing. The maximum output power were verified on high, middle and low channels for each test band according to 3GPP TS 34.121 with the following configuration:
⑴ 12.2kbps RMC, 64,144,384 kbps RMC with TPC set to “all 1” .

⑵Test loop Mode 1.
For the output power, the configurations for the DPCCH and DPDCH1 are as followed (EUT do not support the DPDCH2-n)

	ChannelBit Rate (kbps)	Channel SymbolRate (ksps)	Spreading Factor	Spreading Code Number	Bits/Slot
DPCCH	15	15	256	0	10
DPDCH1	15	15	256	64	10
	30	30	128	32	20
	60	60	64	16	40
	120	120	32	8	80
	240	240	16	4	160
	480	480	8	2	320
	960	960	4	1	640
DPDCHn	960	960	4	1, 2, 3	640

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits configured to all “1s”. SAR for other spreading codes and multiple DPDCHn, when supported by the EUT, are not required when the maximum average outputs of each RF channel, for each spreading code and DPDCHn configuration, are less than ¼ dB higher than those measured in 12.2 kbps RMC.

2) HSDPA

SAR for body exposure configurations is measured according to the “Body SAR Measurements““ procedures of 3G device. In addition, body SAR is also measured for HSDPA when the maximum average outputs of each RF channel with HSDPA active is at ¼ dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.

HSDPA should be configured according to UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HAPRQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. The c and d gain factors for DPCCH and DPDCH were set according to the values in the below table, hs for HS-DPCCH is set automatically to the correct value when ΔACK, ΔNACK, ΔCQI = 8. The variation of the βc /βd ratio causes a power reduction at sub-tests 2 - 4.

Sub-test	βc	βd	βd(SF)	βc/βd	βhs	CM(dB)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note1: ∆ACK, ∆NACK and ∆CQI= 8 Ahs = βhs/βc=30/15 βhs=30/15*βc

Note2:For the HS-DPCCH power mask requirement test in clause 5.2C,5.7A,and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1.A,and HSDPA EVM with phase discontinuity in clause 5.13.1AA, ∆ACK and ∆NACK= 8 (Ahs=30/15) with βhs=30/15*βc,and ∆CQI= 7 (Ahs=24/15) with βhs=24/15*βc.

Note3: CM=1 forβc/βd =12/15, βhs/βc=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI‟s
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

Table 5： settings of required H-Set 1 QPSK acc. to 3GPP 34.121

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	MaximumH S-DSCH Transport BlockBits/HS-DSCH TTI	Total Soft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

Table 6： HSDPA UE category

3) HSUPA

Body SAR is also measured for HSDPA when the maximum average outputs of each RF channel with HSDPA active is at ¼ dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-set 1 and QPSK for FRC and 12.2kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA.

Due to inner loop power control requirements in HSDPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSDPA should be configured according to the values indicated below as well as other applicable procedures described in the „WCDMA Handset" and „Release 5 HSDPA Data Device" sections of 3G device.

Sub-test	c	d	d (SF)	c/d	hs(1)	ec	ed	ec (SF)	ed (code)	CM (2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	ed1:47/15 ed2:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ ACK, Δ NACK and Δ CQI = 8 Ahs = hs/ c = 30/15 hs = 30/15 * c
Note 2: CM = 1 for c/ d = 12/15, hs/ c = 24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference
Note 3 : For subtest 1 the c/ d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to c = 10/15 and d = 15/15
Note 4 : For subtest 5 the c/ d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to c = 14/15 and d = 15/15
Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g
Note 6: ed can not be set directly; it is set by Absolute Grant Value.

Table 7： Subtests for UMTS Release 6 HSUPA

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Speading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.UE categories 1 to 6 support QPSK only.UE category 7 supports QPSK.(TS25.306-7.3.0).

Table 8： HSUPA UE category

8.1.2 WiFi Test Configuration

For the 802.11b/g/n SAR tests, a communication link is set up with the test mode software for Wi-Fi mode test. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 1，7 and 13 respectively in the case of 2450 MHz during the test at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the rate which the average output power is maximum. 802.11b/g/n operating modes are tested independently according to the service requirements in each frequency band. 802.11b/g/n modes are tested on channel 1, 7, 13.however, if output power reduction is necessary for channels 1 and/or 13 to meet restricted band requirements the highest output channel closest to each of these channels must be tested instead.

SAR is not required for 802.11g/n channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

8.2 Measurement procedure

8.2.1 Scanning procedure

Step 1: Power reference measurement

The SAR measurement was taken at a selected spatial reference point to monitor power variations during testing. This fixed location point was measured and used as a reference value.

Step 2: *Area scan*

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 10mm*10mm.Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: *Zoom scan*

Around this point, a volume of 30mm*30mm*30mm (fine resolution volume scan, zoom scan) was assessed by measuring 7*7*7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the centre of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. refer to the probe specification) The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points (10*10*10) were interpolated to calculate the average. All neighbouring volumes were evaluated until no neighbouring volume with a higher average value was found.

Step 4: Power reference measurement (drift)

The SAR value at the same location as in step 1 was again measured. (If the value changed by more than 5%, the evaluation should be done repeatedly)

8.2.2 Data Storage

The DASY4 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE3". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated. The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [m W/g], [m W/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

8.2.3 Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	Dcp_i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	ε
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY4 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

With V_i = compensated signal of channel i (i = x, y, z)

U_i = input signal of channel i (i = x, y, z)

Cf = crest factor of exciting field (DASY parameter)

Dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: $$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

H-field probes: $$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$$

With V_i = compensated signal of channel i (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel I (i = x, y, z) [mV/(V/m)^2] for E-field Probes

$ConvF$ = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (E_{tot}^2 \cdot \sigma) / (\varepsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

σ= conductivity in [mho/m] or [Siemens/m]

ε= equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with P_{pwe} = equivalent power density of a plane wave in mW/cm^2

E_{tot} = total electric field strength in V/m

H_{tot} = total magnetic field strength in A/m

8.3 Measurement of RF conducted Power

8.3.1 Conducted Power Of GSM900

Average Conducted Power(dBm)				
Channel		975	38	124
GSM(CS)		33.30	33.29	33.20
GPRS(GMSK)	1 TX Slot	33.31	33.28	33.21
	2TX Slots	33.28	33.26	33.29
	3TX Slots	33.24	33.25	33.23
	4TX Slots	33.06	33.10	33.09
EGPRS(GMSK)	1 TX Slot	33.30	33.29	33.20
	2TX Slots	33.26	33.25	33.27
	3TX Slots	33.28	33.26	33.29
	4TX Slots	33.16	33.18	33.20
EGPRS(8PSK)	1TX Slot	28.32	28.28	28.30
	2TX Slots	28.46	28.42	28.45
	3TX Slots	28.54	28.47	28.49
	4TX Slots	28.68	28.57	28.59

Table 9： Conducted Power Of GSM900

8.3.1 Conducted Power Of GSM1800

Average Conducted Power(dBm)				
Channel		512	698	885
GSM(CS)		29.05	29.63	29.62
GPRS(GMSK)	1 TX Slot	29.05	29.63	29.62
	2 TX Slots	29.09	29.58	29.64
	3 TX Slots	29.12	29.45	29.57
	4 TX Slots	29.15	29.58	29.63
EGPRS(GMSK)	1 TX Slot	29.53	29.57	29.53
	2 TX Slots	29.42	29.43	29.54
	3 TX Slots	29.23	29.25	29.29
	4 TX Slots	29.24	29.28	29.32
EGPRS(8PSK)	1 TX Slot	29.10	29.11	29.42
	2 TX Slots	29.23	29.26	29.32
	3 TX Slots	29.13	29.15	29.20
	4 TX Slots	29.15	29.58	29.63

Table 10： Conducted Power Of GSM1800

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8.3.2 Conducted Power Of WCDMA900

Average Conducted Power(dBm)				
Channel		2712	2788	2863
WCDMA	12.2kbps RMC	24.98	24.94	24.92
	64kbps RMC	24.92	24.87	24.68
	144kbps RMC	24.86	24.87	24.63
	384kbps RMC	24.85	24.89	24.87
HSDPA	Subtest 1	24.66	24.61	24.55
	Subtest 2	24.6	24.54	24.31
	Subtest 3	24.54	24.54	24.26
	Subtest 4	24.53	24.56	24.5
HSUPA	Subtest 1	24.71	24.63	24.59
	Subtest 2	24.65	24.56	24.35
	Subtest 3	24.59	24.56	24.3
	Subtest 4	24.58	24.58	24.54
	Subtest 5	24.71	24.63	24.59

Table 11 : Conducted Power Of WCDMA900

8.3.3 Conducted Power Of WCDMA2100

Average Conducted Power(dBm)				
Channel		9612	9750	9888
WCDMA	12.2kbps RMC	24.17	24.15	24.17
	64kbps RMC	24.62	24.58	24.64
	144kbps RMC	24.58	24.53	24.59
	384kbps RMC	24.62	24.68	24.35
HSDPA	Subtest 1	23.91	23.88	23.87
	Subtest 2	24.36	24.31	24.34
	Subtest 3	24.32	24.26	24.29
	Subtest 4	24.36	24.41	24.05
HSUPA	Subtest 1	23.90	23.84	23.84
	Subtest 2	24.35	24.27	24.31
	Subtest 3	24.31	24.22	24.26
	Subtest 4	24.35	24.37	24.02
	Subtest 5	23.90	23.84	23.84

Table 12 : Conducted Power Of WCDMA2100

8.3.1 Conducted Power Of WIFI

Average Conducted Power(dBm)			
Channel	1CH	7CH	13CH
802.11b	13.50	13.70	13.80
802.11g	11.90	11.80	12.00
802.11n(HT20)	10.80	10.90	10.87
802.11 n(HT40)	9.50	9.45	9.60

Table 13 : Conducted Power Of WIFI

8.3.2 Conducted Power Of BT

Average Conducted Power(dBm)			
Channel	0CH	39CH	78CH
Bluetooth	2.15	2.03	2.32

Table 14 : Conducted Power Of BT

8.4 Measurement of SAR average value

8.4.1 SAR Result Of GSM 900

Test position		Test mode	Test ch./Freq.	SAR (W/kg)		Power drifit (dB)	SAR limit (W/kg)	verdict	Liquid Temp. (℃)
				1-g	10-g				
Body	Front side 15mm	GPRS 4TS	38/897.6	0.050	0.032	-0.123	2.0	PASS	22
	Back side 15mm	GPRS 4TS	38/897.6	0.026	0.018	-0.196	2.0	PASS	22
	Front side 15mm	GPRS 4TS	975/880.2	0.056	0.037	-0.161	2.0	PASS	22
	Front side 15mm	GPRS 4TS	124/914.8	0.069	**0.044**	0.172	2.0	PASS	22
	Front side 15mm	EGPRS 4TS	124/914.8	0.042	0.027	-0.110	2.0	PASS	22
	Front side 15mm with headset	GSM	124/914.8	0.065	0.041	0.110	2.0	PASS	22

Table 15：SAR of GSM 900 for Body

8.4.1 SAR Result Of GSM 1800

Test position		Test mode	Test ch./Freq.	SAR (W/kg)		Power drifit (dB)	SAR limit (W/kg)	verdict	Liquid Temp. (℃)
				1-g	10-g				
Body	Front side 15mm	GPRS 4TS	698/1747.4	0.100	0.058	-0.174	2.0	PASS	22
	Back side 15mm	GPRS 4TS	698/1747.4	0.042	0.025	0.101	2.0	PASS	22
	Front side 15mm	GPRS 4TS	512/1710.2	0.093	0.053	-0.180	2.0	PASS	22
	Front side 15mm	GPRS 4TS	885/1784.8	0.124	**0.071**	-0.125	2.0	PASS	22
	Front side 15mm	EGPRS 4TS	885/1784.8	0.099	0.057	0.175	2.0	PASS	22
	Front side 15mm with headset	GSM	885/1784.8	0.101	0.058	0.012	2.0	PASS	22

Table 16：SAR of GSM 1800 for Body

8.4.2 SAR Result Of WCDMA Band VIII

Test position		Test mode	Test ch./Freq.	SAR (W/kg)		Power drifit (dB)	SAR limit (W/kg)	verdict	Liquid Temp. (℃)
				1-g	10-g				
Body	Front side 15mm	RMC	2788/897.6	0.055	**0.035**	-0.191	2.0	PASS	22
	Back side 15mm	RMC	2788/897.6	0.025	0.017	0.122	2.0	PASS	22
	Front side 15mm	RMC	2712/882.4	0.035	0.023	0.007	2.0	PASS	22
	Front side 15mm	RMC	2863/912.6	0.034	0.022	0.044	2.0	PASS	22
	Front side 15mm with headset	RMC	2788/897.6	0.053	0.031	0.112	2.0	PASS	22

Table 17：SAR of WCDMA Band VIII for Body

8.4.3 SAR Result Of WCDMA Band I

Test position		Test mode	Test ch./Freq.	SAR (W/kg)		Power drifit (dB)	SAR limit (W/kg)	verdict	Liquid Temp. (℃)
				1-g	10-g				
Body	Front side 15mm	RMC	9750/1950	0.136	0.077	-0.094	2.0	PASS	22
	Back side 15mm	RMC	9750/1950	0.073	0.041	0.030	2.0	PASS	22
	Front side 15mm	RMC	9612/1922.4	0.136	**0.078**	-0.083	2.0	PASS	22
	Front side 15mm	RMC	9888/1977.6	0.137	0.077	-0.097	2.0	PASS	22
	Front side 15mm with headset	RMC	9888/1977.6	0.132	0.075	0.021	2.0	PASS	22

Table 18：SAR of WCDMA Band I for Body

8.4.4 SAR Result Of WIFI

Test position		Test mode	Test ch./Freq.	SAR (W/kg)		Power drifit (dB)	SAR limit (W/kg)	verdict	Liquid Temp. (℃)
				1-g	10-g				
Body	Front side 15mm	802.11b	7/2442	0.043	0.022	0.012	2.0	PASS	22
	Back side 15mm	802.11b	7/2442	0.052	0.018	-0.053	2.0	PASS	22
	Back side 15mm	802.11b	1/2412	0.048	0.015	-0.022	2.0	PASS	22
	Back side 15mm	802.11b	13/2472	0.085	**0.043**	-0.013	2.0	PASS	22

Table 19：SAR of WIFI for Body

Note:

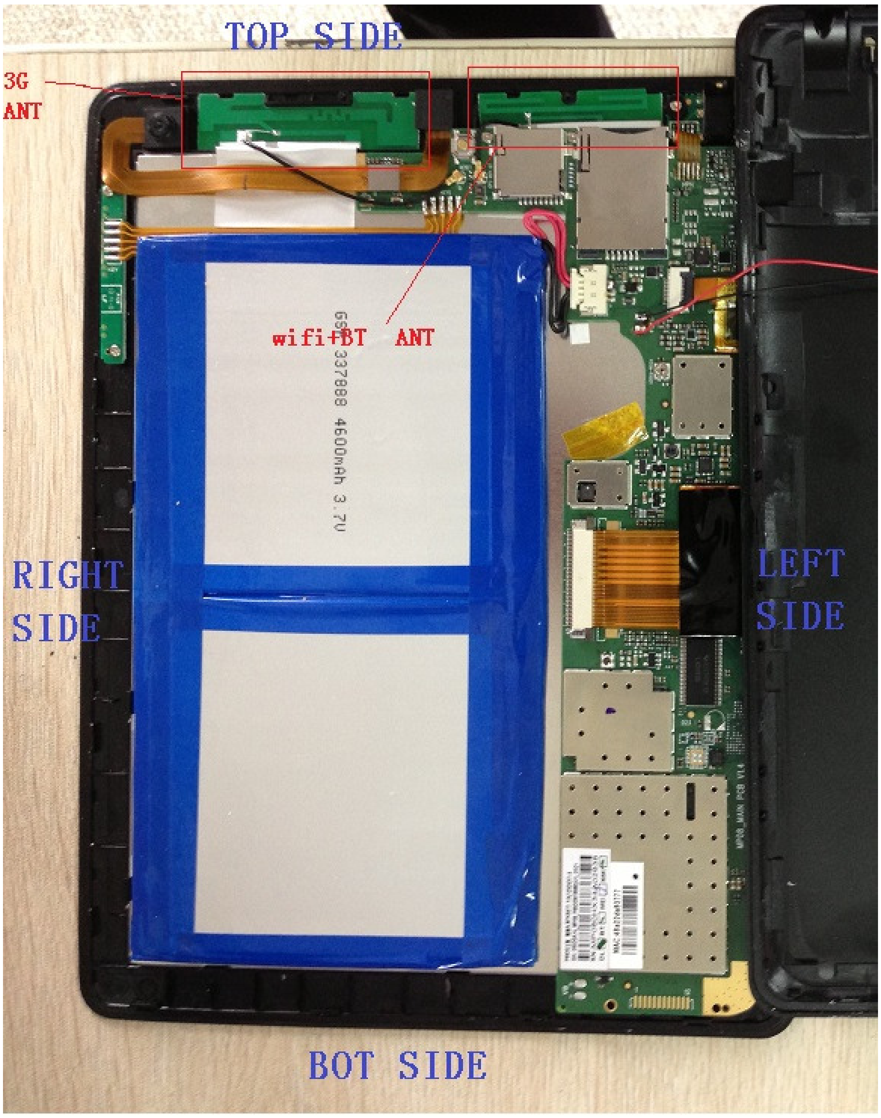
1） Test positions of EUT(the distance between the EUT and the phantom is 0mm for all sides)

2） If the SAR measured at the middle of channel for each test configurations is at least 3dB lower than the SAR limit test at the high and low channel is optional

3） The maximum SAR value is marked in **bold**

8.5 Multiple Transmitter Evaluation

8.5.1 Stand-alone SAR



According to the output power measurement results and the SAR of BT/Wi-Fi and GSM/WCDMA antenna we can draw the conclusion that:

Stand-alone SAR evaluation is required for Wi-Fi, because the Max output power of Wi-Fi unlicensed transmitter is 13.80Bm ≥ 20mW (13dBm).

Stand-alone SAR evaluation is not required for BT, because the Max output power of BT unlicensed transmitter is 2.32dBm<20mW (13dBm).

8.5.2 Simultaneous SAR

Simultaneous Transmission SAR evaluation is not required for GSM/WCDMA & BT, because the sum SAR of them is 0.078＜2.0W/kg.

Simultaneous Transmission SAR evaluation is not required for GSM/WCDMA & WiFi, because the sum SAR of them is 0.100＜2.0W/kg

Simultaneous Transmission SAR evaluation is not required for BT & WiFi, because the sum SAR of them is 0.043＜2.0W/kg

8.6 Detailed Test Results

Date/Time: 2013-5-6 10:44:37

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM900 GPRS 4TS 38CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

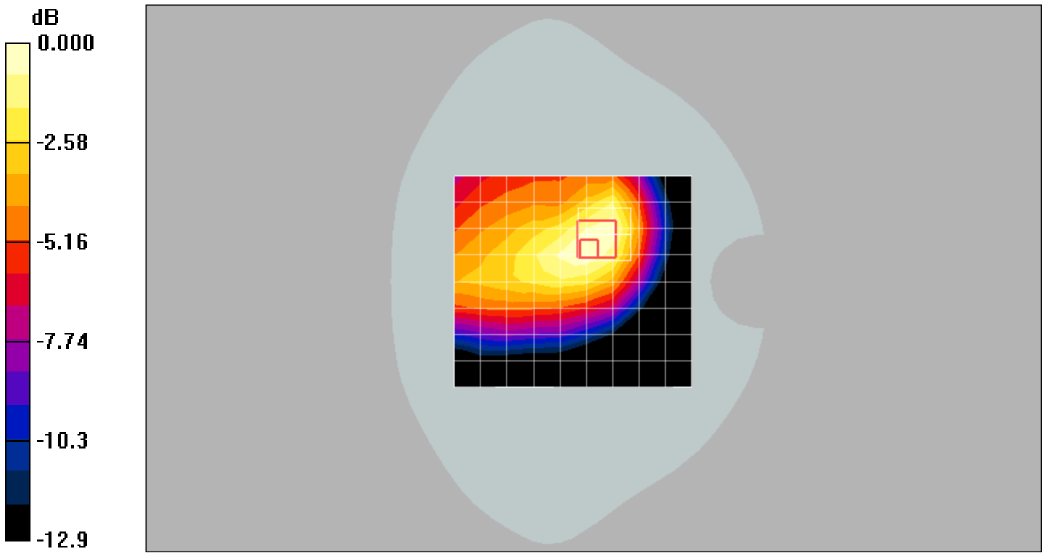
Communication System: EGSM900-GPRS (4TS); Frequency: 897.6 MHz;Duty Cycle: 1:2.075
Medium: HSL900 Medium parameters used: f = 898 MHz; σ = 0.964 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.054 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.09 V/m; Power Drift = -0.123 dB
Peak SAR (extrapolated) = 0.076 W/kg
SAR(1 g) = 0.050 mW/g; SAR(10 g) = 0.032 mW/g
Maximum value of SAR (measured) = 0.056 mW/g



0 dB = 0.056mW/g

Date/Time: 2013-5-6 10:13:42

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM900 GPRS 4TS 38CH Back Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

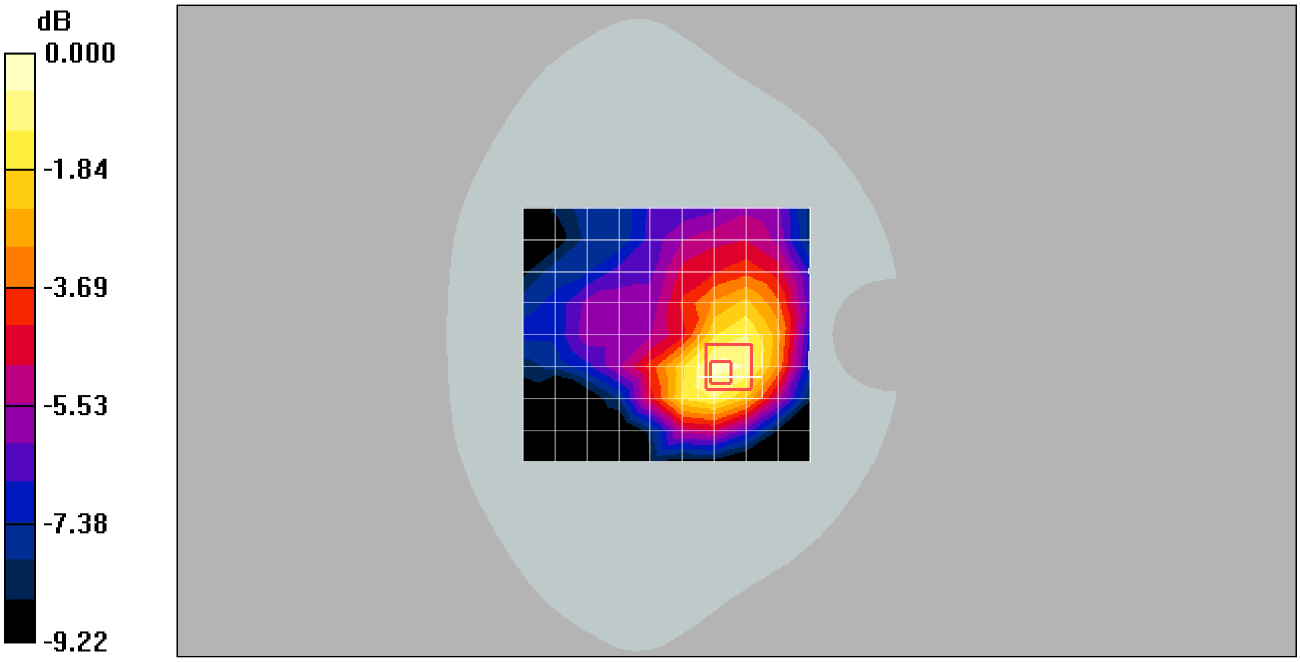
Communication System: EGSM900-GPRS (4TS); Frequency: 897.6 MHz;Duty Cycle: 1:2.075
Medium: HSL900 Medium parameters used: f = 898 MHz; σ = 0.964 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.027 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.07 V/m; Power Drift = -0.196 dB
Peak SAR (extrapolated) = 0.039 W/kg
SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.018 mW/g
Maximum value of SAR (measured) = 0.029 mW/g



0 dB = 0.029mW/g

Date/Time: 2013-5-6 11:06:33

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM900 GPRS 4TS 975CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

Communication System: EGSM900-GPRS (4TS); Frequency: 880.2 MHz;Duty Cycle: 1:2.075
Medium: HSL900 Medium parameters used (interpolated): f = 880.2 MHz; σ = 0.957 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

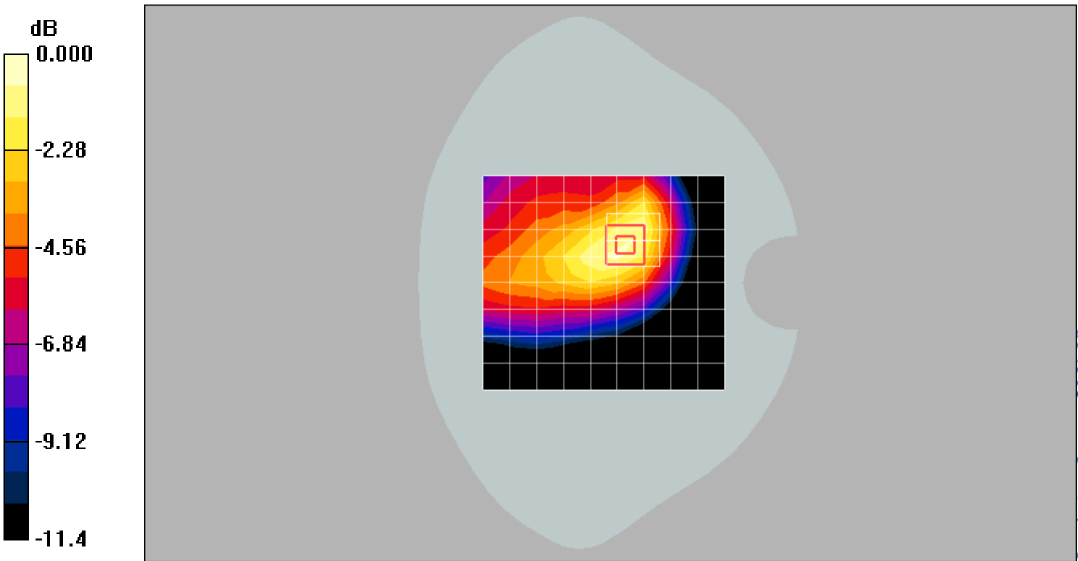
- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.053 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.92 V/m; Power Drift = -0.161 dB
Peak SAR (extrapolated) = 0.084 W/kg
SAR(1 g) = 0.056 mW/g; SAR(10 g) = 0.037 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.060 mW/g



0 dB = 0.060mW/g

Date/Time: 2013-5-6 11:35:37

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM900 GPRS 4TS 124CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

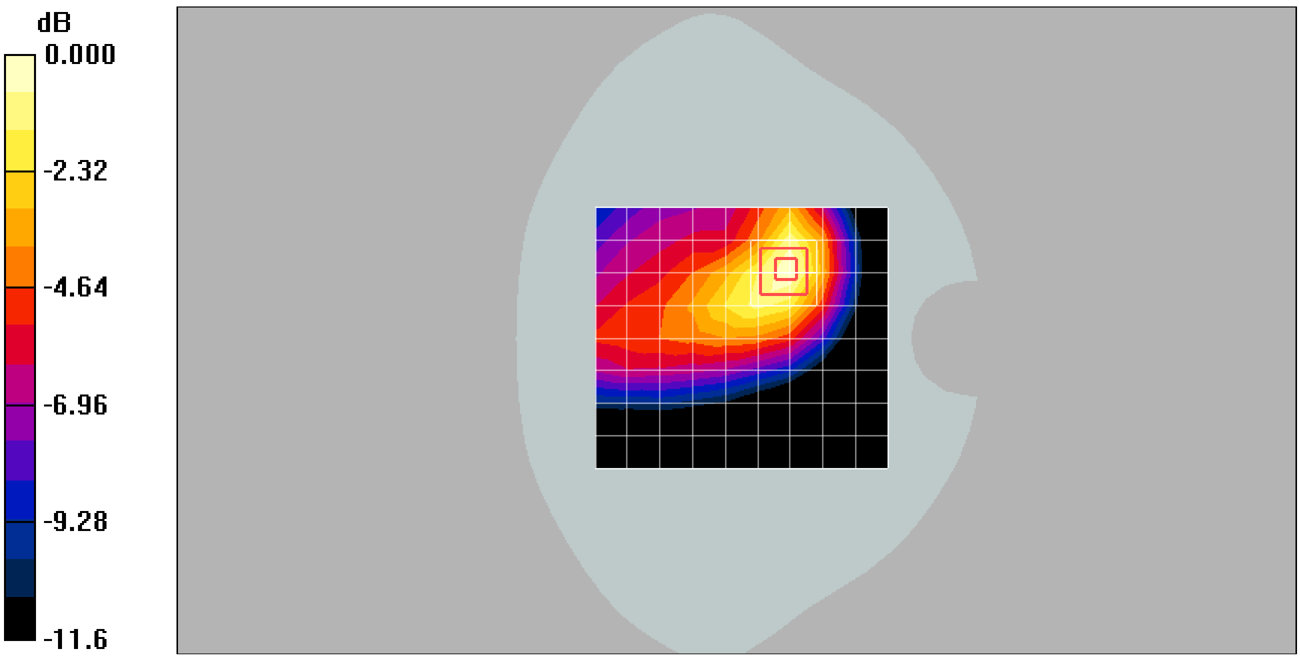
Communication System: EGSM900-GPRS (4TS); Frequency: 914.8 MHz;Duty Cycle: 1:2.075
Medium: HSL900 Medium parameters used: f = 915 MHz; σ = 0.984 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.074 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.64 V/m; Power Drift = 0.172 dB
Peak SAR (extrapolated) = 0.107 W/kg
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.044 mW/g
Maximum value of SAR (measured) = 0.075 mW/g



0 dB = 0.075mW/g

Date/Time: 2013-5-6 12:10:21

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM900 EGPRS 4TS 124CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

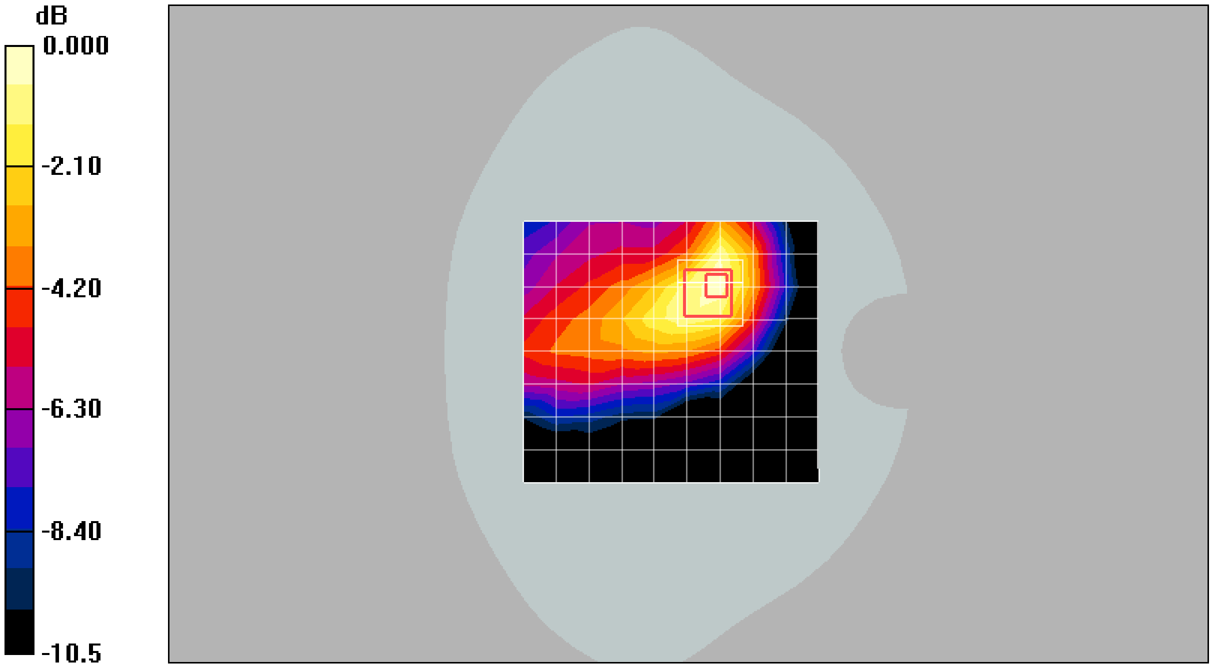
Communication System: EGSM900-EGPRS 4TS Mode; Frequency: 914.8 MHz;Duty Cycle: 1:2.075
Medium: HSL900 Medium parameters used: f = 915 MHz; σ = 0.984 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.043 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.71 V/m; Power Drift = -0.110 dB
Peak SAR (extrapolated) = 0.067 W/kg
SAR(1 g) = 0.042 mW/g; SAR(10 g) = 0.027 mW/g
Maximum value of SAR (measured) = 0.045 mW/g



0 dB = 0.045mW/g

Date/Time: 2013-5-6 12:50:37

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM900 124CH Front Side 15mm with Headset

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

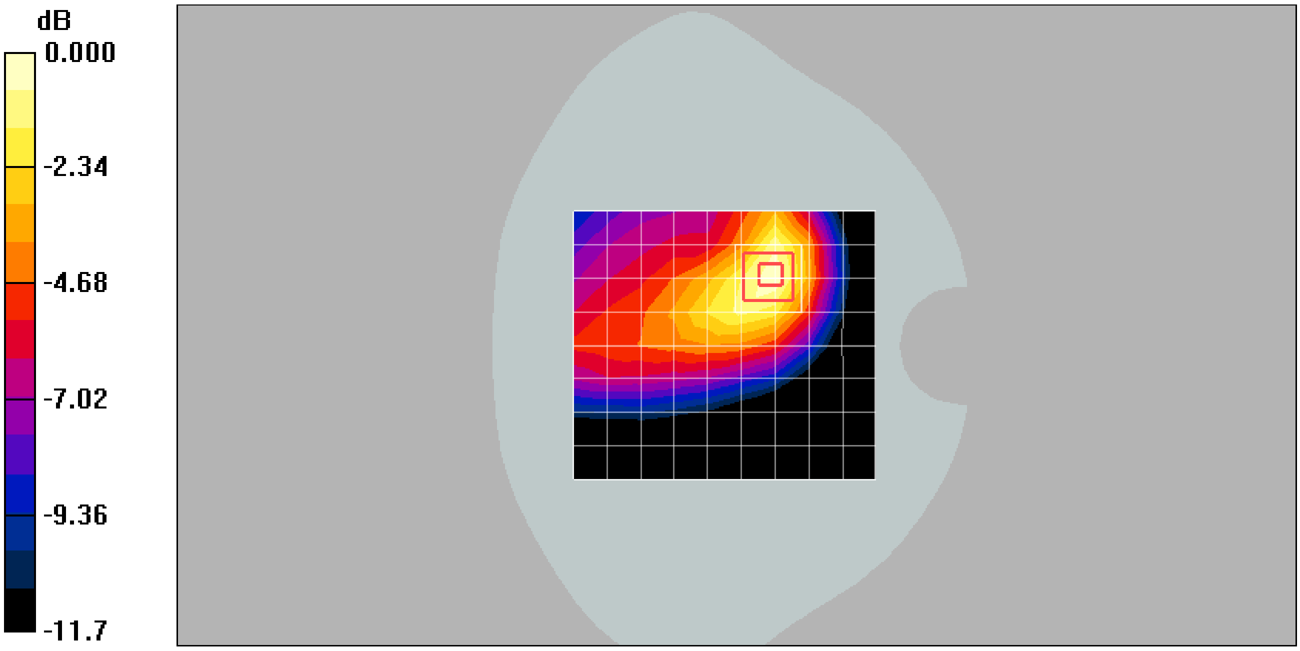
Communication System: EGSM900-GSM Mode; Frequency: 914.8 MHz;Duty Cycle: 1:8.3
Medium: HSL900 Medium parameters used: f = 915 MHz; σ = 0.984 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.075 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.65 V/m; Power Drift = 0.110 dB
Peak SAR (extrapolated) = 0.108 W/kg
SAR(1 g) = 0.065 mW/g; SAR(10 g) = 0.041 mW/g
Maximum value of SAR (measured) = 0.072 mW/g



0 dB = 0.072mW/g

Date/Time: 2013-5-6 16:45:21

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM1800 GPRS 4TS 698CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

Communication System: DCS1800-GPRS Mode (4ts); Frequency: 1747.4 MHz;Duty Cycle: 1:2.075
Medium: HSL1800 Medium parameters used (interpolated): f = 1747.4 MHz; σ = 1.43 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

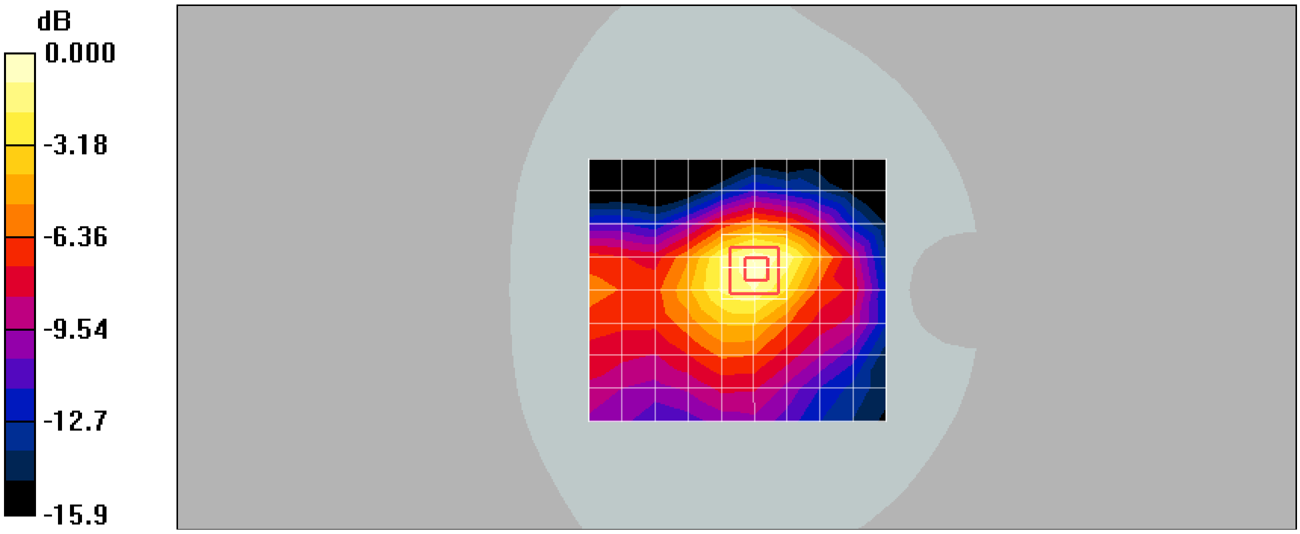
- Probe: ES3DV3 - SN3088; ConvF(5.12, 5.12, 5.12); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.102 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.96 V/m; Power Drift = -0.174 dB
Peak SAR (extrapolated) = 0.163 W/kg
SAR(1 g) = 0.100 mW/g; SAR(10 g) = 0.058 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.110 mW/g



0 dB = 0.110mW/g

Date/Time: 2013-5-6 17:17:21

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM1800 GPRS 4TS 698CH Back Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

Communication System: DCS1800-GPRS Mode (4ts); Frequency: 1747.4 MHz;Duty Cycle: 1:2.075
Medium: HSL1800 Medium parameters used (interpolated): f = 1747.4 MHz; σ = 1.43 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

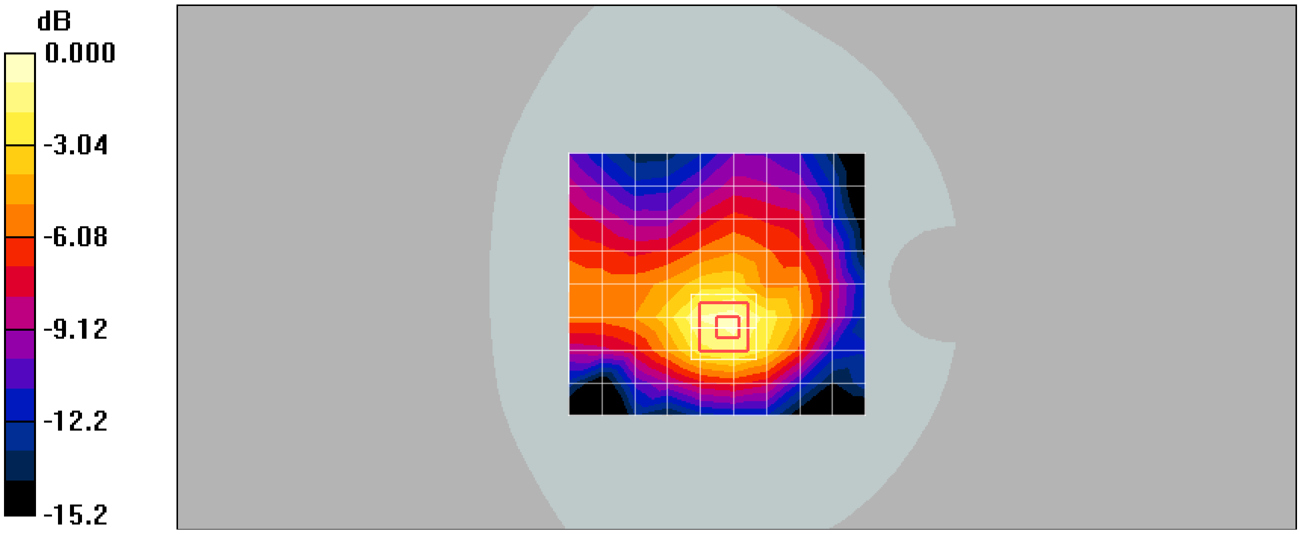
- Probe: ES3DV3 - SN3088; ConvF(5.12, 5.12, 5.12); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.042 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.81 V/m; Power Drift = 0.101 dB
Peak SAR (extrapolated) = 0.067 W/kg
SAR(1 g) = 0.042 mW/g; SAR(10 g) = 0.024 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.046 mW/g



0 dB = 0.046mW/g

Date/Time: 2013-5-6 17:46:18

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM1800 GPRS 4TS 885CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

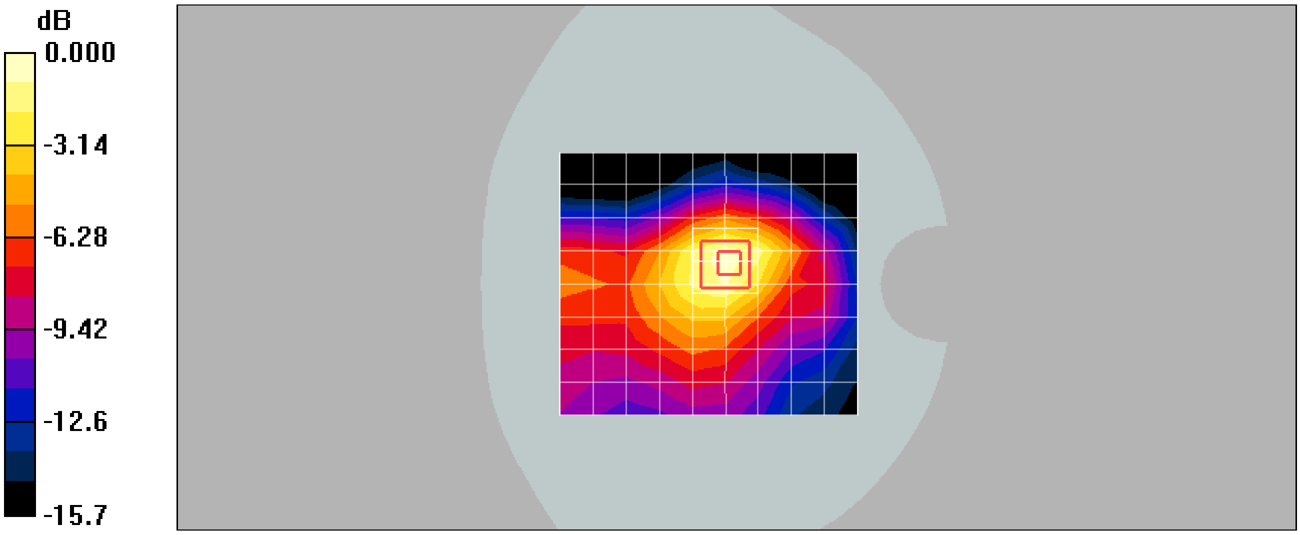
Communication System: DCS1800-GPRS Mode (4ts); Frequency: 1784.8 MHz;Duty Cycle: 1:2.075
Medium: HSL1800 Medium parameters used: f = 1785 MHz; σ = 1.47 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.12, 5.12, 5.12); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.122 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.71 V/m; Power Drift = -0.125 dB
Peak SAR (extrapolated) = 0.209 W/kg
SAR(1 g) = 0.124 mW/g; SAR(10 g) = 0.071 mW/g
Maximum value of SAR (measured) = 0.136 mW/g



0 dB = 0.136mW/g

Date/Time: 2013-5-6 18:18:13

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM1800 GPRS 4TS 512CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

Communication System: DCS1800-GPRS Mode (4ts); Frequency: 1710.2 MHz;Duty Cycle: 1:2.075
Medium: HSL1800 Medium parameters used (interpolated): f = 1710.2 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

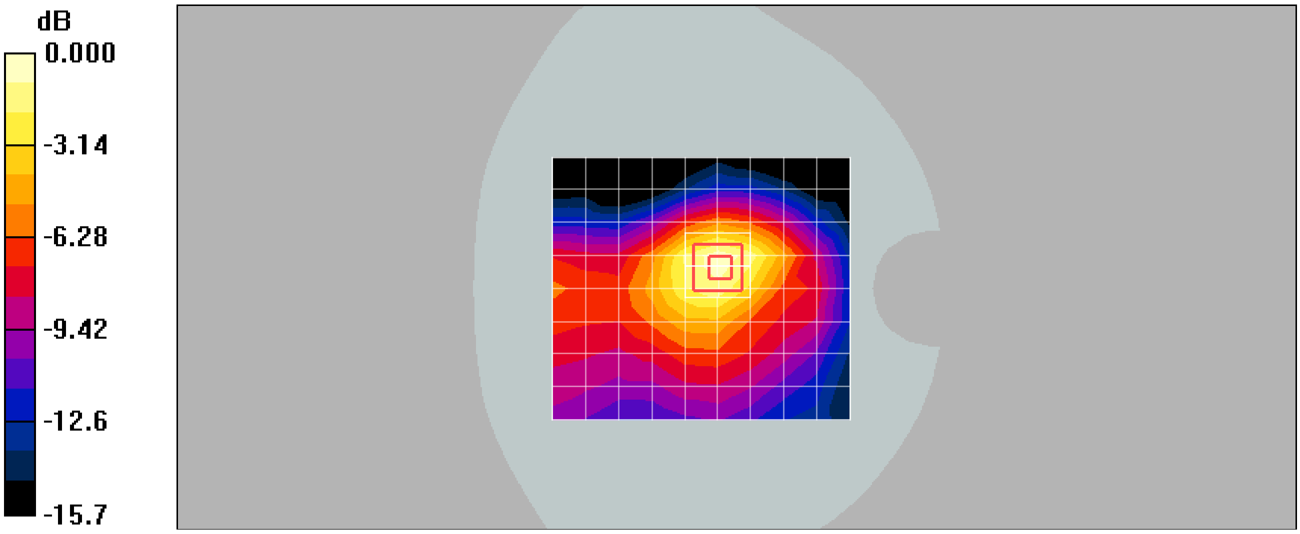
- Probe: ES3DV3 - SN3088; ConvF(5.12, 5.12, 5.12); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.095 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.56 V/m; Power Drift = -0.180 dB
Peak SAR (extrapolated) = 0.152 W/kg
SAR(1 g) = 0.093 mW/g; SAR(10 g) = 0.053 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.102 mW/g



0 dB = 0.102mW/g

Date/Time: 2013-5-6 18:52:18

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM1800 EGPRS 4TS 885CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

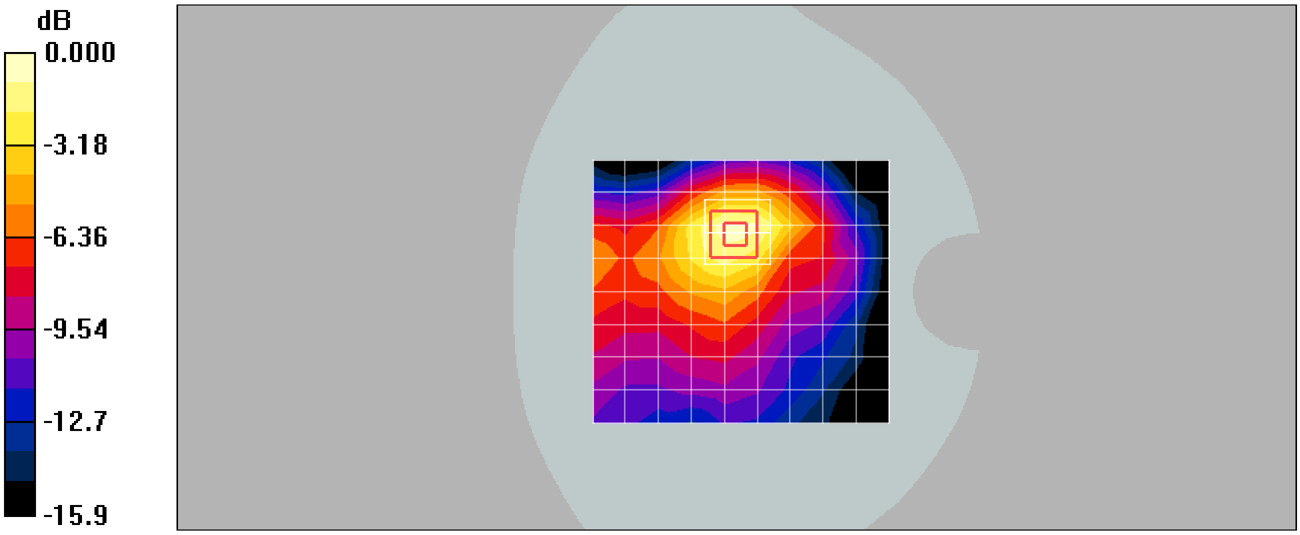
Communication System: DCS1800-EGPRS Mode (4ts); Frequency: 1784.8 MHz;Duty Cycle: 1:2.075
Medium: HSL1800 Medium parameters used: f = 1785 MHz; σ = 1.47 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.12, 5.12, 5.12); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.098 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.79 V/m; Power Drift = 0.175 dB
Peak SAR (extrapolated) = 0.166 W/kg
SAR(1 g) = 0.099 mW/g; SAR(10 g) = 0.057 mW/g
Maximum value of SAR (measured) = 0.110 mW/g



0 dB = 0.110mW/g

Date/Time: 2013-5-6 19:22:18

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO GSM1800 885CH Front Side 15mm with Headset

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

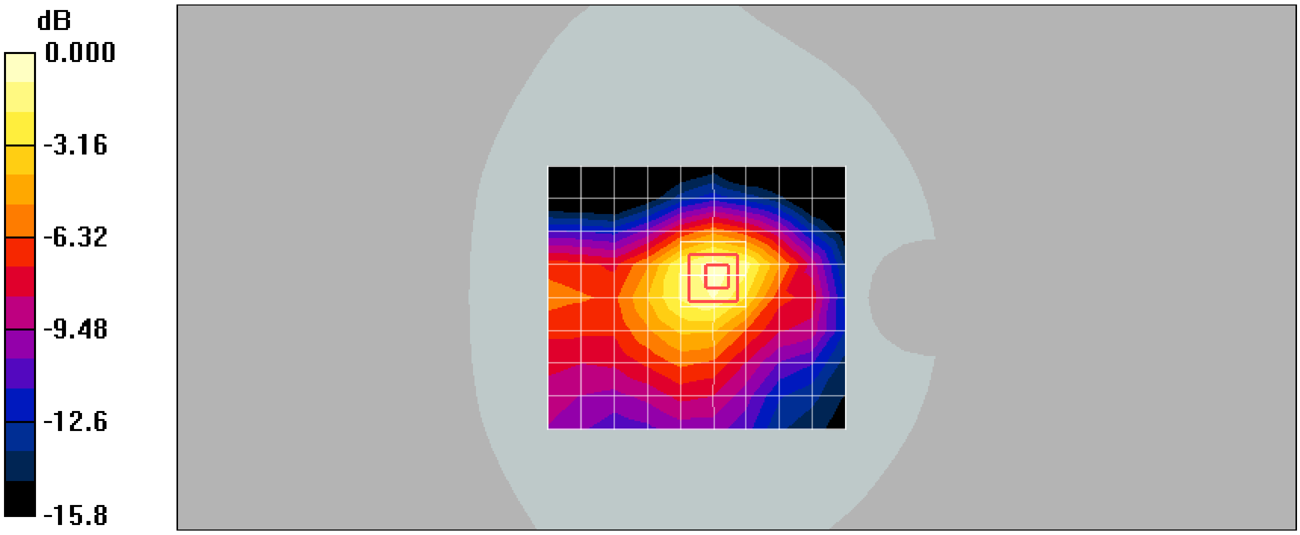
Communication System: DCS1800-GSM Mode; Frequency: 1784.8 MHz;Duty Cycle: 1:8.3
Medium: HSL1800 Medium parameters used: f = 1785 MHz; σ = 1.47 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.12, 5.12, 5.12); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.124 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.76 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 0.215 W/kg
SAR(1 g) = 0.101 mW/g; SAR(10 g) = 0.058 mW/g
Maximum value of SAR (measured) = 0.128 mW/g



0 dB = 0.128mW/g

Date/Time: 2013-5-6 13:55:29

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WCDMA Bank VIII 2788CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

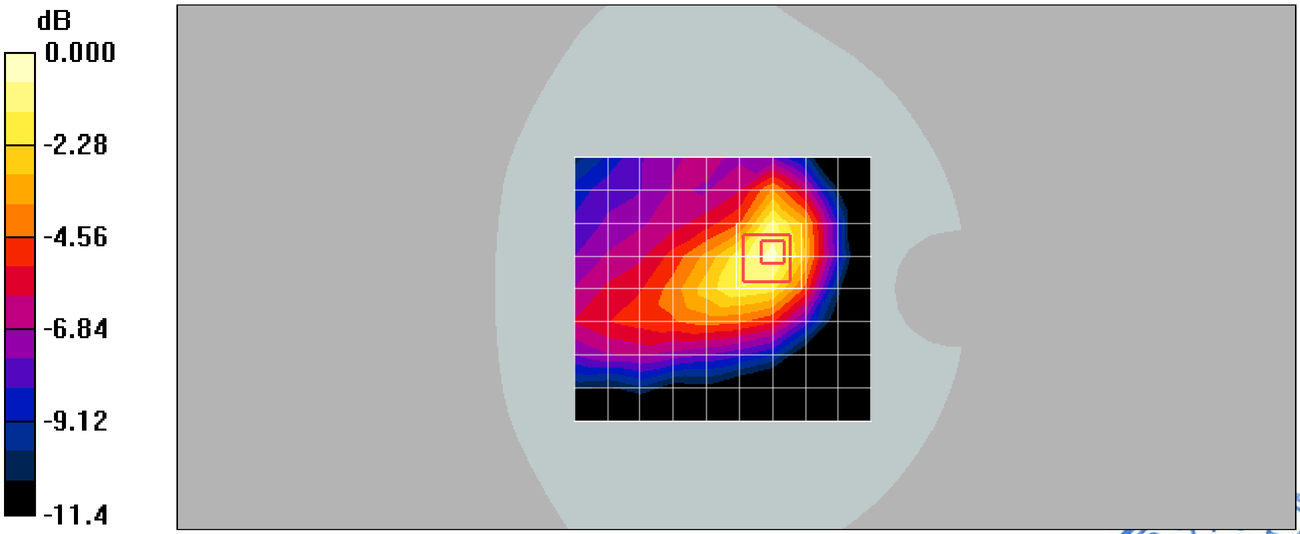
Communication System: WCDMA Band VIII; Frequency: 897.6 MHz;Duty Cycle: 1:1
Medium: HSL900 Medium parameters used: f = 898 MHz; σ = 0.964 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.054 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.10 V/m; Power Drift = -0.191 dB
Peak SAR (extrapolated) = 0.086 W/kg
SAR(1 g) = 0.055 mW/g; SAR(10 g) = 0.035 mW/g
Maximum value of SAR (measured) = 0.060 mW/g



0 dB = 0.060mW/g

Date/Time: 2013-5-6 14:19:35

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WCDMA Bank VIII 2788CH Back Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

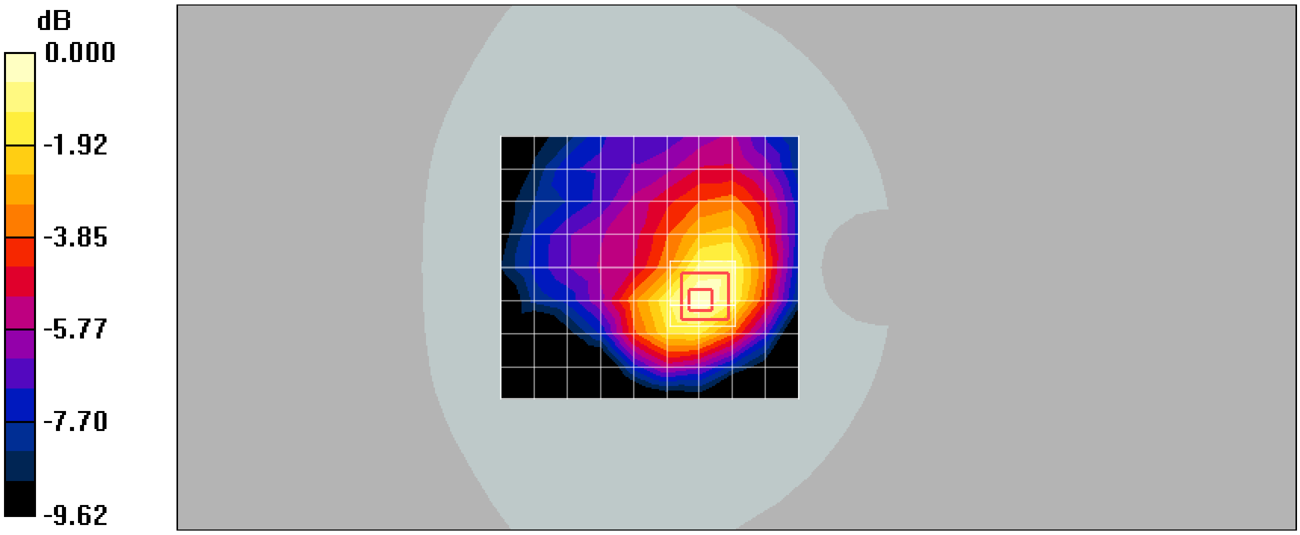
Communication System: WCDMA Band VIII; Frequency: 897.6 MHz;Duty Cycle: 1:1
Medium: HSL900 Medium parameters used: f = 898 MHz; σ = 0.964 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.027 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.10 V/m; Power Drift = 0.122 dB
Peak SAR (extrapolated) = 0.035 W/kg
SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.017 mW/g
Maximum value of SAR (measured) = 0.026 mW/g



0 dB = 0.026mW/g

Date/Time: 2013-5-6 15:11:19

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WCDMA Bank VIII 2863CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

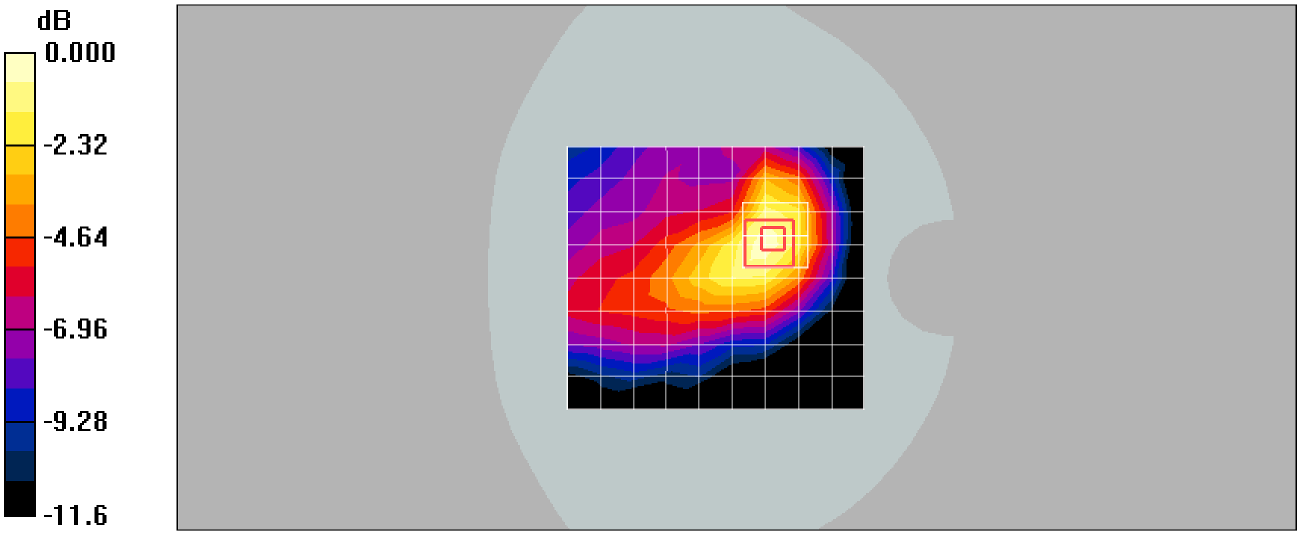
Communication System: WCDMA Band VIII; Frequency: 912.6 MHz;Duty Cycle: 1:1
Medium: HSL900 Medium parameters used: f = 913 MHz; σ = 0.983 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.036 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.12 V/m; Power Drift = 0.044 dB
Peak SAR (extrapolated) = 0.053 W/kg
SAR(1 g) = 0.034 mW/g; SAR(10 g) = 0.022 mW/g
Maximum value of SAR (measured) = 0.037 mW/g



0 dB = 0.037mW/g

Date/Time: 2013-5-6 14:44:08

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WCDMA Bank VIII 2712CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

Communication System: WCDMA Band VIII; Frequency: 882.4 MHz;Duty Cycle: 1:1
Medium: HSL900 Medium parameters used (interpolated): f = 882.4 MHz; σ = 0.948 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

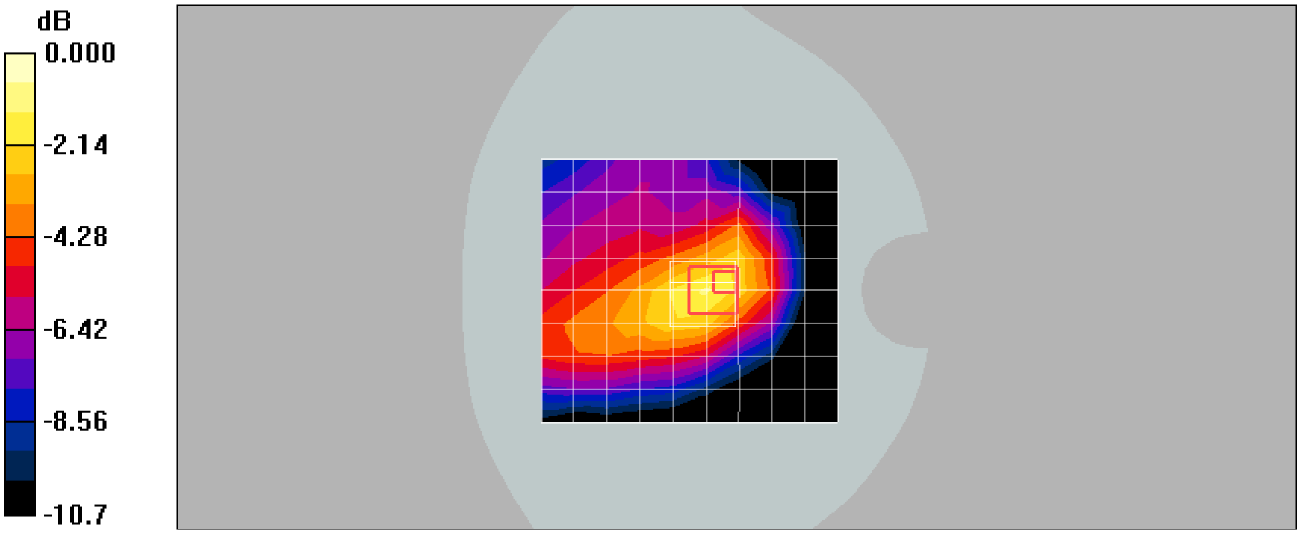
- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.028 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.79 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 0.051 W/kg
SAR(1 g) = 0.035 mW/g; SAR(10 g) = 0.023 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.038 mW/g



0 dB = 0.038mW/g

Date/Time: 2013-5-6 15:42:25

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WCDMA Bank VIII 2788CH Front Side 15mm with Headset

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

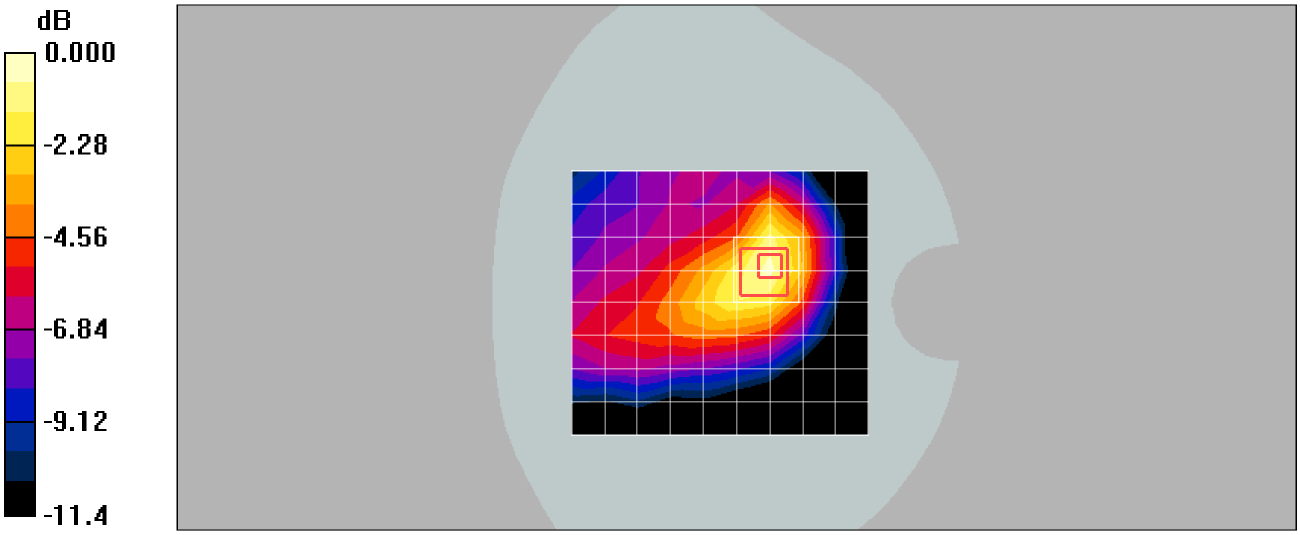
Communication System: WCDMA Band VIII; Frequency: 897.6 MHz;Duty Cycle: 1:1
Medium: HSL900 Medium parameters used: f = 898 MHz; σ = 0.964 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.25, 6.25, 6.25); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.054 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.10 V/m; Power Drift = 0.112dB
Peak SAR (extrapolated) = 0.086 W/kg
SAR(1 g) = 0.053mW/g; SAR(10 g) = 0.031 mW/g
Maximum value of SAR (measured) = 0.058 mW/g



0 dB = 0.058mW/g

Date/Time: 2013-5-7 9:14:35

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WCDMA Band I 9750CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

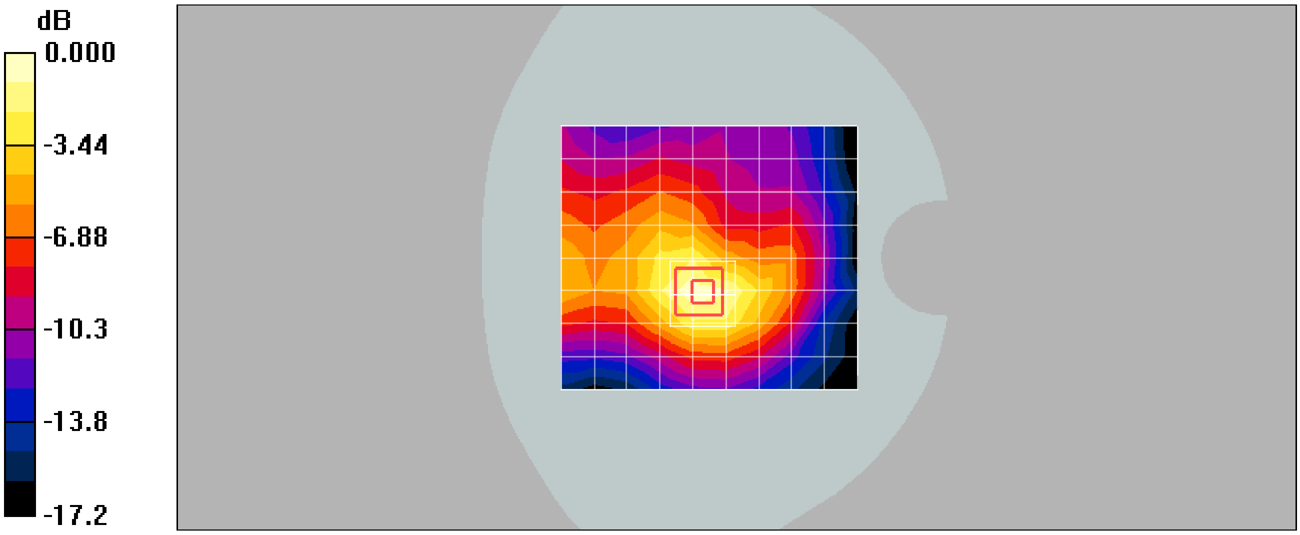
Communication System: WCDMA Band I; Frequency: 1950 MHz;Duty Cycle: 1:1
Medium: HSL2000 Medium parameters used: f = 1950 MHz; σ = 1.35 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.93, 4.93, 4.93); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.078 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.90 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 0.125 W/kg
SAR(1 g) = 0.073 mW/g; SAR(10 g) = 0.041 mW/g
Maximum value of SAR (measured) = 0.080 mW/g



0 dB = 0.080mW/g

Date/Time: 2013-5-7 9:35:25

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WCDMA Band I 9750CH Back Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

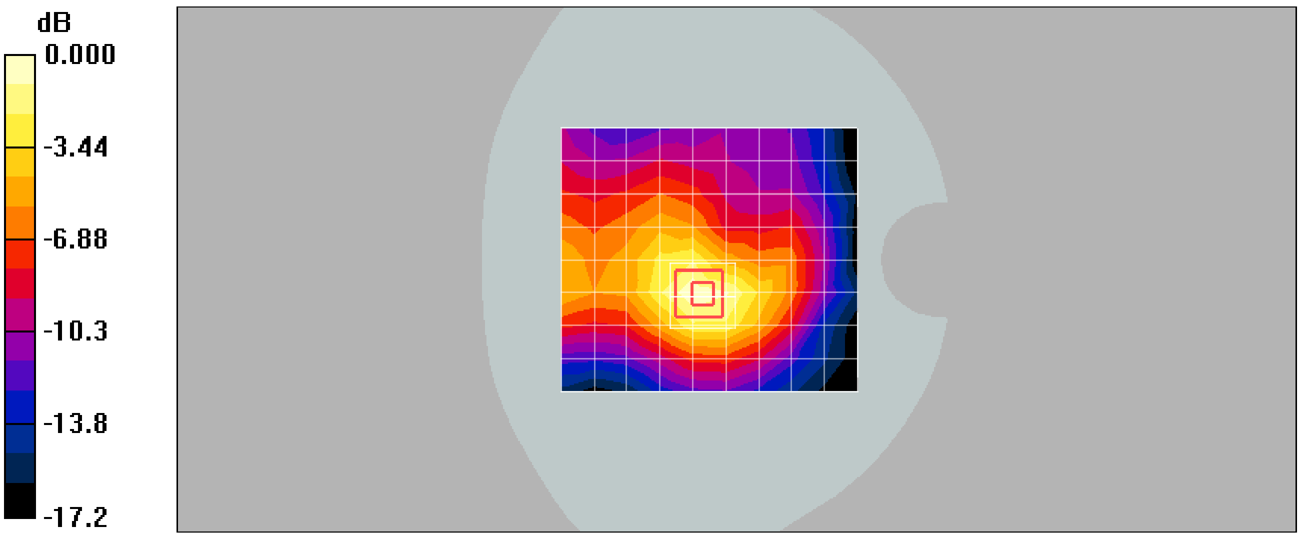
Communication System: WCDMA Band I; Frequency: 1950 MHz;Duty Cycle: 1:1
Medium: HSL2000 Medium parameters used: f = 1950 MHz; σ = 1.35 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.93, 4.93, 4.93); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.078 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.90 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 0.125 W/kg
SAR(1 g) = 0.073 mW/g; SAR(10 g) = 0.041 mW/g
Maximum value of SAR (measured) = 0.080 mW/g



0 dB = 0.080mW/g

Date/Time: 2013-5-7 10:07:15

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WCDMA Band I 9888CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

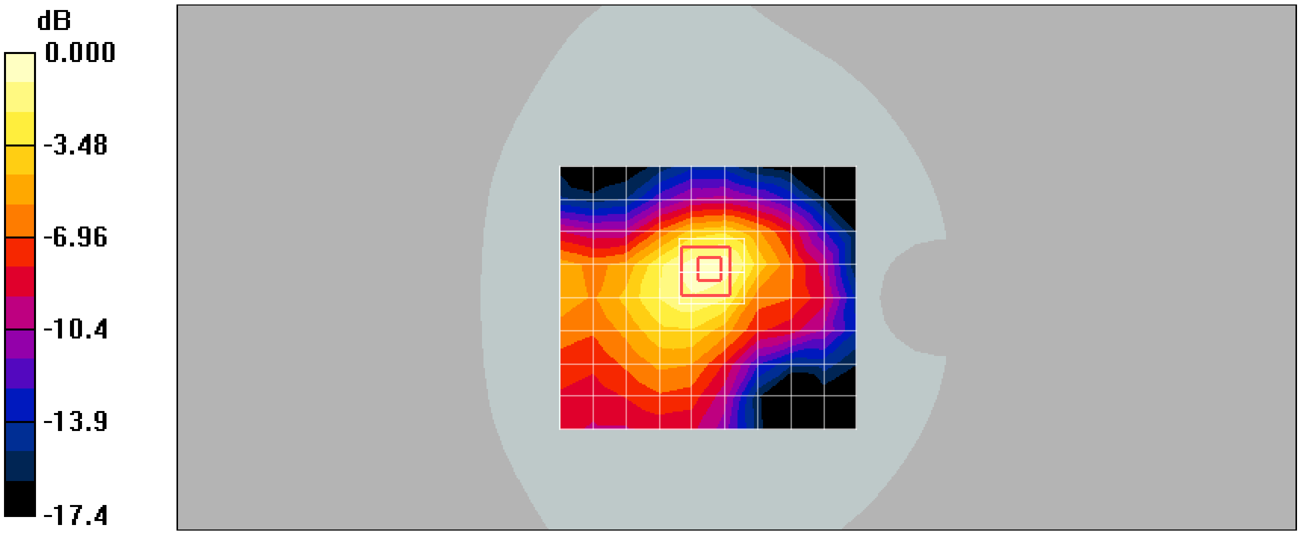
Communication System: WCDMA Band I; Frequency: 1977.6 MHz;Duty Cycle: 1:1
Medium: HSL2000 Medium parameters used: f = 1978 MHz; σ = 1.39 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.93, 4.93, 4.93); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.142 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.87 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 0.243 W/kg
SAR(1 g) = 0.137 mW/g; SAR(10 g) = 0.077 mW/g
Maximum value of SAR (measured) = 0.150 mW/g



0 dB = 0.150mW/g

Date/Time: 2013-5-7 10:38:25

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WCDMA Band I 9612CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

Communication System: WCDMA Band I; Frequency: 1922.4 MHz;Duty Cycle: 1:1
Medium: HSL2000 Medium parameters used (interpolated): f = 1922.4 MHz; σ = 1.32 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

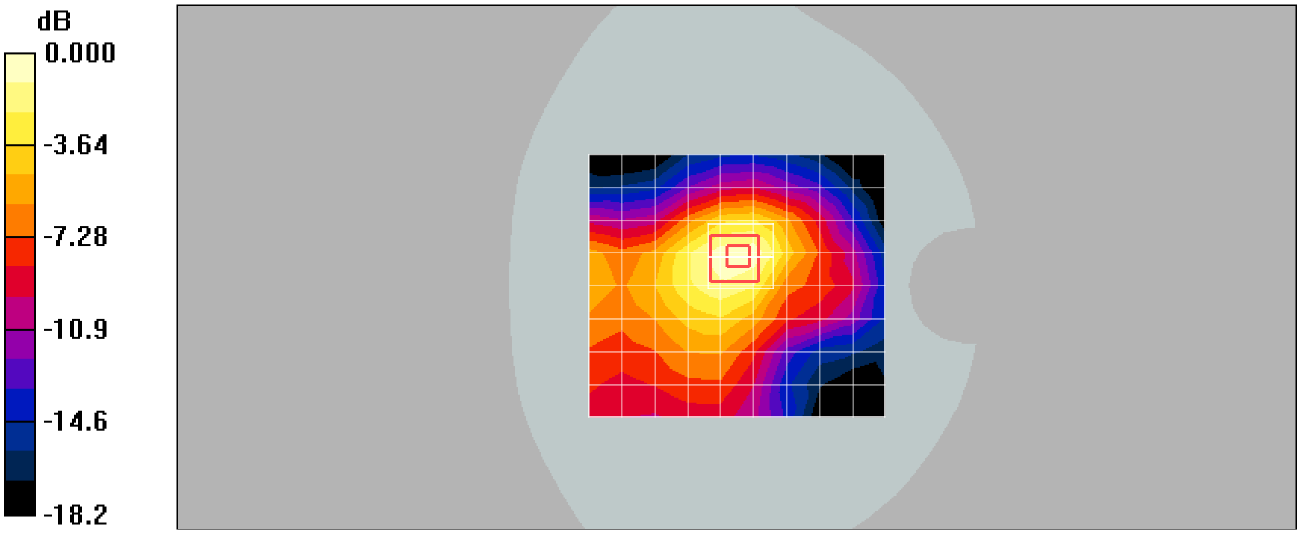
- Probe: ES3DV3 - SN3088; ConvF(4.93, 4.93, 4.93); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.141 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.95 V/m; Power Drift = -0.083 dB
Peak SAR (extrapolated) = 0.236 W/kg
SAR(1 g) = 0.136 mW/g; SAR(10 g) = 0.077 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.149 mW/g



0 dB = 0.149mW/g

Date/Time: 2013-5-7 11:09:35

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WCDMA Band I 9888CH Front Side 15mm with Headset

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

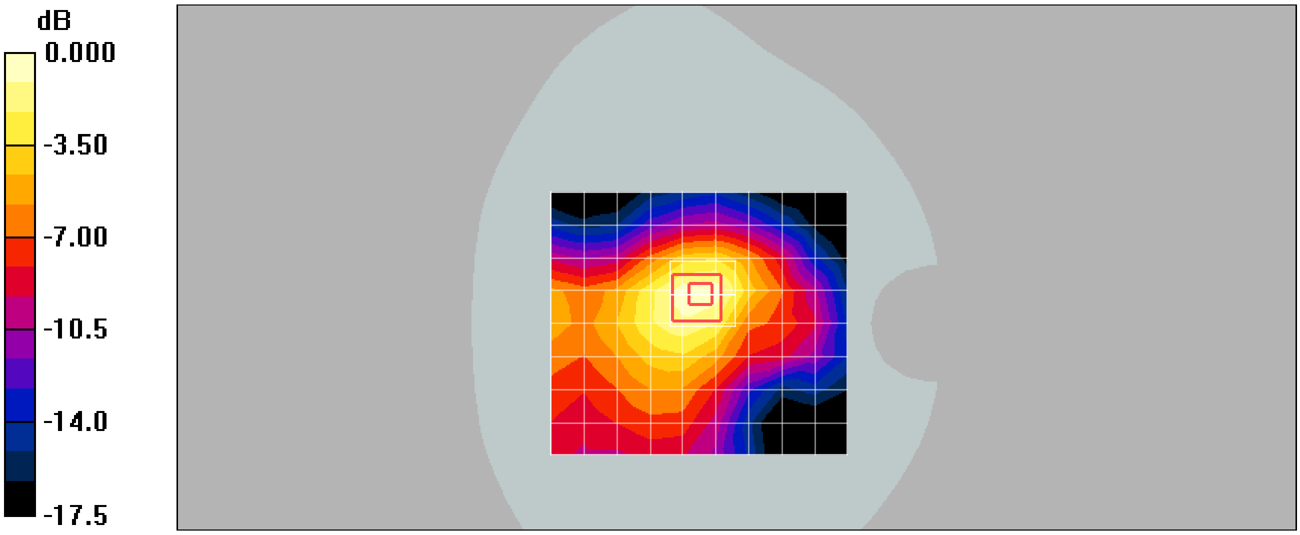
Communication System: WCDMA Band I; Frequency: 1950 MHz;Duty Cycle: 1:1
Medium: HSL2000 Medium parameters used: f = 1950 MHz; σ = 1.35 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.93, 4.93, 4.93); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (10x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.139 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.86 V/m; Power Drift = 0.021 dB
Peak SAR (extrapolated) = 0.240 W/kg
SAR(1 g) = 0.132 mW/g; SAR(10 g) = 0.075 mW/g
Maximum value of SAR (measured) = 0.148 mW/g



0 dB = 0.148mW/g

Date/Time: 2013-5-7 13:08:25

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WIFI 802.11b 7CH Front Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

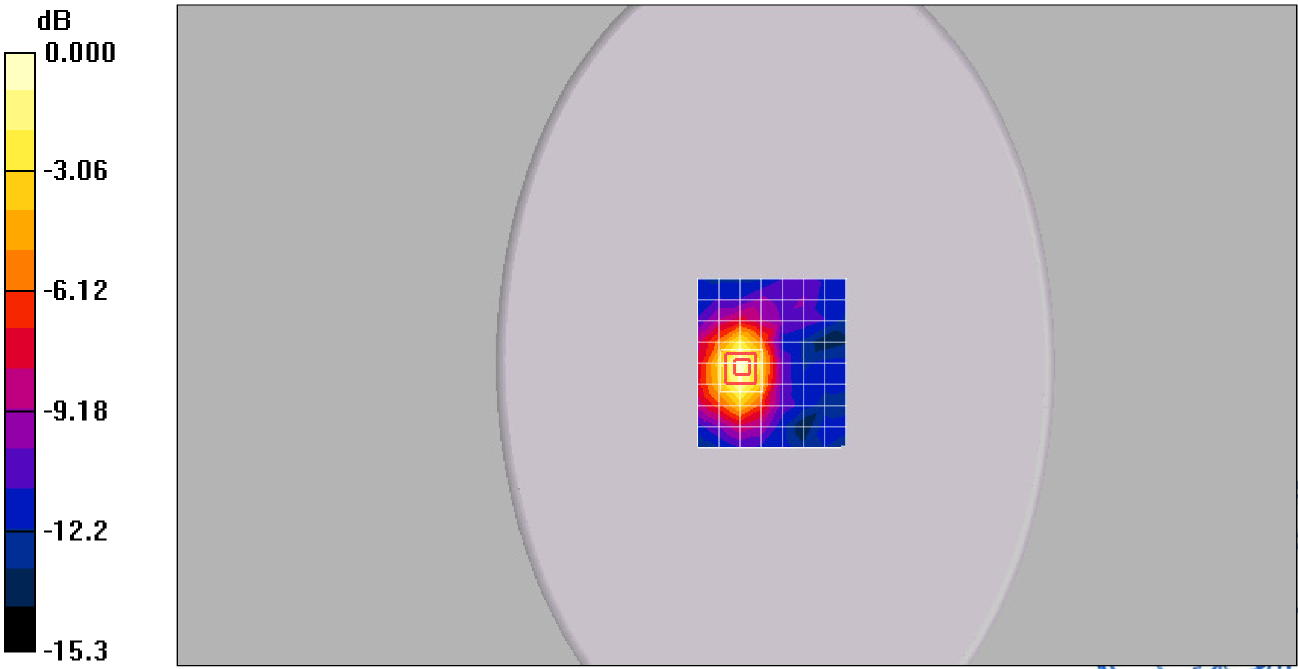
Communication System: 802.11b; Frequency: 2442 MHz;Duty Cycle: 1:1
Medium: HSL2450 Medium parameters used: f = 2442 MHz; σ = 1.82 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- ES3DV3 - SN3088; ConvF(4.24, 4.24, 4.24); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: ELI V5.0; Type: ELI; Serial: 1128
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (8x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.067 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.48 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 0.121 W/kg
SAR(1 g) = 0.043 mW/g; SAR(10 g) = 0.022 mW/g
Maximum value of SAR (measured) = 0.068 mW/g



0 dB = 0.068mW/g

Date/Time: 2013-5-7 13:39:15

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WIFI 802.11b 7CH Back Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

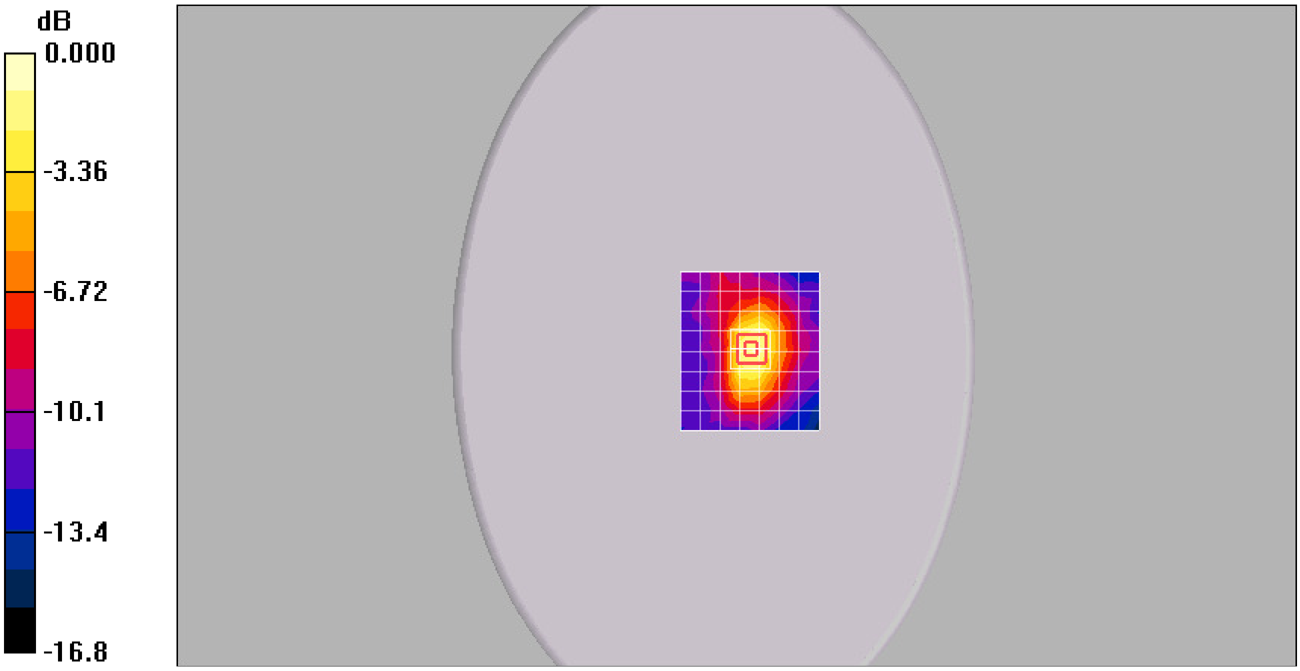
Communication System: 802.11b; Frequency: 2442 MHz;Duty Cycle: 1:1
Medium: HSL2450 Medium parameters used: f = 2442 MHz; σ = 1.82 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- ES3DV3 - SN3088; ConvF(4.24, 4.24, 4.24); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: ELI V5.0; Type: ELI; Serial: 1128
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (8x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.067 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.19 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 0.144 W/kg
SAR(1 g) = 0.052 mW/g; SAR(10 g) = 0.018 mW/g
Maximum value of SAR (measured) = 0.090 mW/g



0 dB = 0.090mW/g

Date/Time: Date/Time: 2013-5-7 14:25:55

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WIFI 802.11b 13CH Back Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

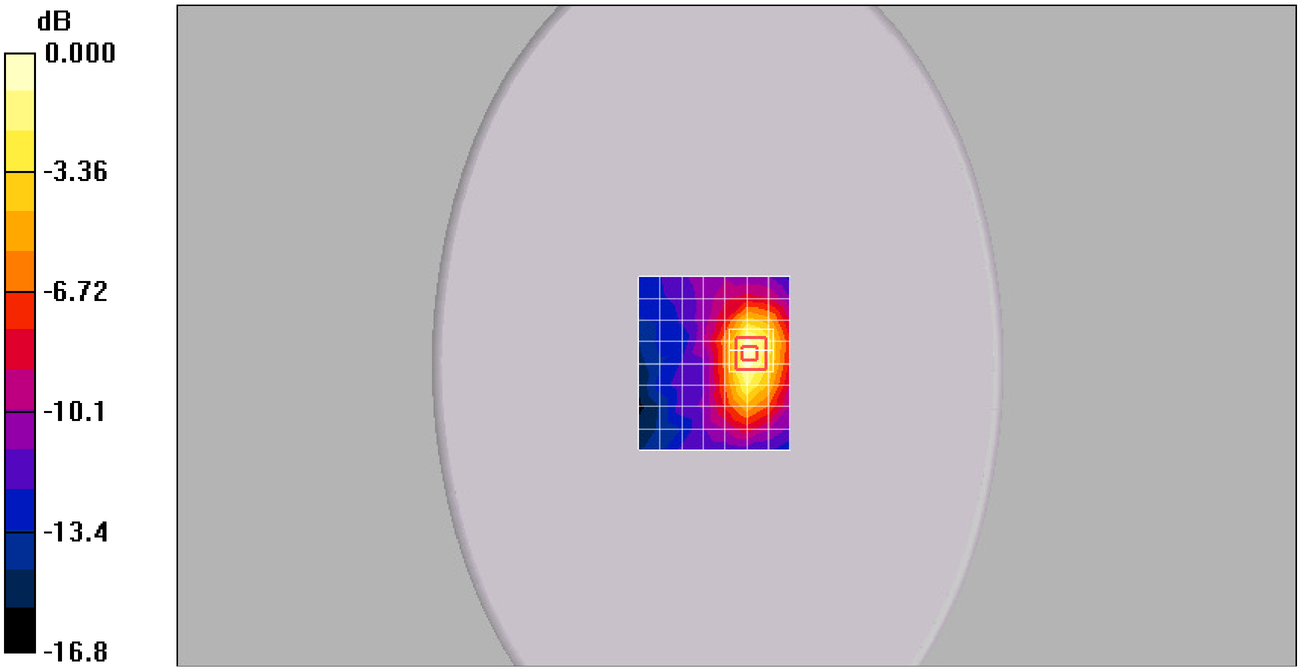
Communication System: 802.11b; Frequency: 2472 MHz;Duty Cycle: 1:1
Medium: HSL2450 Medium parameters used: f = 2472 MHz; σ = 1.85 mho/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- ES3DV3 - SN3088; ConvF(4.24, 4.24, 4.24); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: ELI V5.0; Type: ELI; Serial: 1128
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (8x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.105 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.82 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 0.207 W/kg
SAR(1 g) = 0.085 mW/g; SAR(10 g) = 0.043 mW/g
Maximum value of SAR (measured) = 0.115 mW/g



0 dB = 0.115mW/g

Date/Time: 2013-5-7 14:58:45

Test Laboratory: SGS-SAR Lab

PMP7280C3G_WH_DUO WIFI 802.11b 1CH Back Side 15mm

DUT: PMP7280C3G_WH_DUO; Type: Tablet PC; Serial: NA

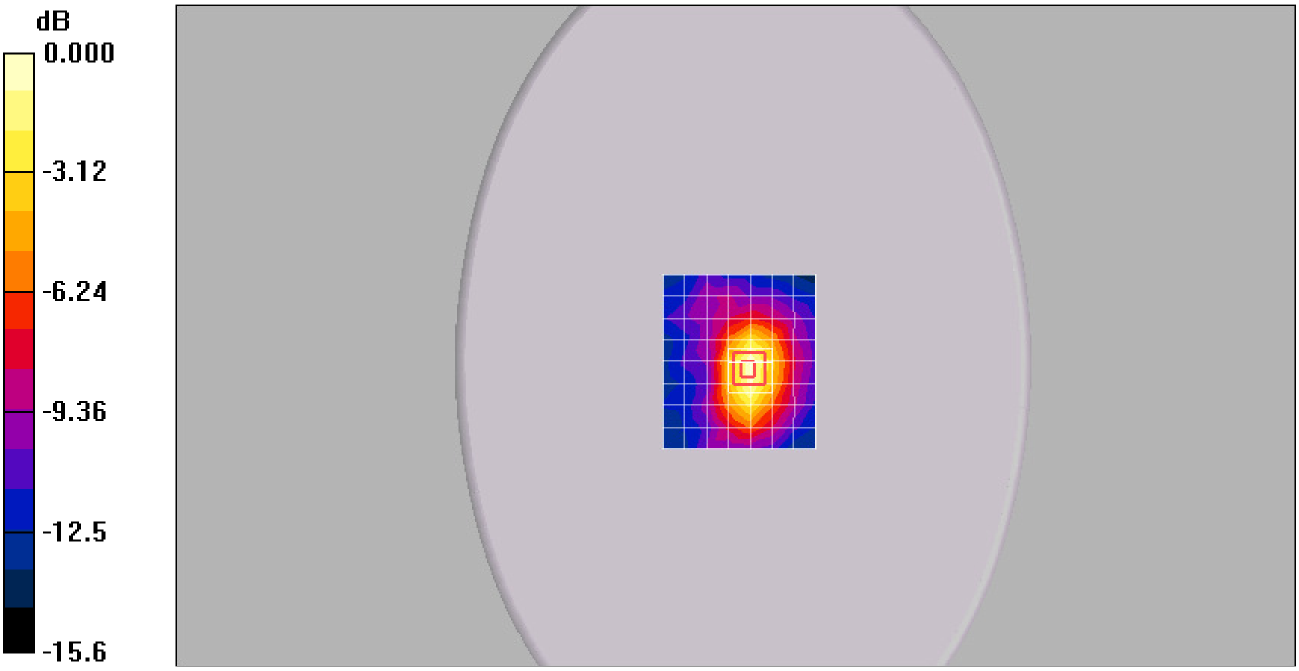
Communication System: 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: HSL2450 Medium parameters used: f = 2412 MHz; σ = 1.81 mho/m; ε_r = 39.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- ES3DV3 - SN3088; ConvF(4.24, 4.24, 4.24); Calibrated: 2012-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2012-11-27
- Phantom: ELI V5.0; Type: ELI; Serial: 1128
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (8x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.080 mW/g

Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.64 V/m; Power Drift = -0.022 dB
Peak SAR (extrapolated) = 0.152 W/kg
SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.015 mW/g
Maximum value of SAR (measured) = 0.087 mW/g



0 dB = 0.087mW/g

9 Photographs

9.1 EUT Test Setup

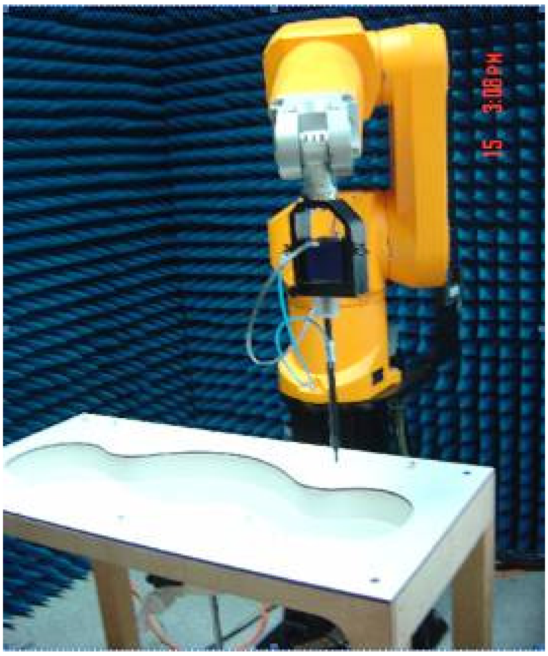


Photo 1: SAR measurement System

9.2 Photographs of EUT

Photo 2: Front View	Photo 3: Back View
	

Photo 4: Accessory	NA
	NA

9.3 Photographs of EUT test position

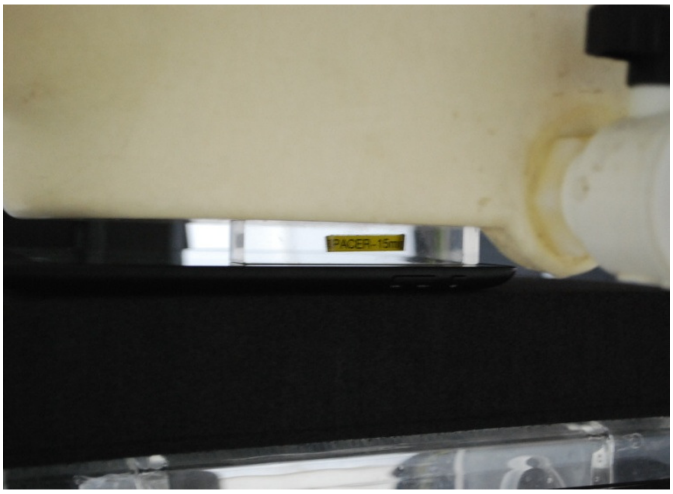
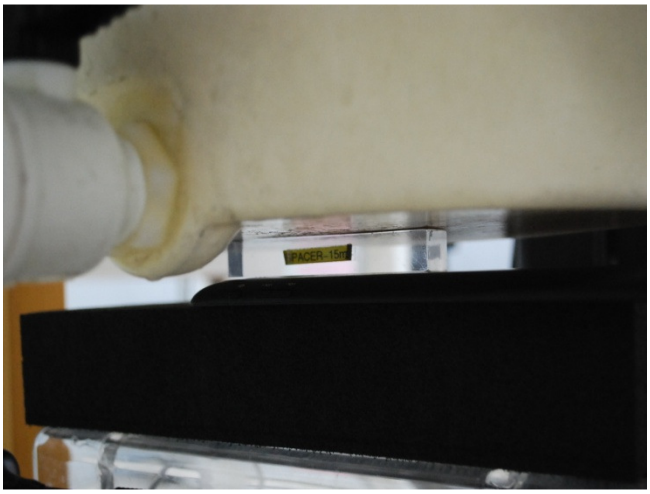
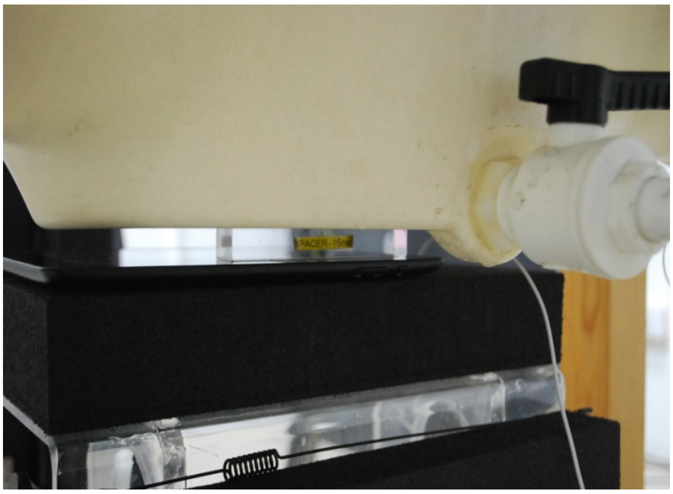
Photo 5: Front side 15mm	Photo 6: Back side 15mm
	

Photo 7: Front side 15mm with Headset	NA
	NA

9.4 Photographs of Tissue Simulate Liquid

Photo 8: Tissue Simulate Liquid for Head 900	**Photo 9: Tissue Simulate Liquid for Head 1800**

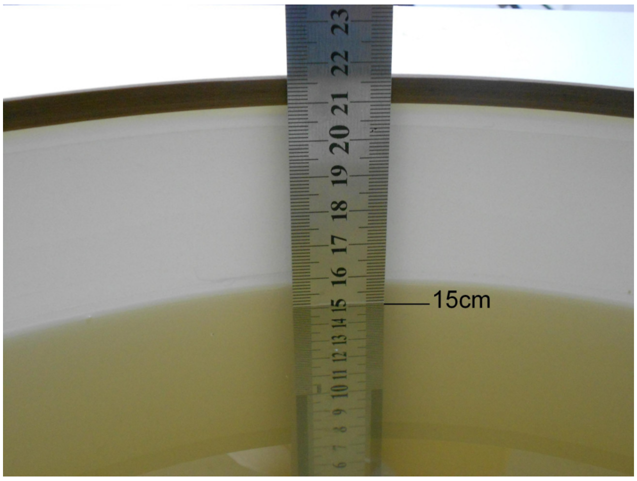
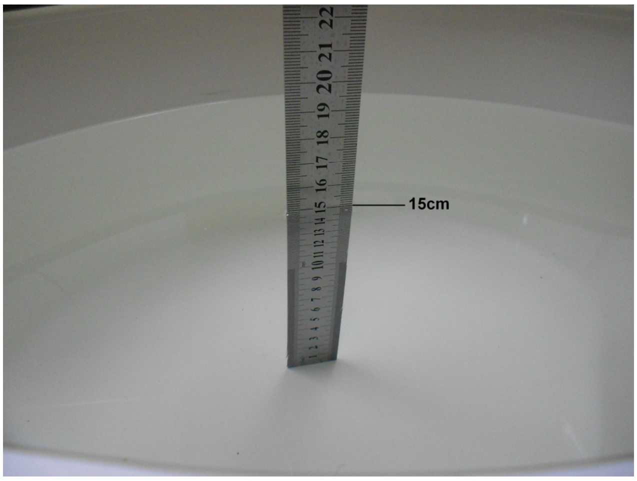
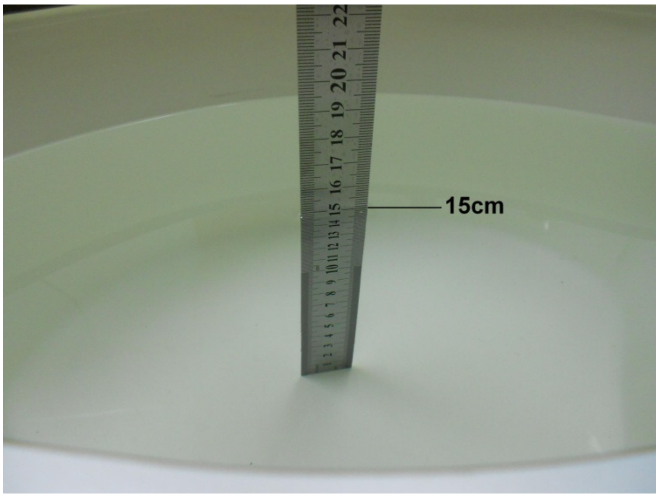
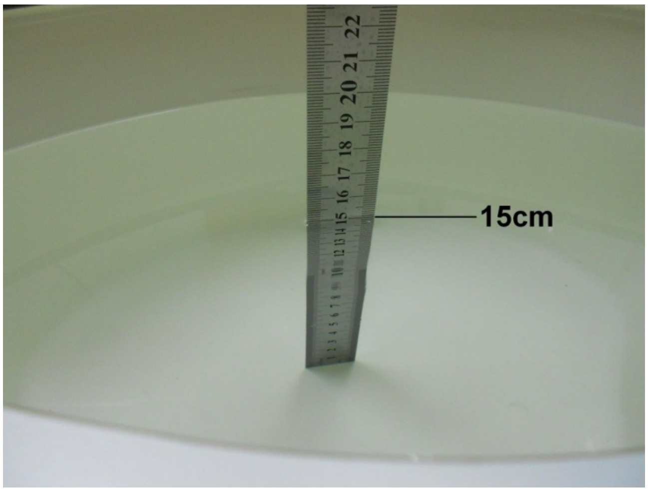
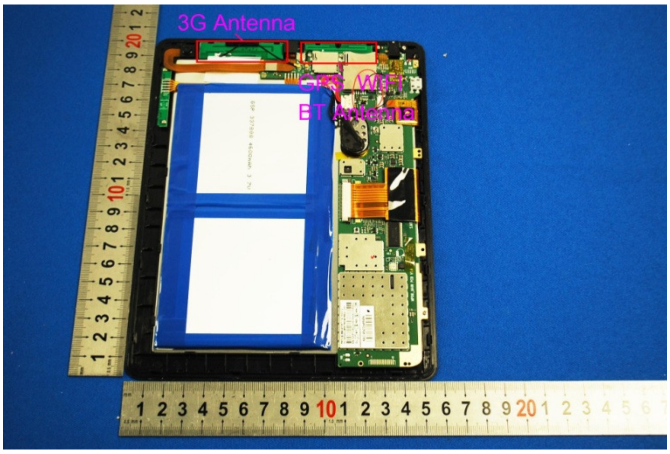

	

Photo 10: Tissue Simulate Liquid for Head 2000	**Photo 11: Tissue Simulate Liquid for Head 2450**
	

9.5 EUT Constructional Details

The EUT external and internal photos	
	

10 Calibration certificate

10.1 Probe Calibration certificate

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

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

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

Accreditation No.: **SCS 108**

Client: SGS-SZ (Auden)

Certificate No: ES3-3088_Nov12/2

CALIBRATION CERTIFICATE (Replacement of No:ES3-3088_Nov12)

Object	ES3DV3 - SN:3088
Calibration procedure(s)	QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes
Calibration date:	November 26, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: December 18, 2012

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

Certificate No: ES3-3088_Nov12/2 Page 1 of 11

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

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

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

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	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, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3088

Manufactured: July 20, 2005
Calibrated: November 26, 2012

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

ES3DV3– SN:3088

November 26, 2012

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3088

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (µV/(V/m)^2)[A]	1.30	1.27	1.20	± 10.1 %
DCP (mV)[B]	97.5	95.4	94.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.0	0.0	1.0	112.5	±3.5 %
			Y	0.0	0.0	1.0	108.8	
			Z	0.0	0.0	1.0	139.7	

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3088

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	6.44	6.44	6.44	0.14	1.10	± 13.4 %
850	41.5	0.92	6.25	6.25	6.25	0.16	2.87	± 12.0 %
1810	40.0	1.40	5.12	5.12	5.12	0.61	1.30	± 12.0 %
1900	40.0	1.40	5.01	5.01	5.01	0.54	1.42	± 12.0 %
2000	40.0	1.40	4.93	4.93	4.93	0.52	1.45	± 12.0 %
2450	39.2	1.80	4.24	4.24	4.24	0.67	1.45	± 12.0 %
2600	39.0	1.96	4.03	4.03	4.03	0.64	1.57	± 12.0 %

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3088

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	6.76	6.76	6.76	0.09	1.10	± 13.4 %
850	55.2	0.99	6.02	6.02	6.02	0.28	1.83	± 12.0 %
1900	53.3	1.52	4.91	4.91	4.91	0.40	1.81	± 12.0 %
2450	52.7	1.95	4.20	4.20	4.20	0.63	1.45	± 12.0 %

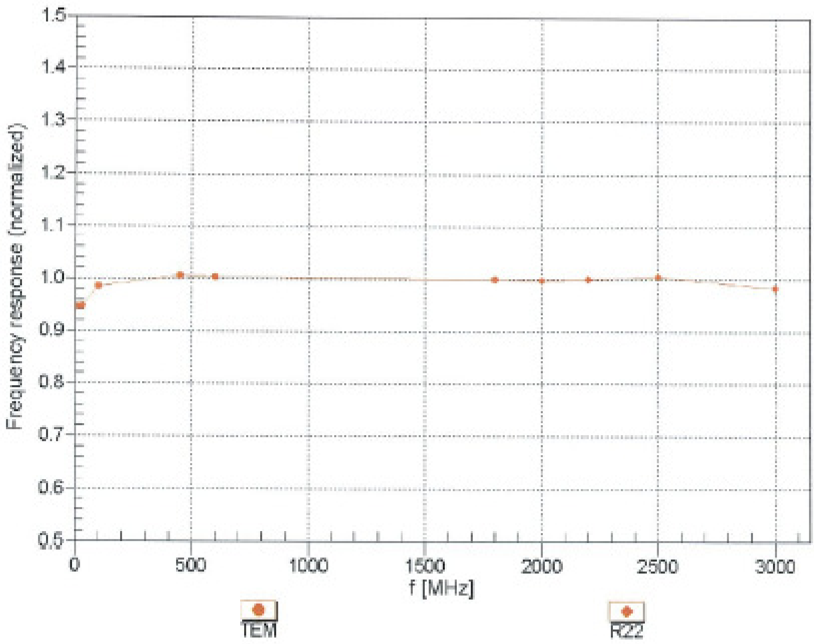
[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of 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.

ES3DV3– SN:3088

November 26, 2012

Frequency Response of E-Field

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

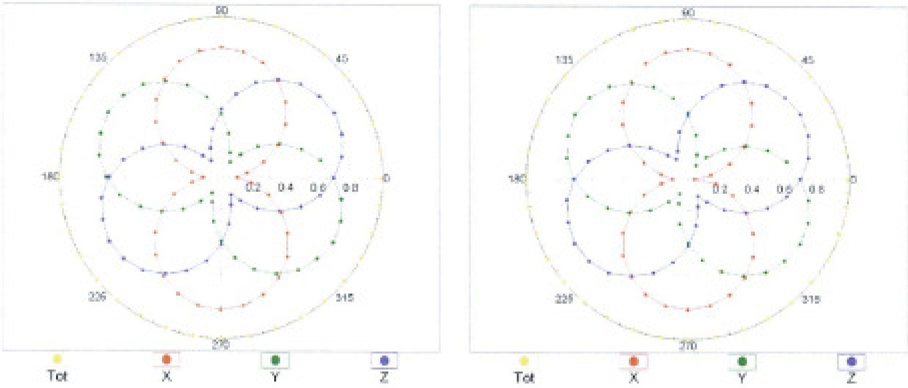


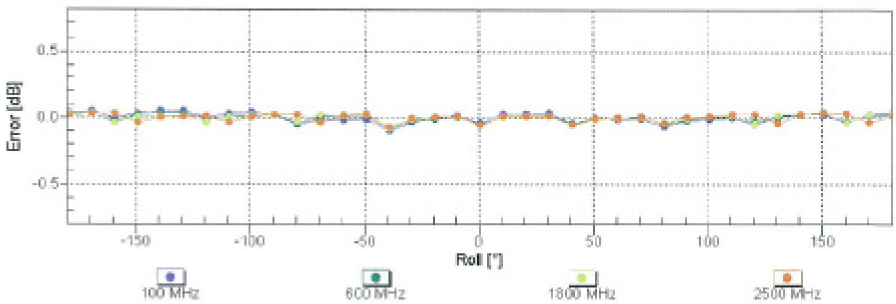
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ES3DV3– SN:3088 November 26, 2012

Receiving Pattern (ϕ), ϑ = 0°

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

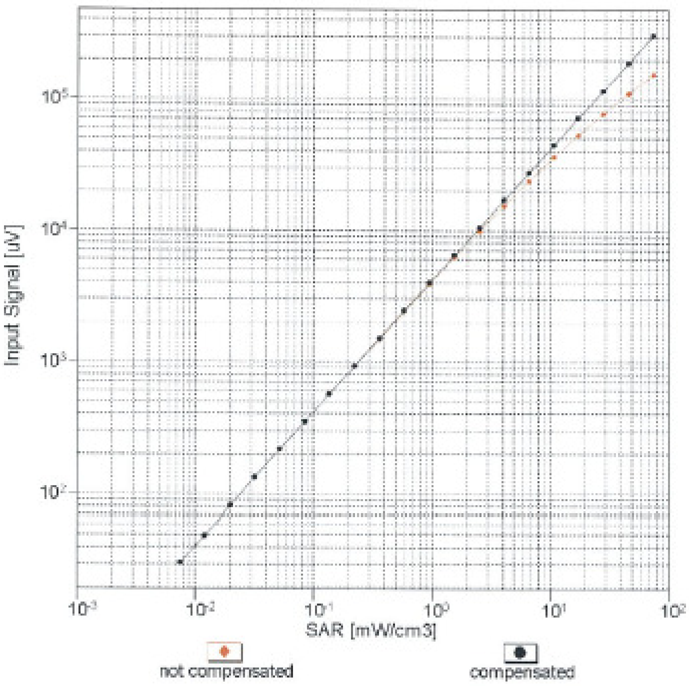


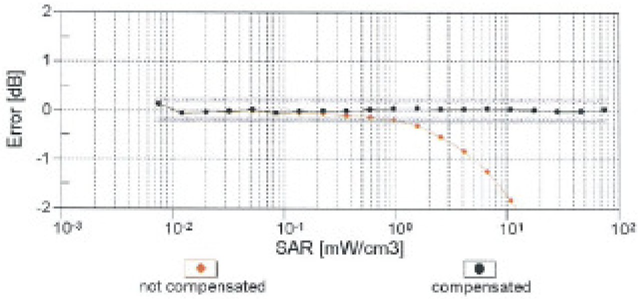


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

(TEM cell , f = 900 MHz)



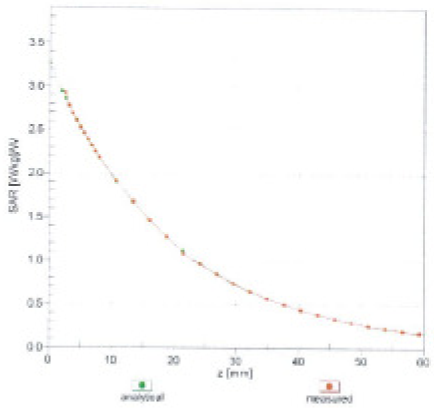


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

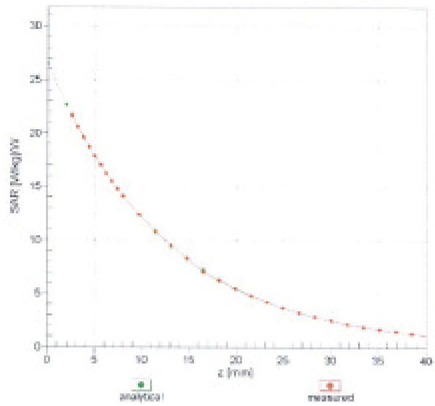
ES3DV3– SN:3088 November 26, 2012

Conversion Factor Assessment

f = 850 MHz,WGLS R9 (H_convF)

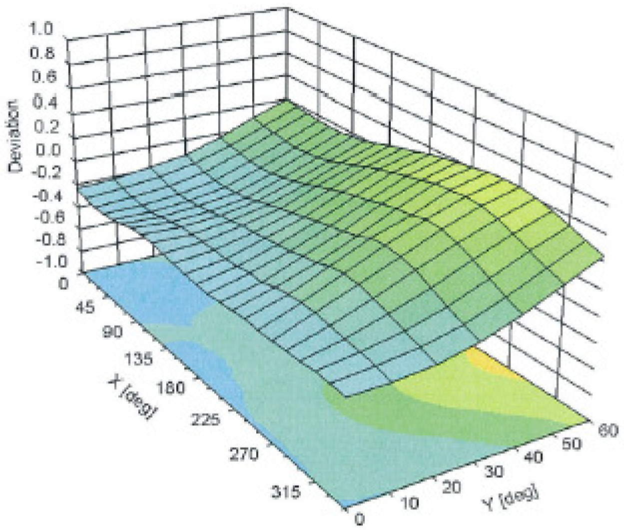


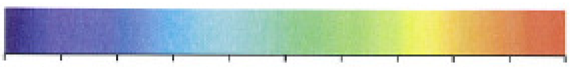
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3088

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-39.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

10.2 DAE Calibration certification

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

IMPORTANT NOTICE

USAGE OF THE DAE 3

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

Battery Exchange: The battery cover of the DAE3 unit is connected to a fragile 3-pin battery connector. Customer is responsible to apply outmost caution not to bend or damage the connector when changing batteries.

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

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

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

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

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

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

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

Schmid & Partner Engineering

TN_BR03091211BD DAE3.doc 11.12.2009

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

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Accreditation No.: **SCS 108**

Client **SGS-SZ (Auden)**

Certificate No: **DAE3-569_Nov12/2**

CALIBRATION CERTIFICATE(Replacement of No: DAE3-569_Nov12)

Object	DAE3 - SD 000 D03 AA - SN: 569
Calibration procedure(s)	QA CAL-06.v25 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	November 27, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	02-Oct-12 (No:12728)	Oct-13
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V2.1	SE UWS 053 AA 1001	05-Jan-12 (in house check)	In house check: Jan-13

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Technician	[signature]
Approved by:	Fin Bomholt	R&D Director	[signature]

Issued: December 18, 2012

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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	402.968 ± 0.1% (k=2)	403.372 ± 0.1% (k=2)	403.548 ± 0.1% (k=2)
Low Range	3.94054 ± 0.7% (k=2)	3.95468 ± 0.7% (k=2)	3.94242 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	263 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199993.76	-1.98	-0.00
Channel X	+ Input	19997.53	-2.30	-0.01
Channel X	- Input	-19999.17	2.28	-0.01
Channel Y	+ Input	199992.48	-3.57	-0.00
Channel Y	+ Input	20001.24	1.40	0.01
Channel Y	- Input	-19999.39	2.08	-0.01
Channel Z	+ Input	199990.99	-4.72	-0.00
Channel Z	+ Input	19999.07	-0.69	-0.00
Channel Z	- Input	-20000.76	0.87	-0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	1999.94	-0.18	-0.01
Channel X	+ Input	201.11	0.49	0.24
Channel X	- Input	-200.76	-1.41	0.71
Channel Y	+ Input	1999.36	-0.88	-0.04
Channel Y	+ Input	200.05	-0.59	-0.29
Channel Y	- Input	-199.85	-0.58	0.29
Channel Z	+ Input	2000.62	0.35	0.02
Channel Z	+ Input	198.90	-1.67	-0.83
Channel Z	- Input	-200.58	-1.29	0.65

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-1.02	-2.35
	- 200	3.10	1.32
Channel Y	200	4.92	4.59
	- 200	-6.46	-6.42
Channel Z	200	-14.23	-14.62
	- 200	12.06	11.62

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.47	-1.64
Channel Y	200	9.66	-	3.82
Channel Z	200	6.38	7.97	-

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	16193	16677
Channel Y	16547	16761
Channel Z	15792	16956

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	0.46	-1.51	2.07	0.68
Channel Y	-0.16	-1.86	1.29	0.63
Channel Z	-1.14	-2.59	0.30	0.57

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

10.3 Dipole Calibration certification

10.3.1 D900V2

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 108**

Client **SGS-SZ (Auden)**

Certificate No: **D900V2-184_Nov12/2**

CALIBRATION CERTIFICATE (Replacement of No:D900V2-184_Nov12)

Object	D900V2 - SN: 184
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	November 26, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

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

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

Issued: December 18, 2012

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Certificate No: D900V2-184_Nov12/2 Page 1 of 6

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.3
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.97 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.9 ± 6 %	0.94 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.60 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**10.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.67 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.81 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8 Ω - 6.2 jΩ
Return Loss	- 24.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.409 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 01, 2003

DASY5 Validation Report for Head TSL

Date: 26.11.2012

Test Laboratory: SPEAG, Zurich, Switzerland

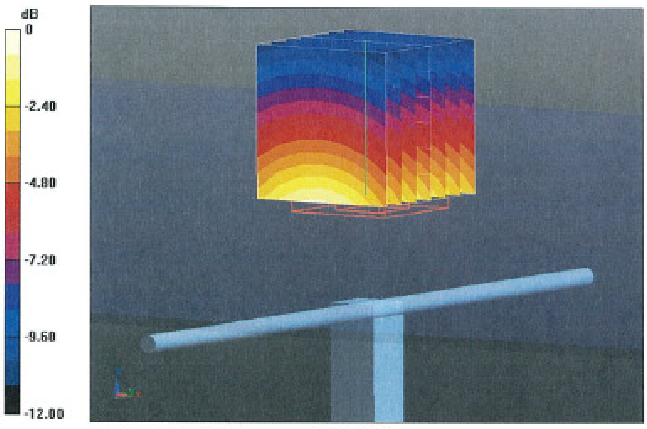
DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN: 184

Communication System: CW; Frequency: 900 MHz
Medium parameters used: f = 900 MHz; σ = 0.94 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

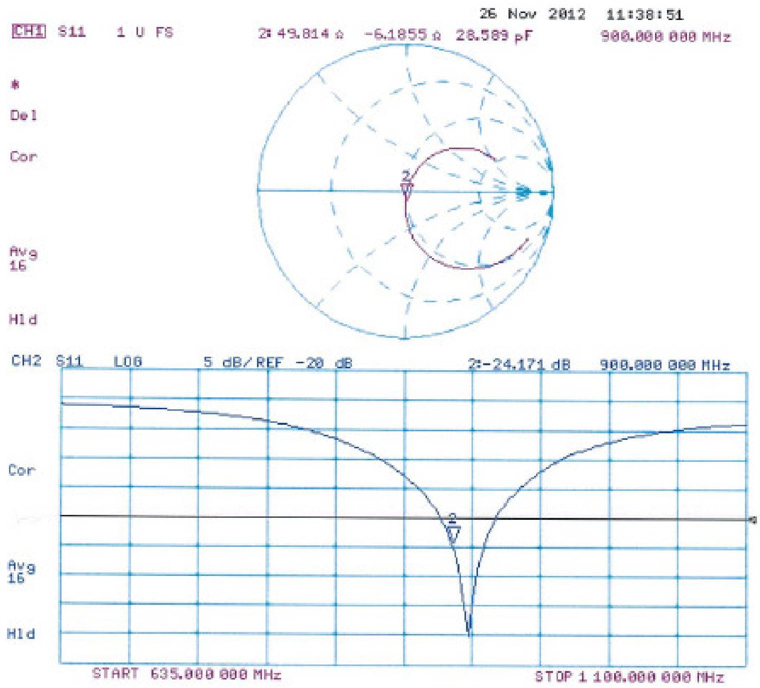
- Probe: ES3DV3 - SN3205; ConvF(5.97, 5.97, 5.97); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.875 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.94 W/kg
SAR(1 g) = 2.6 W/kg; SAR(10 g) = 1.67 W/kg
Maximum value of SAR (measured) = 3.05 W/kg



0 dB = 3.05 W/kg = 4.84 dBW/kg

Impedance Measurement Plot for Head TSL



10.3.2 D1800V2

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Accreditation No.: **SCS 108**

Client **SGS-SZ (Auden)**

Certificate No: **D1800V2-2d070_Nov12/2**

CALIBRATION CERTIFICATE (Replacement of No:D1800V2-2d070_Nov12)

Object	D1800V2 - SN: 2d070
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	November 27, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

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

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

Issued: December 18, 2012

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Certificate No: D1800V2-2d070_Nov12/2 Page 1 of 6

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.3
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.2 ± 6 %	1.39 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**37.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.94 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.8 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.0 Ω - 5.3 jΩ
Return Loss	- 25.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.212 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 26, 2003

DASY5 Validation Report for Head TSL

Date: 27.11.2012

Test Laboratory: SPEAG, Zurich, Switzerland

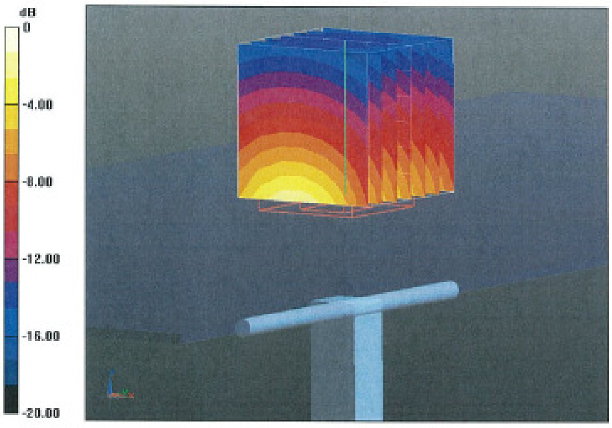
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d070

Communication System: CW; Frequency: 1800 MHz
Medium parameters used: f = 1800 MHz; σ = 1.39 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

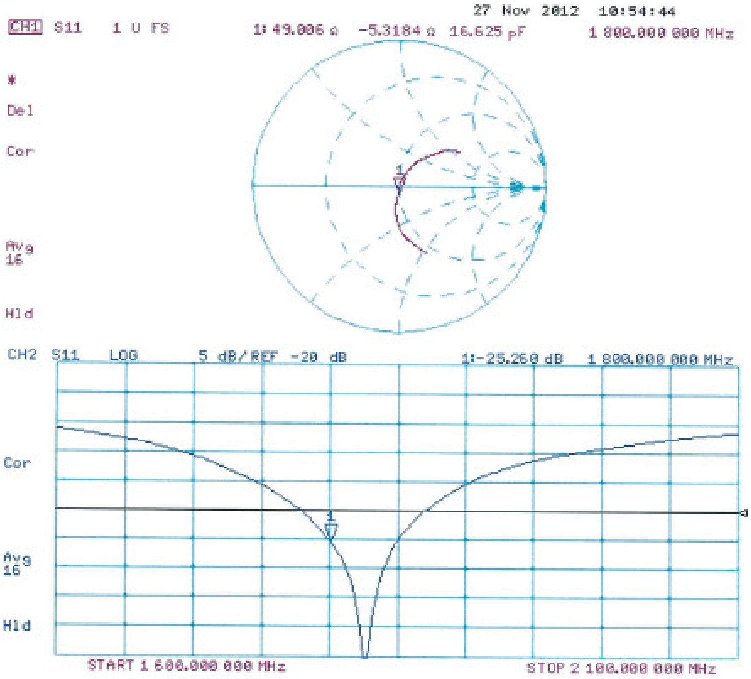
- Probe: ES3DV3 - SN3205; ConvF(5.07, 5.07, 5.07); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.564 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 9.33 W/kg; SAR(10 g) = 4.94 W/kg
Maximum value of SAR (measured) = 11.5 W/kg



0 dB = 11.5 W/kg = 10.61 dBW/kg

Impedance Measurement Plot for Head TSL



10.3.3 D2000V2

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Accreditation No.: **SCS 108**

Client **SGS-SZ (Auden)**

Certificate No: **D2000V2-1017_Nov12/2**

CALIBRATION CERTIFICATE (Replacement of No:D2000V2-1017_Nov12)

Object	D2000V2 - SN: 1017
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	November 26, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

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

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Techincian	[signature]
Approved by:	Katja Pokovic	Technical Manager	[signature]

Issued: December 18, 2012

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Certificate No: D2000V2-1017_Nov12/2 Page 1 of 6

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.3
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2000 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	40.3 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.93 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.19 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.9 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.6 Ω - 0.6 jΩ
Return Loss	- 35.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.185 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	February 05, 2004

DASY5 Validation Report for Head TSL

Date: 26.11.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2000 MHz; Type: D2000V2; Serial: D2000V2 - SN: 1017

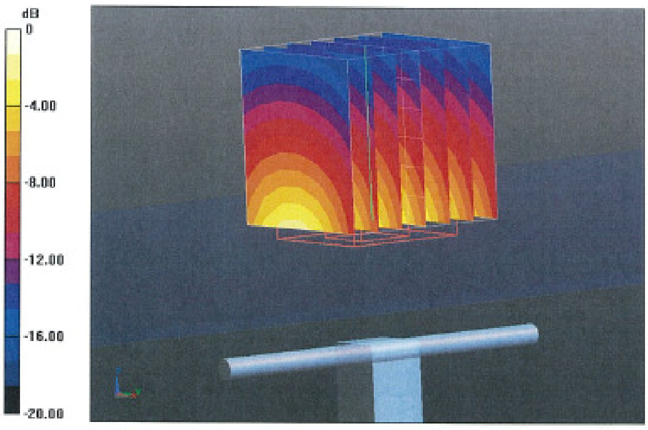
Communication System: CW; Frequency: 2000 MHz
Medium parameters used: f = 2000 MHz; $\sigma = 1.38$ mho/m; $\varepsilon_r = 40.3$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.93, 4.93, 4.93); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

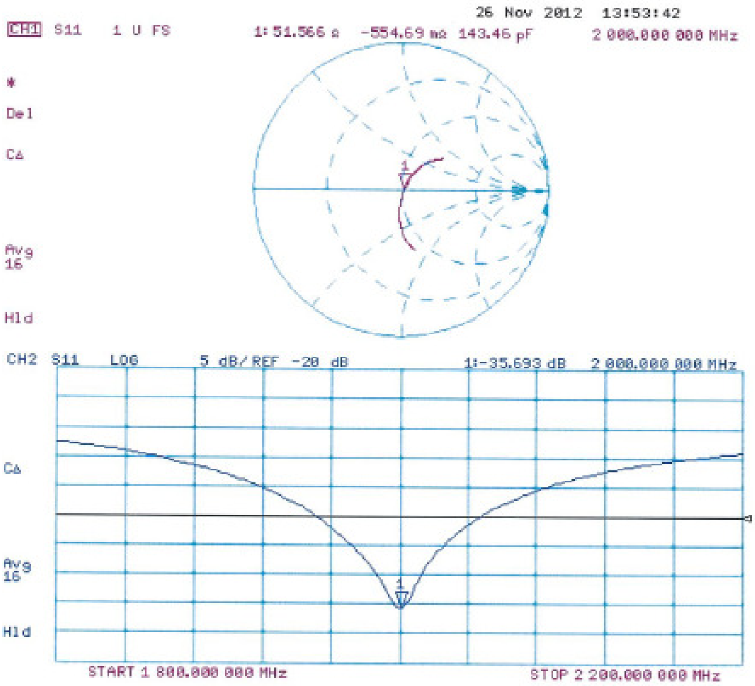
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.294 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 9.93 W/kg; SAR(10 g) = 5.19 W/kg
Maximum value of SAR (measured) = 12.2 W/kg



0 dB = 12.2 W/kg = 10.86 dBW/kg

Impedance Measurement Plot for Head TSL



10.3.4 D2450V2

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Accreditation No.: **SCS 108**

Client **SGS-SZ (Auden)**

Certificate No: **D2450V2-733_Nov12/2**

CALIBRATION CERTIFICATE (Replacement of No:D2450V2-733_Nov12)

Object	D2450V2 - SN: 733
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	November 26, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	01-Nov-12 (No. 217-01640)	Oct-13
Power sensor HP 8481A	US37292783	01-Nov-12 (No. 217-01640)	Oct-13
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

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

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

Issued: December 18, 2012

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Certificate No: D2450V2-733_Nov12/2 Page 1 of 8

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.3
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.7 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**52.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.2 ± 6 %	2.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**51.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.1 W/kg ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.7 Ω + 1.7 jΩ
Return Loss	- 28.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.1 Ω + 3.9 jΩ
Return Loss	- 28.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.148 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 07, 2003

DASY5 Validation Report for Head TSL

Date: 26.11.2012

Test Laboratory: SPEAG, Zurich, Switzerland

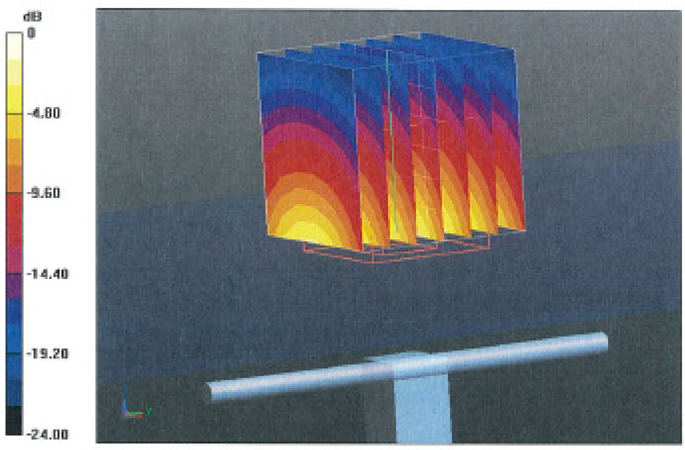
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 733

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; $\sigma = 1.85$ mho/m; $\varepsilon_r = 38.7$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

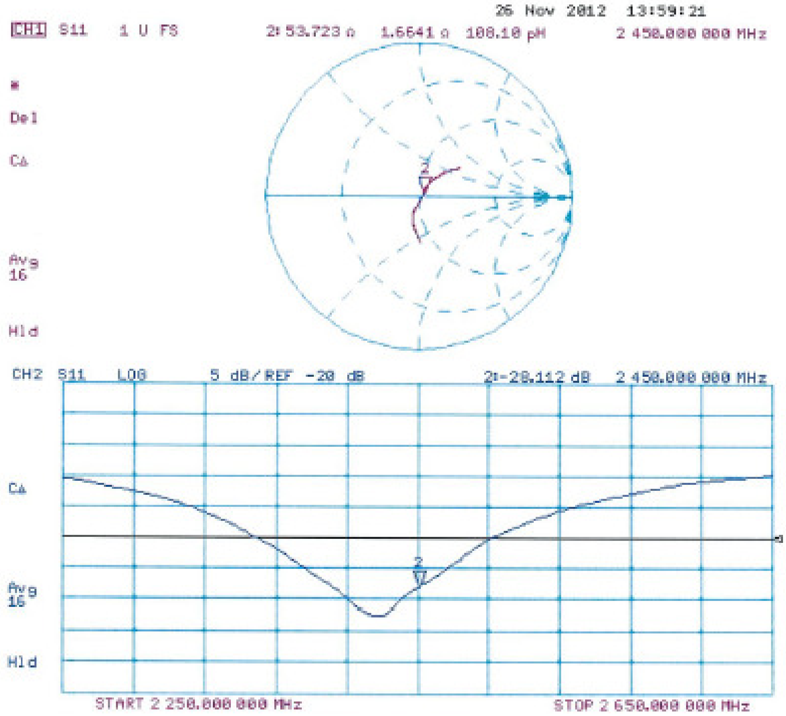
- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.958 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 27.4 W/kg
SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.16 W/kg
Maximum value of SAR (measured) = 16.9 W/kg



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

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 26.11.2012

Test Laboratory: SPEAG, Zurich, Switzerland

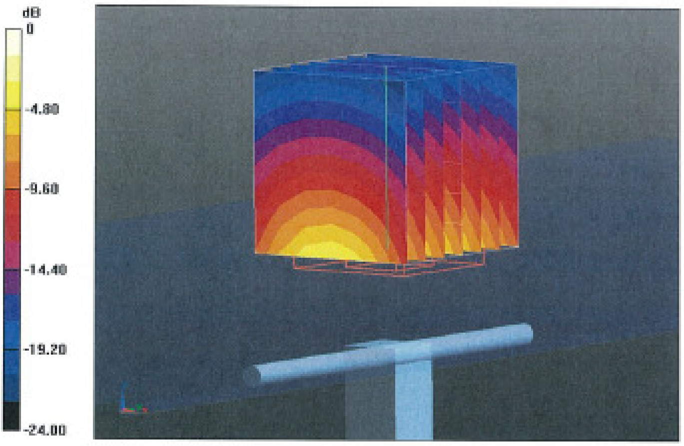
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 733

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.01 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

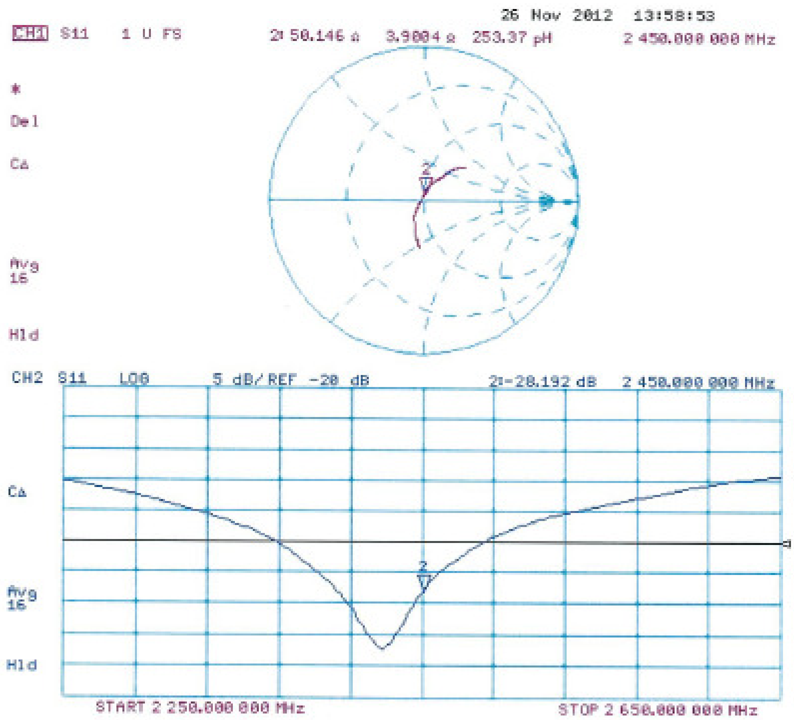
- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.3(988); SEMCAD X 14.6.7(6848)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.578 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 27.0 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.09 W/kg
Maximum value of SAR (measured) = 17.1 W/kg



0 dB = 17.1 W/kg = 12.33 dBW/kg

Impedance Measurement Plot for Body TSL



Certificate No: D2450V2-733_Nov12/2 Page 8 of 8

END OF REPORT