A Test Lab Techno Corp.

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SAR EVALUATION REPORT

Test Report No.	:	**1009FS17-02**
Applicant	:	**HTC Corporation**
Product Type	:	**Smartphone**
Trade Name	:	**HTC**
Model Number	:	**PD98120**
Dates of Test	:	**Sep. 02, ~ Oct. 21, 2010, Nov. 19, 2010**
Test Environment	:	**Ambient Temperature： 22 ±2˚C**
		Relative Humidity：40 - 70 %
Test Specification	:	**Standard C95.1-2005**
		IEEE Std. 1528-2003
		2.1093;FCC/OET Bulletin 65 Supplement C [July 2001]
		RSS-102 Issue 3 (June 2009)
		FCC KDB 648474 D01 SAR Handsets Multi Xmiter and Ant
		FCC KDB 648474 D02 SAR Polcy Handsts Multi Xmiter Ant
		FCC KDB 941225 D03 SAR Test Reduction GSM GPRS EDGE
		FCC KDB 248227 D01 SAR meas for 802.11abg vo1r02
Max. SAR	:	**1.140 W/kg Head SAR**
		0.534 W/kg Body SAR
Test Lab Location	:	**Chang-an Lab**

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
3. The measurement report has to be written approval of A Test Lab Techno Corp. It may only be reproduced or published in full. This report shall not be reproduced except in full, without the written approval of A Test Lab Techno Corp. The test results in the report only apply to the tested sample.

Sam Chuang **Nov. 24, 2010**
Approve Signer

Alex Wu **Nov. 24, 2010**
Testing Engineer

Contents

1. Description of Equipment under Test (EUT)

Applicant	:	HTC Corporation
Applicant Address	:	No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan
Manufacturer	:	HTC Corporation
Manufacturer Address	:	No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan
Product Type	:	Smartphone
Trade Name	:	HTC
Model Number	:	PD98120
IMEI No.	:	354455040010165 (for #1 GSM Power Amplifier) 354455040015438 (for #2 GSM Power Amplifier)
FCC ID	:	NM8PD98120
Tx Frequency	:	824.2 - 848.8 MHz GSM/GPRS/EGPRS 850 1850.2 - 1909.8 MHz PCS/GPRS/EGPRS 1900 1852.4 - 1907.6 MHz WCDMA(RMC 12.2K)/HSDPA Band II 826.4 - 846.4 MHz WCDMA(RMC 12.2K)/HSDPA Band V 2412 - 2462 MHz IEEE 802.11b/802.11g 2412 - 2462 MHz Draft 802.11n 2.4GHz Standard-20MHz 2402 - 2480 MHz Bluetooth
Device Class	:	GPRS/EGPRS Class B
Multi-slot Class	:	GPRS/EGPRS Class 10 (The maximum number of downlink is 4 and maximum number of uplink is 2, total timeslots is 5.)
RF Conducted Power	:	0.438 W / 26.41 dBm GSM/GPRS/EGPRS 850 (for #1 GSM Power Amplifier) 0.414 W / 26.17 dBm GSM/GPRS/EGPRS 850 (for #2 GSM Power Amplifier) 0.217 W / 23.36 dBm PCS/GPRS/EGPRS 1900 (for #1 GSM Power Amplifier) 0.217 W / 23.37 dBm PCS/GPRS/EGPRS 1900 (for #2 GSM Power Amplifier) 0.226 W / 23.54 dBm WCDMA /HSDPA Band II 0.252 W / 24.01 dBm WCDMA /HSDPA Band V 0.059 W / 17.70 dBm IEEE 802.11b 0.019 W / 12.90 dBm IEEE 802.11g 0.017 W / 12.28 dBm Draft 802.11n 2.4GHz Standard-20MHz 0.001 W / -0.80 dBm Bluetooth
Max. SAR Measurement	:	1.140 W/kg Head SAR 0.534 W/kg Body SAR
Antenna Type	:	PIFA Antenna
Device Category	:	Portable
RF Exposure Environment	:	General Population / Uncontrolled
Battery Option	:	Standard (The battery has two types. The batteries are same specifications, it only differs from manufacturer.)
Application Type	:	Certification

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment / general population exposure limits specified in Standard C95.1-2005 / RSS-102 Issue 3 (June 2009) and had been tested in accordance with the measurement procedures specified in IEEE Std. 1528-2003.

2. Introduction

The A Test Lab Techno Corp. has performed measurements of the maximum potential exposure to the user of **HTC Corporation Trade Name：HTC Model(s)：PD98120.** The test procedures, as described in American National Standards, Institute C95.1 - 2005〔1〕, FCC/OET Bulletin 65 Supplement C [July 2001] and RSS-102 Issue 3 (June 2009) were employed and they specify the maximum exposure limit of 1.6mW/g as averaged over any 1 gram of tissue for portable devices being used within 25cm between user and EUT in the uncontrolled environment. A description of the product and operating configuration, detailed summary of the test results, methodology and procedures used in the equipment used are included within this test report.

3. SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy (dw) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Figure 2).

SAR Mathematical Equation

$$SAR = \frac{d}{dt}\left(\frac{dw}{dm}\right) = \frac{d}{dt}\left(\frac{dw}{\rho dv}\right)$$

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

$$SAR = \frac{\sigma E^2}{\rho}$$

Where：

σ = conductivity of the tissue (S/m)

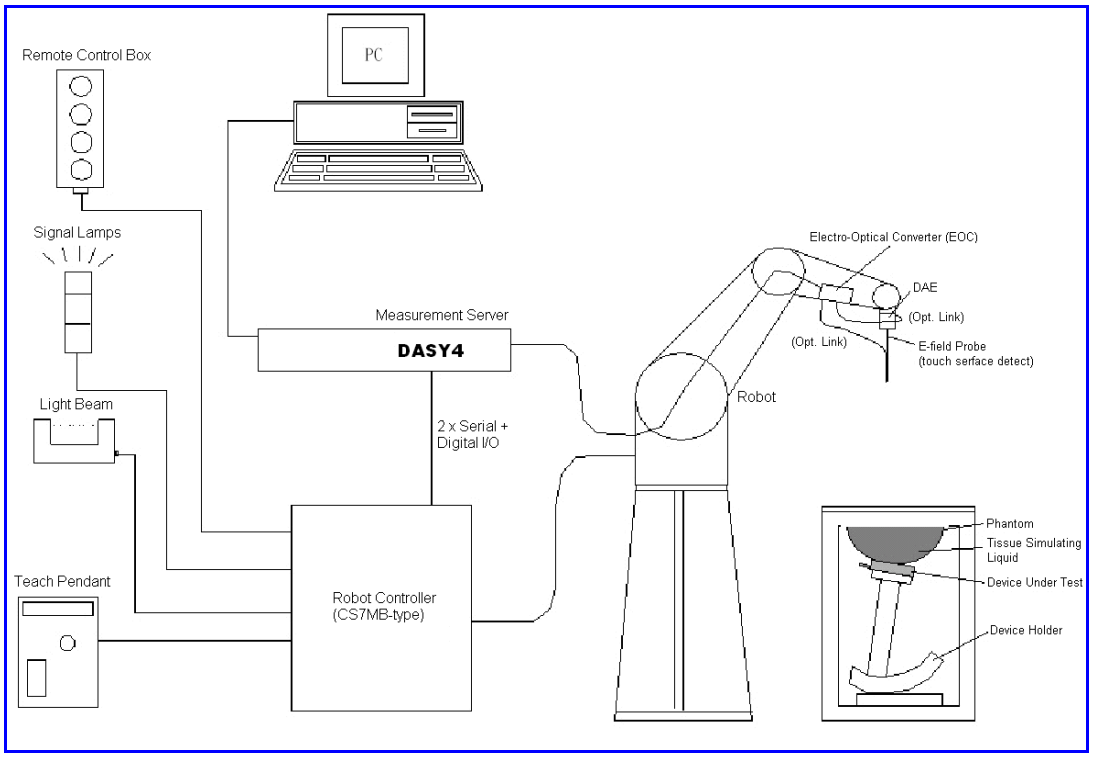
ρ = mass density of the tissue (kg/m^3)

E = RMS electric field strength (V/m)

＊**Note**：

The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane〔2〕

4. SAR Measurement Setup



The DASY4 system for performing compliance tests consists of the following items:

1. A standard high precision 6-axis robot (Stäubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
2. 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.
3. 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.
4. 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.
5. A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
6. A computer operating Windows 2000 or Windows XP.
7. DASY4 software.
8. Remote controls with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
9. The SAM twin phantom enabling testing left-hand and right-hand usage.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
12. Validation dipole kits allowing validating the proper functioning of the system.

5. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Last Calibration	Remark
SPEAG	Dosimetric E-Field Probe	EX3DV4	3578	06/22/2010	(1)
SPEAG	Dosimetric E-Field Probe	EX3DV3	3519	02/23/2010	(1)
SPEAG	835MHz System Validation Kit	D835V2	4d082	07/20/2010	(1)
SPEAG	1900MHz System Validation Kit	D1900V2	5d111	07/16/2010	(1)
SPEAG	2450MHz System Validation Kit	D2450V2	712	02/19/2010	(1)
SPEAG	Data Acquisition Electronics	DAE4	541	07/21/2010	(1)
SPEAG	Measurement Server	SE UMS 001 BA	1021	NCR	-----
SPEAG	Device Holder	N/A	N/A	NCR	-----
SPEAG	Phantom	SAM V4.0	1009	NCR	-----
SPEAG	Robot	Staubli RX90L	F00/589B1/A/01	NCR	-----
SPEAG	Software	DASY4 V4.7 Build 80	N/A	NCR	-----
SPEAG	Software	SEMCAD V1.8 Build 186	N/A	NCR	-----
R&S	Wireless Communication Test Set	CMU200	109369	08/10/2010	(1)
Agilent	Wireless Communication Test Set	E5515C	GB47020167	05/25/2009	(2)
Agilent	ENA Series Network Analyzer	E5071B	MY42402996	11/04/2009	(1)
Agilent	Dielectric Probe Kit	85070C	US99360094	NCR	-----
R&S	Power Sensor	NRP-Z22	100179	05/17/2009	(2)
Agilent	Signal Generator	E8257D	MY44320425	03/09/2009	(2)
Agilent	Dual Directional Coupler	778D	50334	NCR	-----
Mini-Circuits	Power Amplifier	ZHL-42W-SMA	D111103#5	NCR	-----
Mini-Circuits	Power Amplifier	ZVE-8G-SMA	D042005 671800514	NCR	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

NOTE: N.C.R. = No Calibration Request.

6. Tissue Simulating Liquids

The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the tissue. The dielectric parameters of the liquids were verified prior to the SAR evaluation using an 85070C Dielectric Probe Kit and an E5071B Network Analyzer.

IEEE SCC-34/SC-2 in 1528 recommended Tissue Dielectric Parameters

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in human head. Other head and body tissue parameters that have not been s

pecified in 1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equation and extrapolated according to the head parameter specified in 1528.

Target Frequency	Head		Body	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 - 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00
(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)				

Table 1. Tissue dielectric parameters for head and body phantoms

6.1 Ingredients

The following ingredients are used:

- Water: deionized water (pure H_20), resistivity ≥ 16 M Ω -as basis for the liquid
- Sugar: refied white sugar (typically 99.7 % sucrose, available as crystal sugar in food shops) to reduce relative permittivity
- Salt: pure NaCl -to increase conductivity
- Cellulose: Hydroxyethyl-cellulose, medium viscosity (75-125 mPa.s, 2% in water, 20◦C), CAS # 54290 -to increase viscosity and to keep sugar in solution.
- Preservative: Preventol D-7 Bayer AG, D-51368 Leverkusen, CAS # 55965-84-9 -to prevent the spread of bacteria and molds
- DGBE: Diethylenglycol-monobuthyl ether (DGBE), Fluka Chemie GmbH, CAS # 112-34-5 -to reduce relative permittivity

6.2 Recipes

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

Note: The goal dielectric parameters (at 22 ℃) must be achieved within a tolerance of ±5% for ε and ±5% for σ.

Liquid type	**HSL 900-B**	
Ingredient	Weight (g)	Weight (%)
Water	532.63	40.29
Sugar	765.49	57.90
Cellulose	3.20	0.24
Salt	18.29	1.38
Preventol	2.40	0.18
Total amount	1,322.00	100.00
Goal dielectric parameters		
Frequency [MHz]	835	900
Relative Permittivity	41.5	41.5
Conductivity [S/m]	0.90	0.97

Liquid type	MSL 900-B	
Ingredient	Weight (g)	Weight (%)
Water	633.91	50.75
Sugar	602.12	50.75
Cellulose	-	0.00
Salt	11.76	0.94
Preventol	1.20	0.10
Total amount	1,249.00	100.00
Goal dielectric parameters		
Frequency [MHz]	835	900
Relative Permittivity	55.2	55.0
Conductivity [S/m]	0.97	1.05

Liquid type	HSL 1950-B	
Ingredient	Weight (g)	Weight (%)
Water	554.12	55.41
DGBE	445.08	44.51
Salt	0.80	0.08
Total amount	1,000.00	100.00
Goal dielectric parameters		
Frequency [MHz]	1950	2000
Relative Permittivity	40.0	40.0
Conductivity [S/m]	1.40	1.40

Liquid type	MSL 1950-A	
Ingredient	Weight (g)	Weight (%)
Water	697.94	69.79
DGBE	300.03	30.00
Salt	2.03	0.20
Total amount	1,000.00	100.00
Goal dielectric parameters		
Frequency [MHz]	1950	2000
Relative Permittivity	53.3	53.3
Conductivity [S/m]	1.52	1.52

Liquid type	MSL 2450-B	
Ingredient	Weight (g)	Weight (%)
Water	686.35	68.64
DGBE	313.65	31.37
Salt	-	0.00
Total amount	1,000.00	100.00
Goal dielectric parameters		
Frequency [MHz]	2450	
Relative Permittivity	52.7	
Conductivity [S/m]	1.95	

6.3 Liquid Confirmation

6.3.1 Parameters

Liquid Verify (Ambient Temperature： 22 ± 2 °C；Relative Humidity：40 -70%)

Liquid Type	Frequency	Temp (°C)	Parameters	Target Value	Measured Value	Deviation (%)	Limit (%)	Measured Date
835MHz Head	820MHz	22.0	**εr**	41.5	40.70	-1.93%	± 5	09/02/2010
			σ	0.90	0.908	0.89%	± 5	
	835MHz	22.0	**εr**	41.5	40.50	-2.41%	± 5	
			σ	0.90	0.922	2.44%	± 5	
	850MHz	22.0	**εr**	41.5	40.40	-2.65%	± 5	
			σ	0.90	0.938	4.22%	± 5	
835MHz Head	820MHz	22.0	**εr**	41.5	40.70	-1.93%	± 5	10/21/2010
			σ	0.90	0.908	0.89%	± 5	
	835MHz	22.0	**εr**	41.5	40.50	-2.41%	± 5	
			σ	0.90	0.922	2.44%	± 5	
	850MHz	22.0	**εr**	41.5	40.40	-2.65%	± 5	
			σ	0.90	0.938	4.22%	± 5	
1900MHz Head	1850MHz	22.0	εr	40.0	40.3	0.75%	± 5	09/03/2010
			σ	1.40	1.34	-4.29%	± 5	
	1900MHz	22.0	εr	40.0	40.3	0.75%	± 5	
			σ	1.40	1.38	-1.43%	± 5	
	1930MHz	22.0	εr	40.0	40.1	0.25%	± 5	
			σ	1.40	1.40	0.00%	± 5	

Table 2. Measured Tissue dielectric parameters for head and body phantoms

Liquid Verify (Ambient Temperature： 22 ± 2 °C；Relative Humidity：40 -70%)								
Liquid Type	**Frequency**	**Temp (°C)**	**Parameters**	**Target Value**	**Measured Value**	**Deviation (%)**	**Limit (%)**	**Measured Date**
1900MHz Head	1850MHz	22.0	εr	40.0	40.3	0.75%	± 5	10/21/2010
			σ	1.40	1.34	-4.29%	± 5	
	1900MHz	22.0	εr	40.0	40.3	0.75%	± 5	
			σ	1.40	1.38	-1.43%	± 5	
	1930MHz	22.0	εr	40.0	40.1	0.25%	± 5	
			σ	1.40	1.40	0.00%	± 5	
835MHz Body	820MHz	22.0	εr	55.2	54.70	-0.91%	± 5	09/03/2010
			σ	0.97	0.964	-0.67%	± 5	
	835MHz	22.0	εr	55.2	54.70	-0.91%	± 5	
			σ	0.97	0.981	1.13%	± 5	
	850MHz	22.0	εr	55.2	54.70	-0.91%	± 5	
			σ	0.97	1.001	3.20%	± 5	
835MHz Body	820MHz	22.0	εr	55.2	54.70	-0.91%	± 5	10/21/2010
			σ	0.97	0.964	-0.67%	± 5	
	835MHz	22.0	εr	55.2	54.70	-0.91%	± 5	
			σ	0.97	0.981	1.13%	± 5	
	850MHz	22.0	εr	55.2	54.70	-0.91%	± 5	
			σ	0.97	1.001	3.20%	± 5	
1900MHz Body	1850MHz	22.0	**εr**	53.3	52.60	-1.33%	± 5	09/06/2010
			σ	1.52	1.46	-4.14%	± 5	
	1900MHz	22.0	**εr**	53.3	52.60	-1.24%	± 5	
			σ	1.52	1.51	-0.74%	± 5	
	1930MHz	22.0	**εr**	53.3	52.50	-1.97%	± 5	
			σ	1.52	1.55	1.97%	± 5	
1900MHz Body	1850MHz	22.0	**εr**	53.3	51.2	-3.94%	± 5	10/21/2010
			σ	1.52	1.46	-3.95%	± 5	
	1900MHz	22.0	**εr**	53.3	51.1	-4.13%	± 5	
			σ	1.52	1.51	-0.66%	± 5	
	1930MHz	22.0	**εr**	53.3	51.0	-4.32%	± 5	
			σ	1.52	1.53	0.66%	± 5	
2450MHz Body	2400MHz	22.0	**εr**	52.7	51.80	-1.71%	± 5	09/06/2010
			σ	1.95	1.88	-3.73%	± 5	
	2450MHz	22.0	**εr**	52.7	51.70	-1.90%	± 5	
			σ	1.95	1.94	-0.69%	± 5	
	2500MHz	22.0	**εr**	52.7	51.50	-2.33%	± 5	
			σ	1.95	2.00	2.56%	± 5	

Liquid Verify (Ambient Temperature： 22 ± 2 °C；Relative Humidity：40 -70%)								
Liquid Type	**Frequency**	**Temp (°C)**	**Parameters**	**Target Value**	**Measured Value**	**Deviation (%)**	**Limit (%)**	**Measured Date**
2450MHz Body	2400MHz	22.0	**εr**	52.7	51.40	-2.46%	± 5	11/19/2010
			σ	1.95	1.89	-3.12%	± 5	
	2450MHz	22.0	**εr**	52.7	51.29	-2.68%	± 5	
			σ	1.95	1.96	0.32%	± 5	
	2500MHz	22.0	**εr**	52.7	51.13	-2.98%	± 5	
			σ	1.95	2.02	3.63%	± 5	

6.3.2 Liquid Depth

The liquid level was during measurement 15cm ±0.5cm.

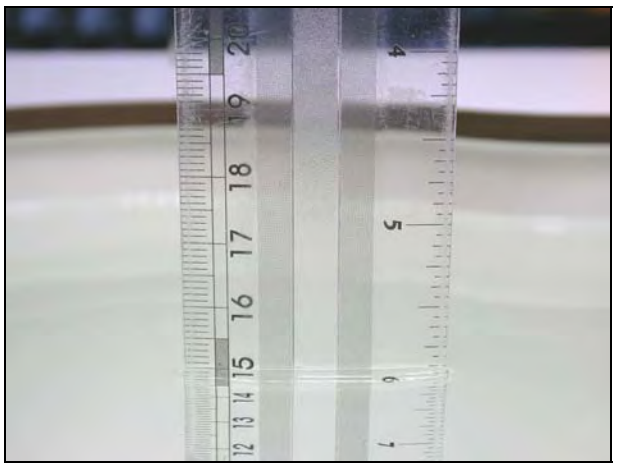


Figure 2. Head-Tissue-Simulating-Liquid

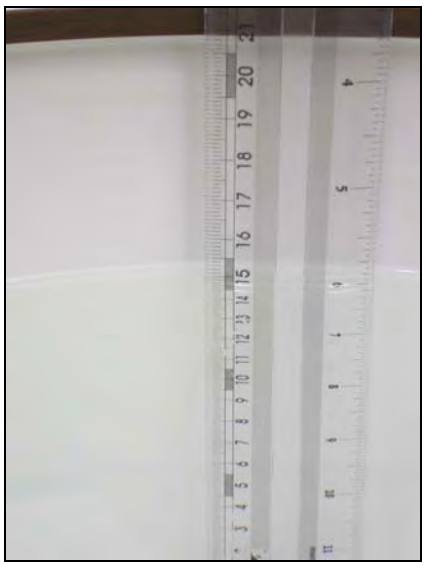


Figure 3. Body-Tissue-Simulating-Liquid

7. Measurement Process

7.1 Device and Test Conditions

The Test Device was provided by **HTC Corporation** for this evaluation. The spatial peak SAR values were assessed for the lowest, middle and highest channels defined by **GSM 850** (#128=824.2MHz, #190=836.6MHz, #251=848.8MHz), **PCS 1900** (#512=1850.2MHz, #661=1880.0MHz, #810=1909.8MHz) , **WCDMA (RMC 12.2K) Band II** (#9262=1852.4MHz, #9400=1880.0MHz, #9538=1907.6MHz) , **WCDMA (RMC 12.2K) Band V** (#4132=826.4MHz, #4183=836.6MHz, #4233=846.4MHz)systems, **IEEE 802.11b / 802.11g** (#1=2412MHz, #6=2437MHz, #11=2462MHz), **Draft 802.11n 2.4GHz Standard-20MHz** (#1=2412MHz, #6=2437MHz, #11=2462MHz), **Bluetooth** (#0=2402MHz, #39=2441MHz, #78=2480MHz) systems..

HSDPA Date Devices setup for SAR Measurement.

HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ 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 conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors(βc, βd), and HS-DPCCH power offset parameters (ΔACK, ΔNACK, ΔCQI) should be set according to values indicated in the Table below.[32] The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.[33]

Sub-test	βc	βd	βd (SF)	βc/βd	βhs(1,2)	CM (dB)(3)	MRP (dB)(3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15(4)	15/15(4)	64	12/15(4)	24/15	1.0	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

Note

1. Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ Ahs = βhs/βc = 30/15 ⇔ βhs= 30/15 *βc
2. For theHS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1A and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with βhs = 30/15 *βc and Δ_{CQI} = 24/15 with βhs = 24/15*βc
3. CM = 1 for βc/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.
4. For subtest 2 the βc/βd ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to βc = 11/15 and βd = 15/15.

Table 3. Setup for Release 5 HSDPA

7.2 RF Conducted Output Power

#1 GSM Power Amplifier						
Band	Mode	CH	Frequency (MHz)	RF Conducted Output Power (dBm)		
				Time Avg.	Burst Avg.	Peak
GSM850	-----	Lowest	824.2	**24.05**	33.24	33.47
		Middle	836.6	23.97	33.16	33.18
		Highest	848.8	23.87	33.06	33.09
GPRS 850	4Down1Up	Lowest	824.2	23.94	33.13	33.17
		Middle	836.6	23.86	33.05	33.09
		Highest	848.8	24.25	33.44	33.45
	3Down2Up	Lowest	824.2	26.31	32.54	32.59
		Middle	836.6	26.05	32.28	32.29
		Highest	848.8	**26.41**	32.64	32.67
EGPRS 850	4Down1Up	Lowest	824.2	17.20	26.39	29.40
		Middle	836.6	17.03	26.22	29.30
		Highest	848.8	17.37	26.56	29.20
	3Down2Up	Lowest	824.2	19.15	25.38	28.40
		Middle	836.6	19.01	25.24	28.20
		Highest	848.8	19.36	25.59	28.10
PCS1900	-----	Lowest	1850.2	19.84	29.03	29.07
		Middle	1880.0	20.91	30.10	30.14
		Highest	1909.8	21.06	30.25	30.29
GPRS 1900	4Down1Up	Lowest	1850.2	20.03	29.22	29.24
		Middle	1880.0	20.57	29.76	29.79
		Highest	1909.8	20.66	29.85	29.87
	3Down2Up	Lowest	1850.2	22.80	29.03	29.05
		Middle	1880.0	23.25	29.48	29.51
		Highest	1909.8	**23.36**	29.59	29.60
EGPRS 1900	4Down1Up	Lowest	1850.2	15.41	24.60	29.00
		Middle	1880.0	16.08	25.27	28.60
		Highest	1909.8	16.11	25.30	28.30
	3Down2Up	Lowest	1850.2	18.26	24.49	28.70
		Middle	1880.0	18.83	25.06	28.40
		Highest	1909.8	18.85	25.08	28.00

#2 GSM Power Amplifier						
Band	Mode	CH	Frequency (MHz)	RF Conducted Output Power (dBm)		
				Time Avg.	Burst Avg.	Peak
GSM850	-----	Lowest	824.2	**23.71**	32.90	33.30
		Middle	836.6	23.51	32.70	33.10
		Highest	848.8	23.31	32.50	32.90
GPRS 850	4Down1Up	Lowest	824.2	23.51	32.70	33.10
		Middle	836.6	23.41	32.60	33.00
		Highest	848.8	23.31	32.50	32.80
	3Down2Up	Lowest	824.2	**26.17**	32.40	32.60
		Middle	836.6	25.77	32.00	32.20
		Highest	848.8	25.47	31.70	31.90
EGPRS 850	4Down1Up	Lowest	824.2	17.31	26.50	29.70
		Middle	836.6	17.11	26.30	29.40
		Highest	848.8	17.01	26.20	29.30
	3Down2Up	Lowest	824.2	19.37	25.60	28.70
		Middle	836.6	18.97	25.20	28.40
		Highest	848.8	18.87	25.10	28.20
PCS1900	-----	Lowest	1850.2	**21.31**	30.50	30.70
		Middle	1880.0	20.71	29.90	30.10
		Highest	1909.8	20.31	29.50	29.70
GPRS 1900	4Down1Up	Lowest	1850.2	21.31	30.50	30.70
		Middle	1880.0	20.71	29.90	30.10
		Highest	1909.8	20.31	29.50	29.70
	3Down2Up	Lowest	1850.2	**23.37**	29.60	29.80
		Middle	1880.0	22.87	29.10	29.20
		Highest	1909.8	22.97	29.20	29.40
EGPRS 1900	4Down1Up	Lowest	1850.2	17.01	26.20	29.40
		Middle	1880.0	16.51	25.70	29.00
		Highest	1909.8	16.31	25.50	28.70
	3Down2Up	Lowest	1850.2	20.17	26.40	29.60
		Middle	1880.0	19.47	25.70	28.90
		Highest	1909.8	19.17	25.40	28.60

Band	Sub-test	CH	Frequency (MHz)	RF Conducted Output Power (dBm)	
				Burst Avg.	Peak
WCDMA Band II	---	Lowest	1852.4	23.37	26.63
		Middle	1880.0	**23.54**	26.77
		Highest	1907.6	23.36	26.00
HSDPA Band II	1	Lowest	1852.4	22.61	25.84
		Middle	1880.0	22.83	26.03
		Highest	1907.6	22.73	25.35
	2	Lowest	1852.4	22.58	25.84
		Middle	1880.0	22.81	26.01
		Highest	1907.6	22.72	25.36
	3	Lowest	1852.4	22.09	25.33
		Middle	1880.0	22.31	25.52
		Highest	1907.6	22.23	24.86
	4	Lowest	1852.4	22.11	25.34
		Middle	1880.0	22.31	25.52
		Highest	1907.6	22.21	24.85

Band	Sub-test	CH	Frequency (MHz)	RF Conducted Output Power (dBm)	
				Burst Avg.	Peak
WCDMA Band V	---	Lowest	826.4	23.70	27.70
		Middle	836.6	23.56	27.00
		Highest	846.4	**24.01**	27.20
HSDPA Band V	1	Lowest	826.4	22.66	26.63
		Middle	836.6	22.53	25.95
		Highest	846.4	23.03	26.21
	2	Lowest	826.4	22.64	26.64
		Middle	836.6	22.52	25.95
		Highest	846.4	23.01	26.17
	3	Lowest	826.4	22.15	26.14
		Middle	836.6	22.02	25.45
		Highest	846.4	22.53	25.71
	4	Lowest	826.4	22.14	26.11
		Middle	836.6	22.03	25.45
		Highest	846.4	22.50	25.67

Band	Data Rate	CH	Frequency (MHz)	RF Conducted Output Power (dBm)	
				Average	Peak
IEEE 802.11b	1M	Lowest	2412	17.56	20.22
		Middle	2437	17.55	20.21
		Highest	2462	17.32	20.01
	2M	Lowest	2412	**17.70**	20.40
		Middle	2437	17.52	20.29
		Highest	2462	17.45	20.07
	5.5M	Lowest	2412	17.58	20.34
		Middle	2437	17.54	20.29
		Highest	2462	17.48	20.23
	11M	Lowest	2412	17.26	20.50
		Middle	2437	17.23	20.45
		Highest	2462	17.20	20.20
IEEE 802.11g	6M	Lowest	2412	12.78	22.02
		Middle	2437	12.55	22.35
		Highest	2462	12.90	22.20
	9M	Lowest	2412	**13.21**	22.54
		Middle	2437	12.67	22.75
		Highest	2462	12.70	22.45
	12M	Lowest	2412	12.71	22.25
		Middle	2437	12.45	22.27
		Highest	2462	12.62	22.23
	18M	Lowest	2412	12.31	22.12
		Middle	2437	12.37	22.40
		Highest	2462	12.45	22.33
	24M	Lowest	2412	12.23	22.03
		Middle	2437	12.24	22.45
		Highest	2462	12.14	22.15
	36M	Lowest	2412	11.94	21.95
		Middle	2437	11.82	22.62
		Highest	2462	11.89	22.32
	48M	Lowest	2412	11.45	22.05
		Middle	2437	11.78	22.64
		Highest	2462	11.63	22.22
	54M	Lowest	2412	11.52	22.31
		Middle	2437	11.32	22.54
		Highest	2462	11.46	22.25

Band	Data Rate	CH	Frequency (MHz)	RF Conducted Output Power (dBm)	
				Average	Peak
IEEE 802.11n HT20	6.5M	Lowest	2412	**12.28**	22.47
		Middle	2437	11.82	22.25
		Highest	2462	11.75	22.14
	13M	Lowest	2412	12.01	22.22
		Middle	2437	11.98	22.13
		Highest	2462	11.82	21.94
	19.5M	Lowest	2412	11.75	21.91
		Middle	2437	11.41	21.73
		Highest	2462	11.35	21.66
	26M	Lowest	2412	11.21	22.11
		Middle	2437	11.42	22.10
		Highest	2462	11.22	21.89
	39M	Lowest	2412	10.99	21.81
		Middle	2437	10.89	21.75
		Highest	2462	11.18	22.03
	52M	Lowest	2412	10.56	21.88
		Middle	2437	10.45	21.81
		Highest	2462	10.67	21.96
	58.5M	Lowest	2412	10.48	22.10
		Middle	2437	10.84	22.31
		Highest	2462	10.78	21.99
	65M	Lowest	2412	10.66	21.81
		Middle	2437	10.24	21.73
		Highest	2462	10.59	21.85
Bluetooth		Lowest	2402	-2.23	0.09
		Middle	2441	-1.23	1.19
		Highest	2480	**-0.80**	1.65

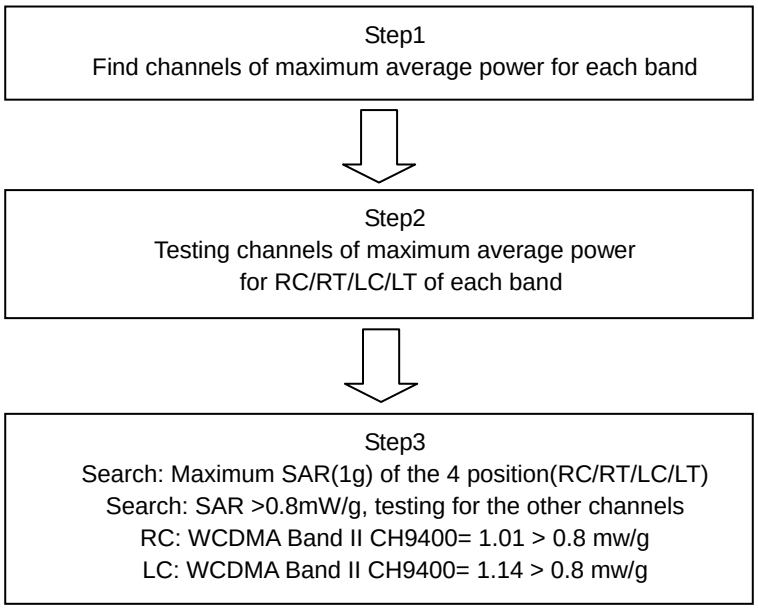
7.3 Test Mode Description

Head					
Band	CH	Phantom Position			
		RC	RT	LC	LT
GSM 850	Low	■	■	■	■
	Middle				
	High				
GPRS 850	Low				
	Middle				
	High				
EGPRS 850	Low				
	Middle				
	High				
GSM 1900	Low	■	■	■	■
	Middle				
	High	■	■	■	■
GPRS 1900	Low				
	Middle				
	High				
EGPRS 1900	Low				
	Middle				
	High				
WCDMA (RMC 12.2K) Band II	Low			■	
	Middle	■	■	■	■
	High			■	
HSDPA Band II	Low				
	Middle				
	High				
WCDMA (RMC 12.2K) Band V	Low				
	Middle				
	High	■	■	■	■
HSDPA Band V	Low				
	Middle				
	High				
IEEE 802.11b	Low				
	Middle				
	High				
IEEE 802.11g	Low				
	Middle				
	High				
Draft 802.11n 2.4GHz Standard-20MHz	Low				
	Middle				
	High				

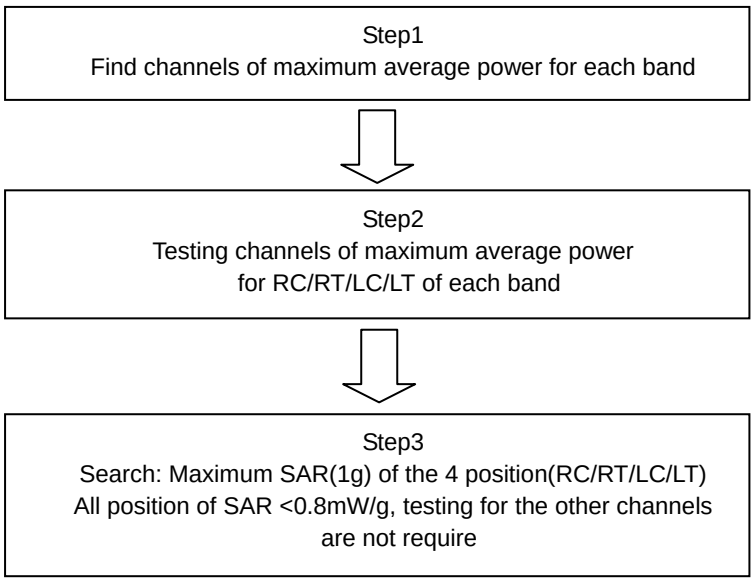
Body			
Band	CH	Phantom Position	Note
		Flat (15mm)	
GSM 850	Low	■	
	Middle		
	High		
GPRS 850	Low	■	(3Down2Up)
	Middle		
	High		
EGPRS 850	Low		
	Middle		
	High		
GSM 1900	Low		
	Middle		
	High	■	
GPRS 1900	Low		
	Middle		
	High	■	(3Down2Up)
EGPRS 1900	Low		
	Middle		
	High		
WCDMA (RMC 12.2K) Band II	Low		
	Middle		
	High	■	
HSDPA Band II	Low		
	Middle		
	High		
WCDMA (RMC 12.2K) Band V	Low		
	Middle		
	High	■	
HSDPA Band V	Low		
	Middle		
	High		
IEEE 802.11b	Low	■	Rate 2 M
	Middle		
	High		
IEEE 802.11g	Low		
	Middle		
	High		
Draft 802.11n 2.4GHz Standard-20MHz	Low	■	Rate 6.5 M
	Middle		
	High		

7.4 Test Flow Chart

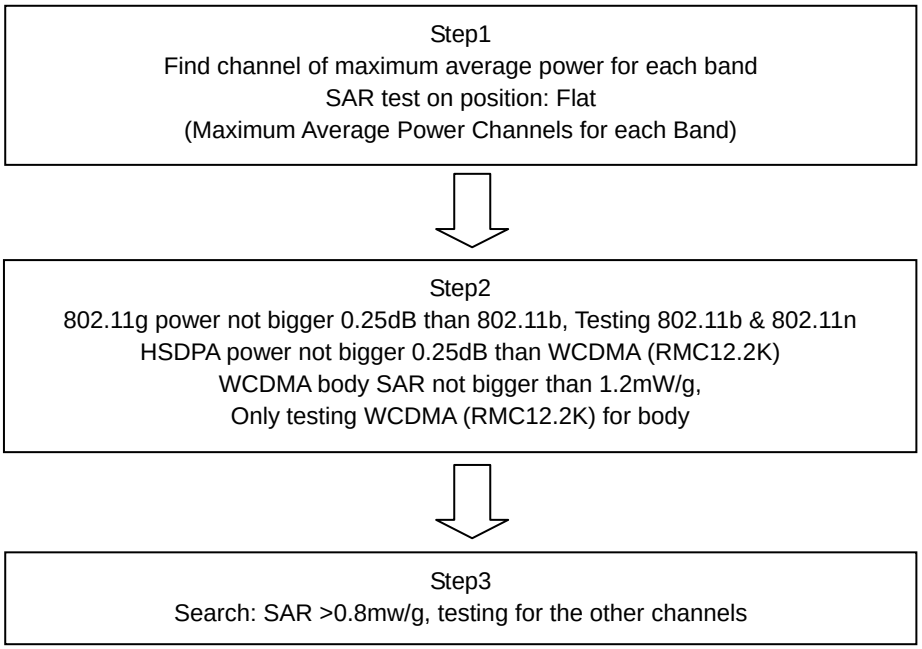
Head Test Flow Chart for #1



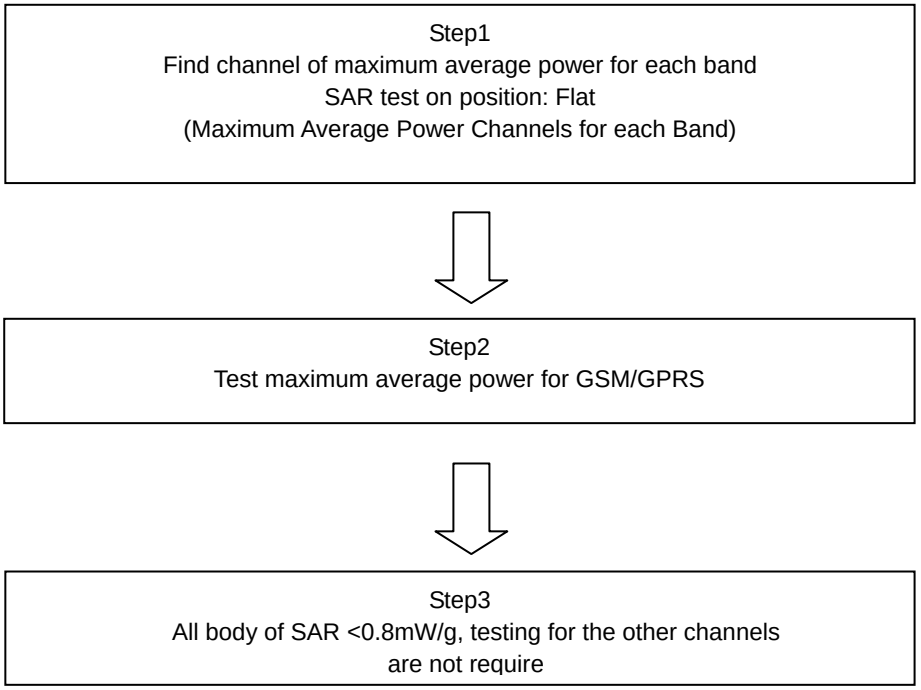
Head Test Flow Chart for #2(2nd PA)



Body Worn Test Flow Chart for #1



Body Worn Test Flow Chart for #2(2nd PA)



7.5 Simultaneous Transmitting Evaluate

RF Conducted Power		
Band	dBm	W
GSM/GPRS/EGPRS 850	26.41	0.44
PCS/GPRS/EGPRS 1900	23.37	0.22
WCDMA/HSDPA Band V	24.01	0.25
WCDMA/HSDPA Band II	23.54	0.23
Wi-Fi 802.11b	17.70	0.06
Wi-Fi 802.11g	13.21	0.02
Wi-Fi 802.11n(HT20)	12.28	0.02
BT	-0.80	0.0008

Antenna Distance	
Antenna Account	Distance (cm)
BT to WLAN	0
BT to WANM(License)	5.7
WLAN to WWAN(License)	5.7

BT and GSM and WLAN simultaneously SAR Description

BT and WLAN are not simultaneous transmission

GSM and WLAN are simultaneous transmission

GSM and BT are simultaneous transmission

(1) Antenna Distance (Ref. antenna location of application document)

BT Antenna and WLAN Antenna 0 cm

BT Antenna and GSM/PCS (License) Antenna 5.7 cm

WLAN Antenna and GSM/PCS (License) Antenna 5.7 cm

1a.BT & GSM 5.7 cm > 5.0 cm

1b.BT & WLAN 0 cm

1a.WLAN & GSM 5.7 cm > 5.0 cm

(2) BT Power <2*Pref and antenna-to-antenna is >5 cm. ~ BT Stand alone SAR is not required.

(3) WLAN > 2*Pref and antenna-to-antenna > 5.0 cm. ~ WLAN Stand alone SAR is required.

(4) GSM/PCS/WCDMA Stand alone SAR is required due to routine evaluation requirements.

(5) HSDPA active is less 1/4 dB than 12.2 kbps RMC, therefore HSDPA Stand alone SAR is not required.

(6) 802.11 g conducted power is lower 0.25dB than 802.11 b, thus choose 802.11 b for the test.

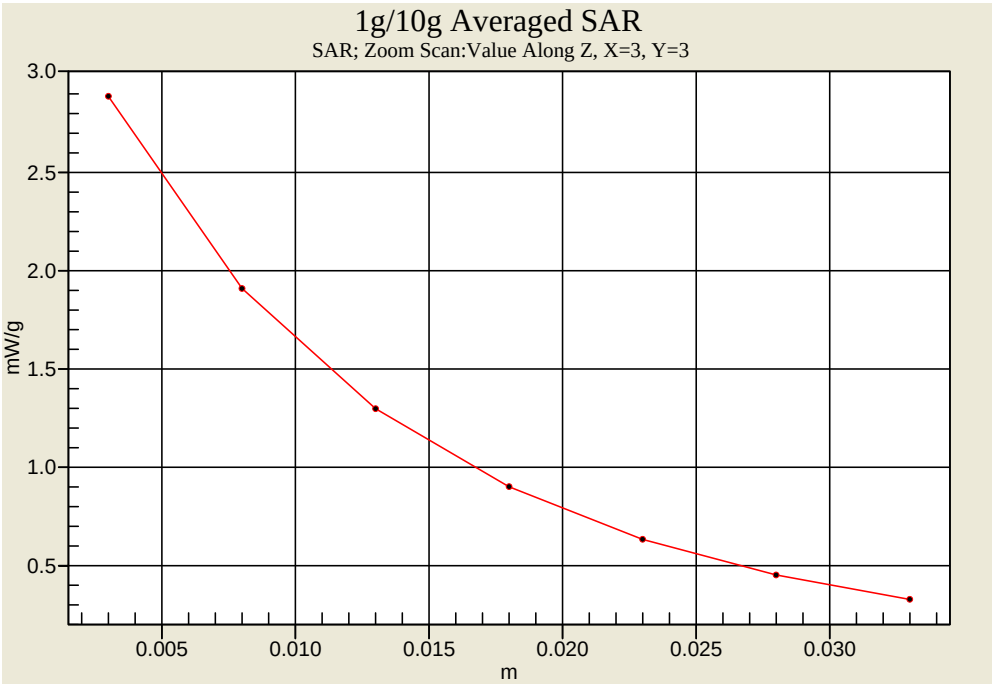
Simultaneously SAR is not required.

7.6 System Performance Check

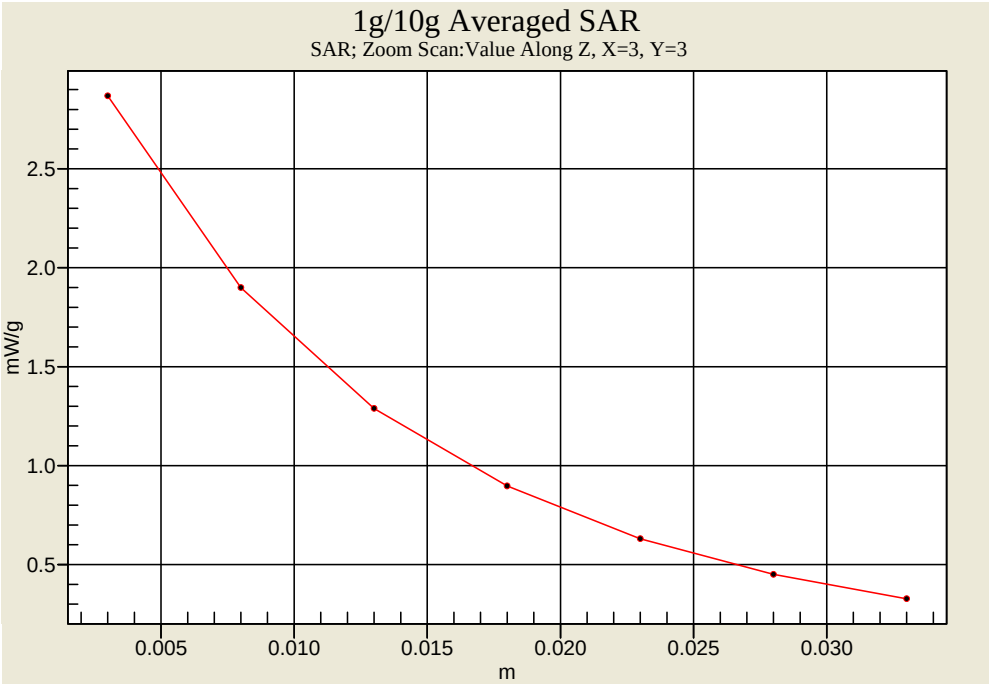
Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of ± 7%. The validation was performed at 835MHz, 1900MHz and 2450MHz.

Validation kit		Mixture Type	SAR_{1g} [mW/g]		SAR_{10g} [mW/g]		Date of Calibration
D835V2-SN4d082		Head	9.60		6.24		07/10/2010
		Body	10.32		6.76		
D1900V2-SN5d111		Head	40.40		21.12		07/16/2010
		Body	42.40		22.64		
D2450V2-SN712		Body	52.00		23.88		02/19/2010
Frequency (MHz)	**Power (dBm)**	**SAR_{1g} (mW/g)**	**SAR_{10g} (mW/g)**	**Drift (dB)**	**Difference Percentage**		**Date of Test**
					1g	**10g**	
835 (Head)	250mW	2.44	1.58	-0.024	1.7 %	1.3 %	10/02/2010
	Normalize to 1 Watt	9.76	6.32				
835 (Head)	250mW	2.43	1.58	-0.018	1.3 %	1.3 %	10/21/2010
	Normalize to 1 Watt	9.72	6.32				
1900 (Head)	250mW	10.3	5.4	0.002	2.0 %	2.3 %	10/03/2010
	Normalize to 1 Watt	41.2	21.6				
1900 (Head)	250mW	10.5	5.52	-0.022	4.0 %	4.5 %	10/21/2010
	Normalize to 1 Watt	42	22.08				
835 (Body)	250mW	2.49	1.64	0.007	-3.5 %	-3.0 %	10/02/2010
	Normalize to 1 Watt	9.96	6.56				
835 (Body)	250mW	2.6	1.72	0.028	0.8 %	1.8 %	10/21/2010
	Normalize to 1 Watt	10.4	6.88				
1900 (Body)	250mW	10.5	5.57	-0.025	-0.9 %	-1.6 %	10/06/2010
	Normalize to 1 Watt	42.0	22.28				
1900 (Body)	250mW	10.5	5.51	0.002	-0.9	-2.7 %	10/21/2010
	Normalize to 1 Watt	42	22.04				
2450 (Body)	250mW	12.7	5.98	-0.027	-2.3 %	0.2 %	10/06/2010
	Normalize to 1 Watt	50.8	23.92				
2450 (Body)	250mW	13.2	5.72	-0.008	1.5 %	-4.2 %	11/19/2010
	Normalize to 1 Watt	52.8	22.88				

Z-axis Plot of System Performance Check

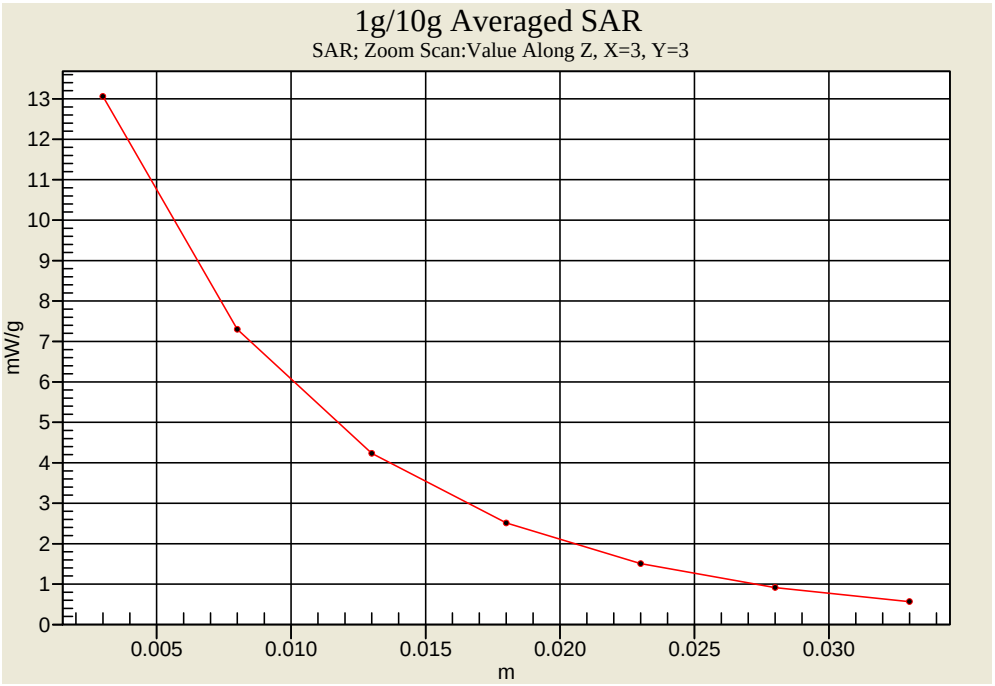


Head-Tissue-Simulating-Liquid 835MHz (09/02/2010)

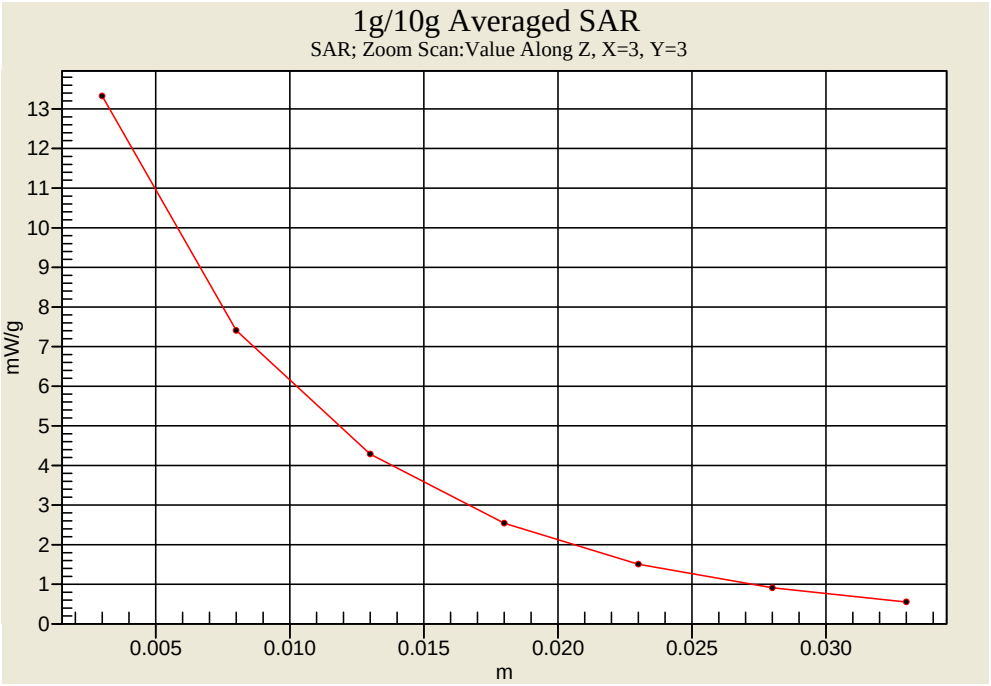


Head-Tissue-Simulating-Liquid 835MHz(10/21/2010)

Z-axis Plot of System Performance Check

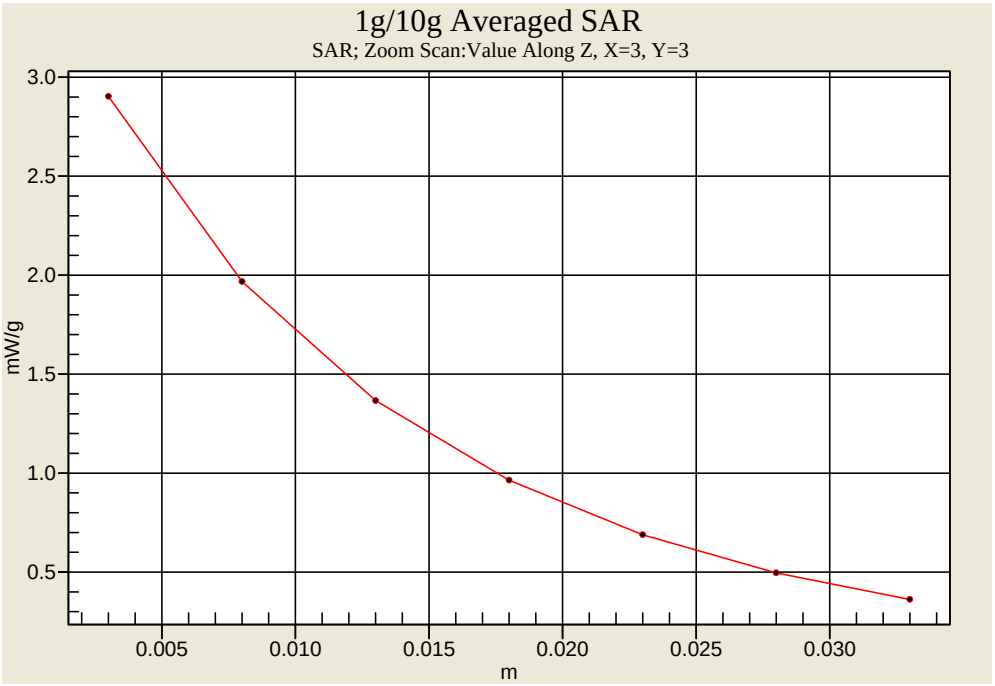


Head-Tissue-Simulating-Liquid 1900MHz(09/03/2010)

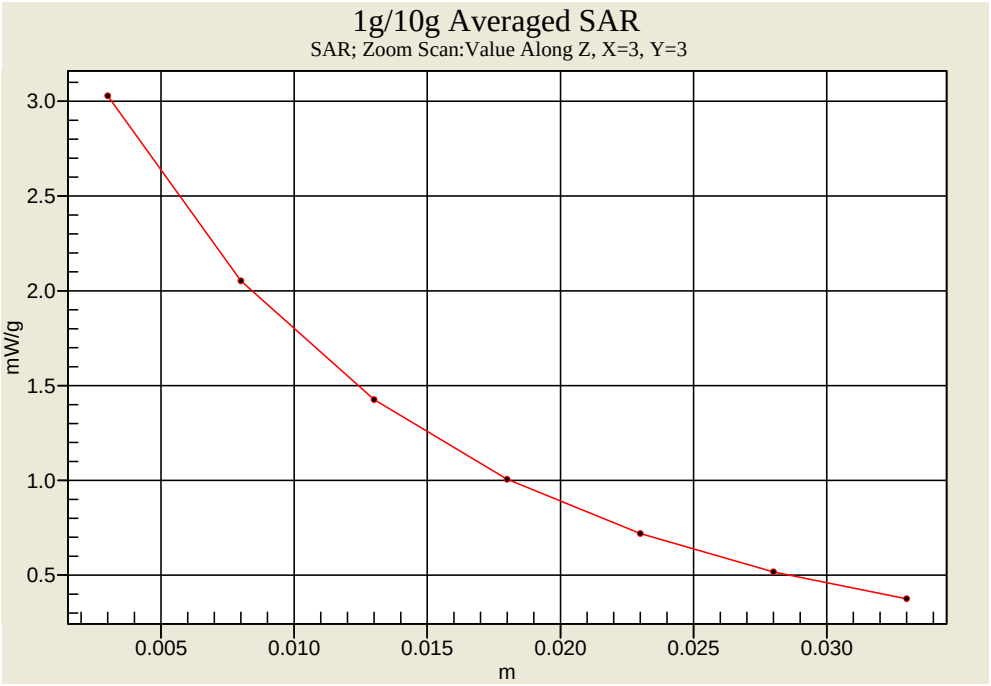


Head-Tissue-Simulating-Liquid 1900MHz(10/21/2010)

Z-axis Plot of System Performance Check

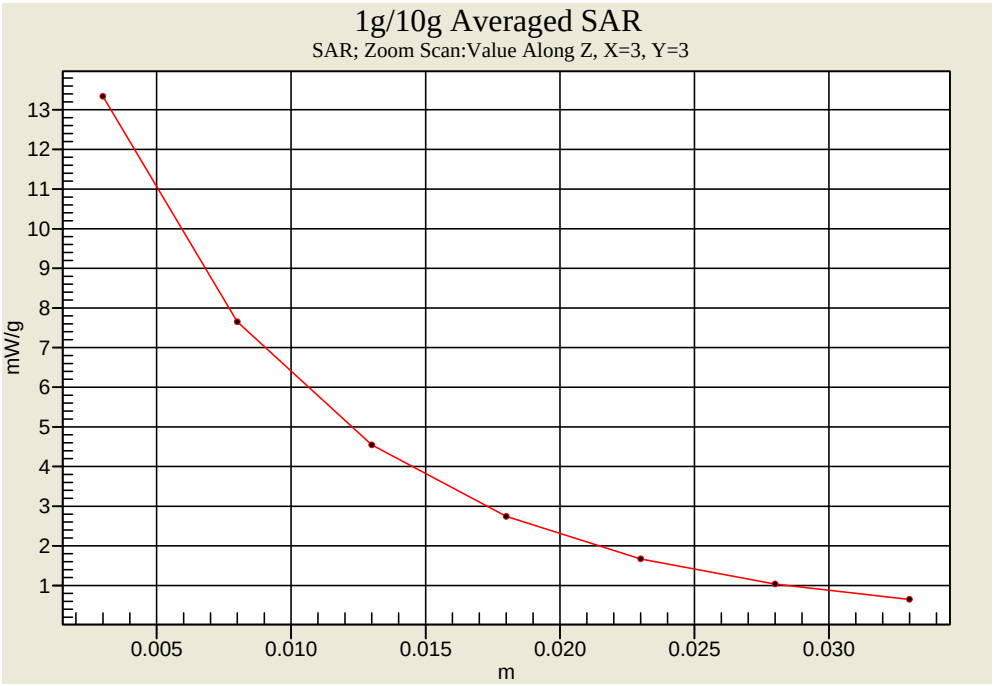


Body-Tissue-Simulating-Liquid 835MHz(09/02/2010)

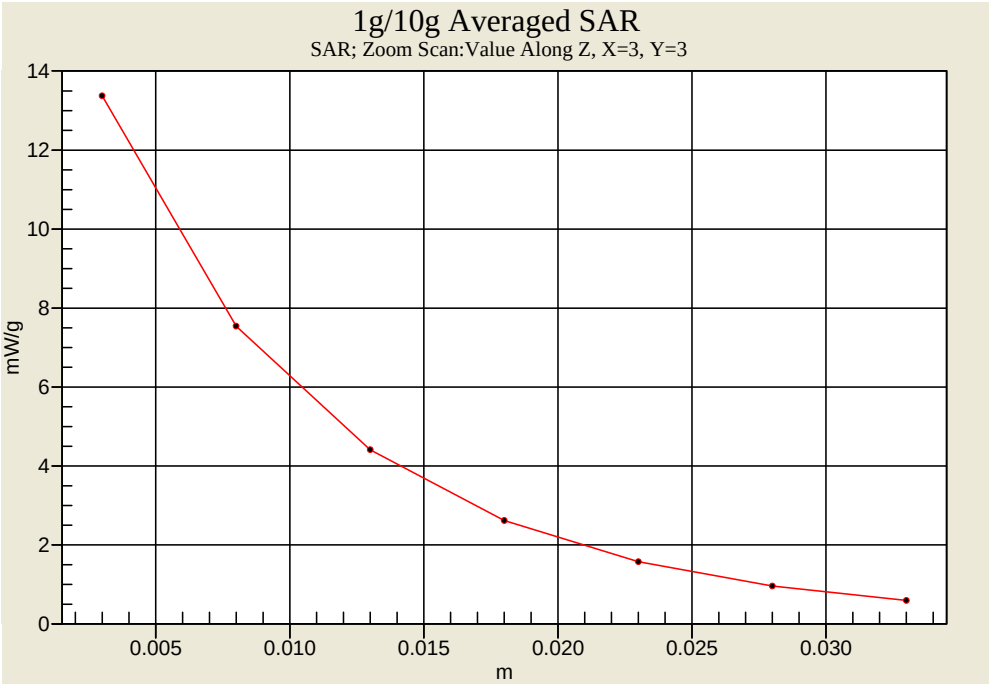


Body-Tissue-Simulating-Liquid 835MHz(10/21/2010)

Z-axis Plot of System Performance Check

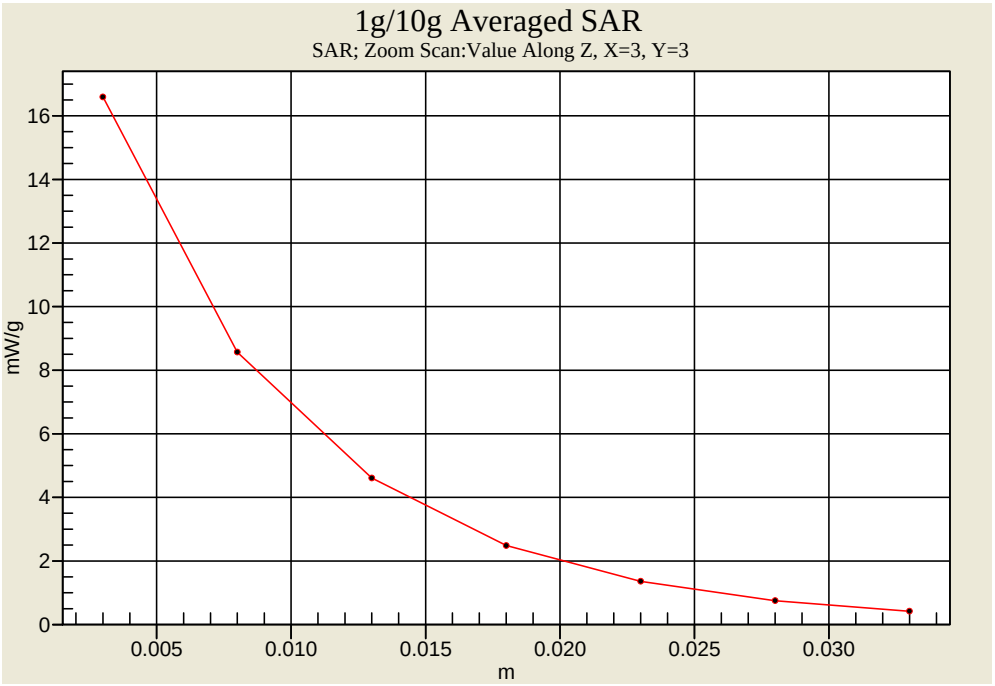


Body-Tissue-Simulating-Liquid 1900MHz(09/06/2010)

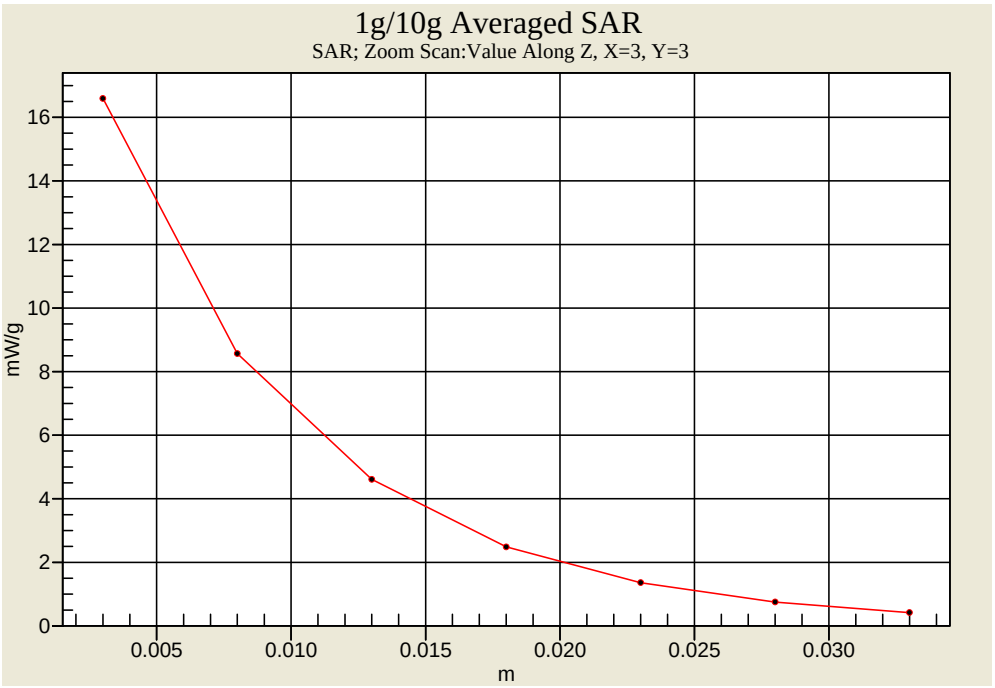


Body-Tissue-Simulating-Liquid 1900MHz(10/21/2010)

Z-axis Plot of System Performance Check



Body-Tissue-Simulating-Liquid 2450MHz(10/06/2010)



Body-Tissue-Simulating-Liquid 2450MHz(11/19/2010)

7.7 Measurement Procedures

The evaluation was performed with the following procedures：

Surface Check： A surface checks job gathers data used with optical surface detection. It determines the distance from the phantom surface where the reflection from the optical detector has its peak. Any following measurement jobs using optical surface detection will then rely on this value. The surface check performs its search a specified number of times, so that the repeatability can be verified. The probe tip distance is 1.3mm to phantom inner surface during scans.

Reference： The reference job measures the field at a specified reference position, at 4 mm from the selected section's grid reference point.

Area Scan： The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a finer measurement around the hot spot. The sophisticated interpolation routines can find the maximum locations even in relatively coarse grids. When an area scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. Any following zoom scan within the same procedure will then perform fine scans around these maxima. The area covered the entire dimension of the EUT and the horizontal grid spacing was 15 mm × 15 mm.

Zoom Scan： Zoom scans are used to assess the highest averaged SAR for cubic averaging volumes with 1 g and 10 g of simulated tissue. The zoom scan measures 7 x 7 x 9 points in a 30 x 30 x 24 mm cube whose base faces are centered around the maxima returned from a preceding area scan within the same procedure.

Drift： The drift job measures the field at the same location as the most recent reference job within the same procedure, with the same settings. The drift measurement gives the field difference in dB from the last reference measurement. Several drift measurements are possible for each reference measurement. This allows monitoring of the power drift of the device in the batch process. If the value changed by more than 5%, the evaluation was repeated.

7.8 Spatial Peak SAR Evaluation

The DASY4 software includes all numerical procedures necessary to evaluate the spatial peak SAR values. Based on the Draft: SCC-34, SC-2, WG-2 - Computational Dosimetry, IEEE P1529/D0.0 (Draft Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) Associated with the Use of Wireless Handsets - Computational Techniques), a new algorithm has been implemented. The spatial-peak SAR can be computed over any required mass.

The base for the evaluation is a ”cube” measurement in a volume of (32x32x30)mm^3 (5x5x7 points). The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan. If the 10g cube or both cubes are not entirely inside the measured volumes, the system issues a warning regarding the evaluated spatial peak values within the Postprocessing engine (SEMCAD). This means that if the measured volume is shifted, higher values might be possible. To get the correct values you can use a finer measurement grid for the area scan. In complicated field distributions, a large grid spacing for the area scan might miss some details and give an incorrectly interpolated peak location.
The entire evaluation of the spatial peak values is performed within the Postprocessing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into three stages:

Interpolation and Extrapolation

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

In DASY4, the choice of the coordinate system defining the location of the measurement points has no influence on the uncertainty of the interpolation, Maxima Search and SAR extrapolation routines. The interpolation, Maxima Search and extrapolation routines are all based on the modified Quadratic Shepard’s method [7].

8. Measurement Uncertainty

Measurement uncertainties in SAR measurements are difficult to quantify due to several variables including biological, physiological, and environmental. However, we estimate the measurement uncertainties in SAR to be less than ± 21.0 %〔8〕.

According to Std. C95.3〔9〕, the overall uncertainties are difficult to assess and will vary with the type of meter and usage situation. However, accuracy's of ±1 to 3 dB can be expected in practice, with greater uncertainties in near-field situations and at higher frequencies (shorter wavelengths), or areas where large reflecting objects are present. Under optimum measurement conditions, SAR measurement uncertainties of at least ±2dB can be expected.

According to CENELEC〔10〕, typical worst-case uncertainty of field measurements is ±5 dB. For well-defined modulation characteristics the uncertainty can be reduced to ±3 dB.

Error Description	Uncertainty value	Prob. Dist.	Div.	(*ci*) 1g	(*ci*) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(*vi*) *veff*
Measurement System								
Probe Calibration	± 5.5 %	N	1	1	1	± 5.5 %	± 5.5 %	
Axial Isotropy	± 4.7 %	R		0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical Isotropy	± 9.6 %	R	$\sqrt{3}$	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary Effects	± 1.0 %	R	$\sqrt{3}$	1	1	± 0.6 %	± 0.6 %	∞
Linearity	± 4.7 %	R	$\sqrt{3}$	1	1	± 2.7 %	± 2.7 %	∞
System Detection Limits	± 1.0 %	R	$\sqrt{3}$	1	1	± 0.6 %	± 0.6 %	∞
Readout Electronics	± 0.3 %	N	1	1	1	± 0.3 %	± 0.3 %	∞
Response Time	± 0.8 %	R	$\sqrt{3}$	1	1	± 0.5 %	± 0.5 %	∞
Integration Time	± 2.6 %	R	$\sqrt{3}$	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Noise	± 3.0 %	R	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Reflections	± 3.0 %	R	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.4 %	R	$\sqrt{3}$	1	1	± 0.2 %	± 0.2 %	∞
Probe Positioning	± 2.9 %	R	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
Max. SAR Eval.	± 1.0 %	R	$\sqrt{3}$	1	1	± 0.6 %	± 0.6 %	∞
Test Sample Related								
Device Positioning	± 2.9 %	N	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6 %	N	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0 %	R	$\sqrt{3}$	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Setup								
Phantom Uncertainty	± 4.0 %	R	$\sqrt{3}$	1	1	± 2.3 %	2.3 %	∞
Liquid Conductivity (target)	± 5.0 %	R	$\sqrt{3}$	0.64	0.43	± 1.8 %	1.2 %	∞
Liquid Conductivity (meas.)	± 2.5 %	N	1	0.64	0.43	± 1.6 %	1.1 %	∞
Liquid Permittivity (target)	± 5.0 %	R	$\sqrt{3}$	0.6	0.49	± 1.7 %	1.4 %	∞
Liquid Permittivity (meas.)	± 2.5 %	N	1	0.6	0.49	± 1.5 %	1.2 %	∞
Combined Std. Uncertainty						± **10.7 %**	± **10.5 %**	387
Expanded STD Uncertainty						± **21.4 %**	± **21.0 %**	

Table 4. Uncertainty Budget of DASY

9. SAR Test Results Summary

Detail results see Appendix B.

9.1 GSM 850 - Head SAR

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

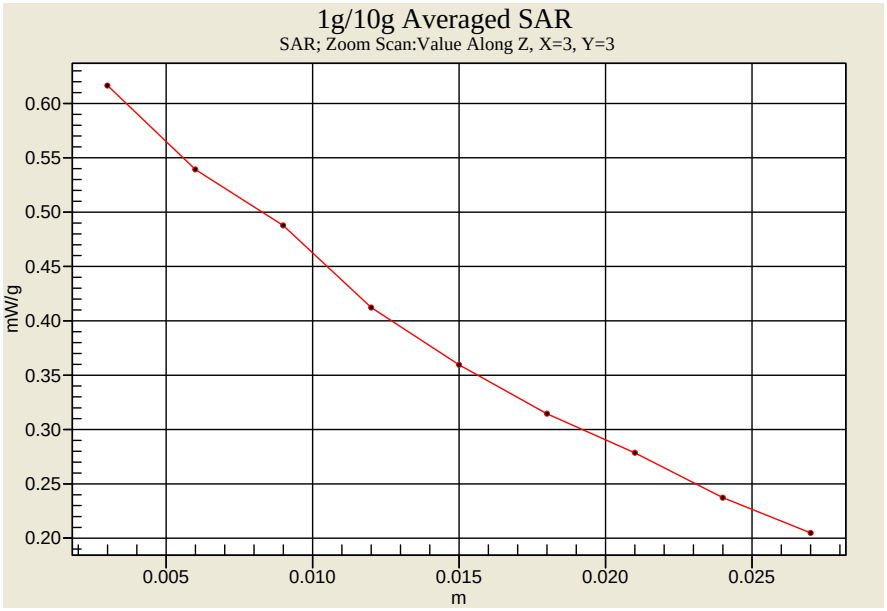
Liquid：

Mixture Type：	HSL835	Liquid Temperature (℃) ：	22.0
		Depth of liquid (cm)：	15

Measurement：

Duty Cycle：	1:8.3	Probe S/N：	3578

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
824.2	128	GSM 850	24.05	Right-Cheek	PIFA	N/A	0.331	-0.020	-----
824.2	128	GSM 850	23.71	Right-Cheek	PIFA	N/A	**0.560**	-0.015	#2 GSM power Amplifier
824.2	128	GSM 850	24.05	Right-Tilted	PIFA	N/A	0.199	0.024	-----
824.2	128	GSM 850	23.71	Right-Tilted	PIFA	N/A	0.375	0.034	#2 GSM power Amplifier
824.2	128	GSM 850	24.05	Left-Cheek	PIFA	N/A	0.275	0.070	-----
824.2	128	GSM 850	23.71	Left-Cheek	PIFA	N/A	0.468	-0.02	#2 GSM power Amplifier
824.2	128	GSM 850	24.05	Left-Tilted	PIFA	N/A	0.192	0.078	-----
824.2	128	GSM 850	23.71	Left-Tilted	PIFA	N/A	0.366	-0.023	#2 GSM power Amplifier
Std. C95.1-2005 / RSS-102-2009 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						**1.6 W/kg (mW/g) Averaged over 1 gram**			



Z-axis Plot of Right-Cheek GSM850 CH 128_#2 GSM power Amplifier

9.2 PCS 1900 - Head SAR

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

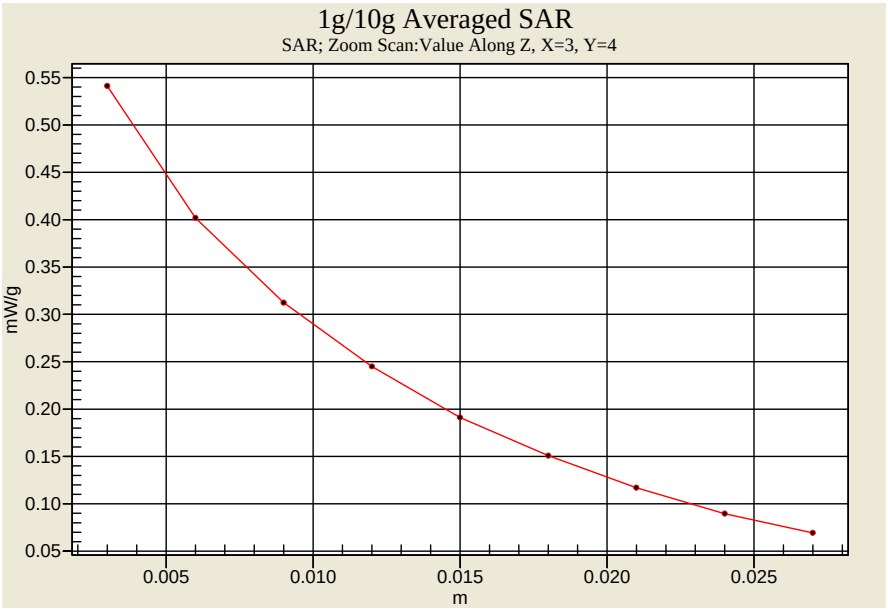
Liquid：

Mixture Type：	HSL1900	Liquid Temperature (℃) ：	22.0
		Depth of liquid (cm)：	15

Measurement：

Duty Cycle：	1:8.3	Probe S/N：	3578

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
1850.2	512	PCS 1900	21.31	Right-Cheek	PIFA	N/A	0.454	-0.065	#2 GSM power Amplifier
1850.2	512	PCS 1900	21.31	Right-Tilted	PIFA	N/A	0.415	0.005	#2 GSM power Amplifier
1850.2	512	PCS 1900	21.31	Left-Cheek	PIFA	N/A	0.431	-0.033	#2 GSM power Amplifier
1850.2	512	PCS 1900	21.31	Left-Tilted	PIFA	N/A	0.341	0.015	#2 GSM power Amplifier
1909.8	810	PCS 1900	21.06	Right-Cheek	PIFA	N/A	**0.456**	0.049	-----
1909.8	810	PCS 1900	21.06	Right-Tilted	PIFA	N/A	0.265	0.038	-----
1909.8	810	PCS 1900	21.06	Left-Cheek	PIFA	N/A	0.392	0.034	-----
1909.8	810	PCS 1900	21.06	Left-Tilted	PIFA	N/A	0.201	0.008	-----
Std. C95.1-2005 / RSS-102-2009 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						**1.6 W/kg (mW/g) Averaged over 1 gram**			



Z-axis Plot of Right-Check PCS1900 CH 810

9.3 WCDMA (RMC 12.2K) Band II - Head SAR

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

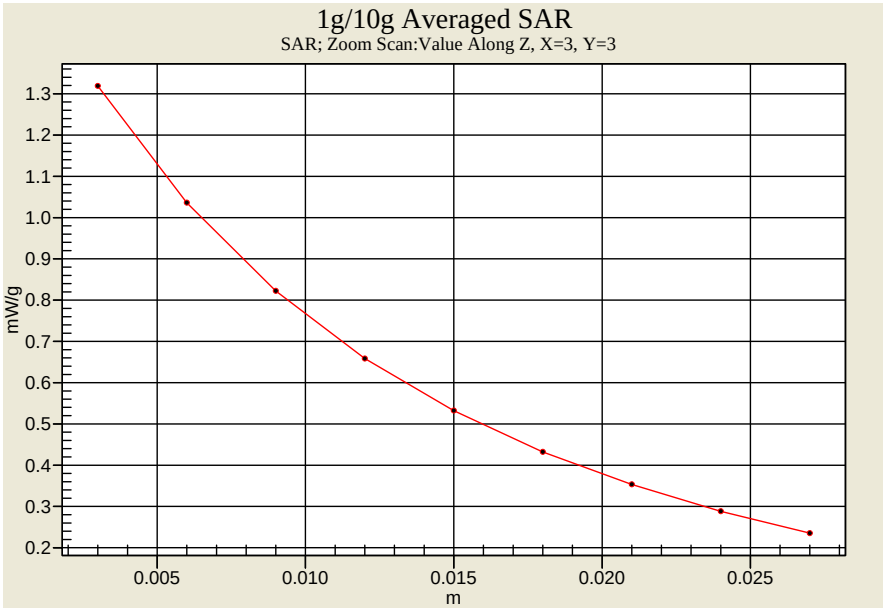
Liquid：

Mixture Type：	HSL1900	Liquid Temperature (℃) ：	22.0
		Depth of liquid (cm)：	15

Measurement：

Duty Cycle：	1:1	Probe S/N：	3578

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
1880.0	9400	Band II	23.54	Right-Cheek	PIFA	N/A	1.010	0.016	-----
1880.0	9400	Band II	23.54	Right-Tilted	PIFA	N/A	0.574	0.013	-----
1852.4	9262	Band II	23.37	Left-Cheek	PIFA	N/A	1.010	-0.029	-----
1880.0	9400	Band II	23.54	Left-Cheek	PIFA	N/A	**1.140**	0.150	-----
1907.6	9538	Band II	23.36	Left-Cheek	PIFA	N/A	0.893	0.017	-----
1880.0	9400	Band II	23.54	Left-Tilted	PIFA	N/A	0.623	-0.006	-----
Std. C95.1-2005 / RSS-102-2009 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			



Z-axis Plot of Left-Check WCDMA Band II CH 9400

9.4 WCDMA (RMC 12.2K) Band V - Head SAR

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

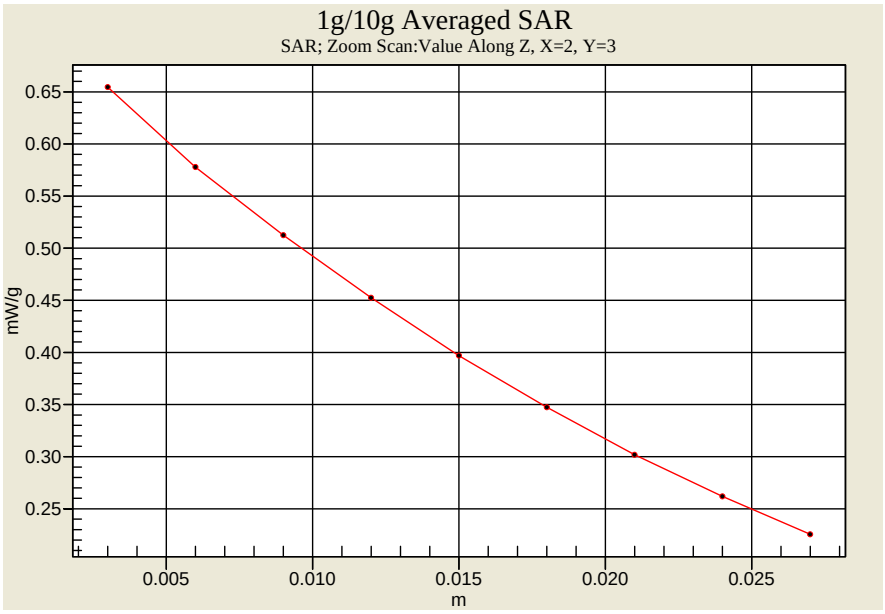
Liquid：

Mixture Type：	HSL835	Liquid Temperature (℃) ：	22.0
		Depth of liquid (cm)：	15

Measurement：

Duty Cycle：	1:1	Probe S/N：	3578

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
846.4	4233	Band V	24.01	Right-Cheek	PIFA	N/A	**0.595**	-0.162	-----
846.4	4233	Band V	24.01	Right-Tilted	PIFA	N/A	0.384	0.081	-----
846.4	4233	Band V	24.01	Left-Cheek	PIFA	N/A	0.540	-0.130	-----
846.4	4233	Band V	24.01	Left-Tilted	PIFA	N/A	0.387	0.096	-----
Std. C95.1-2005 / RSS-102-2009 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						**1.6 W/kg (mW/g) Averaged over 1 gram**			



Z-axis Plot of Right-Check WCDMA Band V CH 4233

9.5 GSM / GPRS 850 - Body SAR (EUT 15 mm separation to Phantom)

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

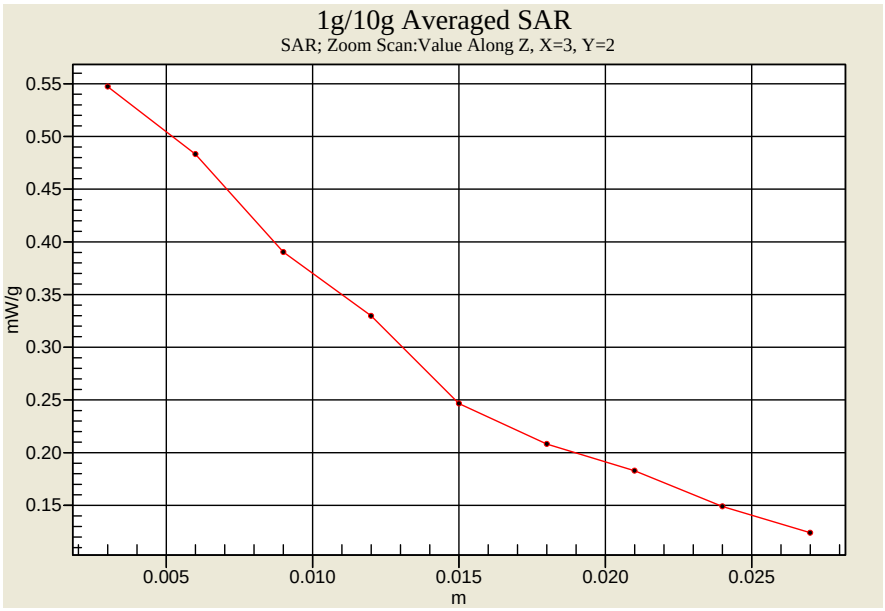
Liquid：

Mixture Type：	MSL835	Liquid Temperature (℃) ：	22.0
		Depth of liquid (cm)：	15

Measurement：

Duty Cycle：	1:8.3	Probe S/N：	3578
	3Down2Up -- 1:4.2		

Frequency MHz	Frequency CH	Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
824.2	128	GSM 850	24.05	Flat	PIFA	Headset	0.132	0.036	-----
824.2	128	GSM 850	23.71	Flat	PIFA	Headset	0.278	-0.076	#2 GSM power Amplifier
848.8	251	GPRS 850 3Down2Up	26.41	Flat	PIFA	Headset	0.362	0.070	-----
848.8	251	GPRS 850 3Down2Up	26.17	Flat	PIFA	Headset	**0.466**	-0.004	#2 GSM power Amplifier
Std. C95.1-2005 / RSS-102-2009 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						**1.6 W/kg (mW/g) Averaged over 1 gram**			



Z-axis Plot of Flat GPRS850 CH 251 (3Down2Up)_ #2 GSM power Amplifier

9.6 PCS / GPRS 1900 - Body SAR (EUT 15 mm separation to Phantom)

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

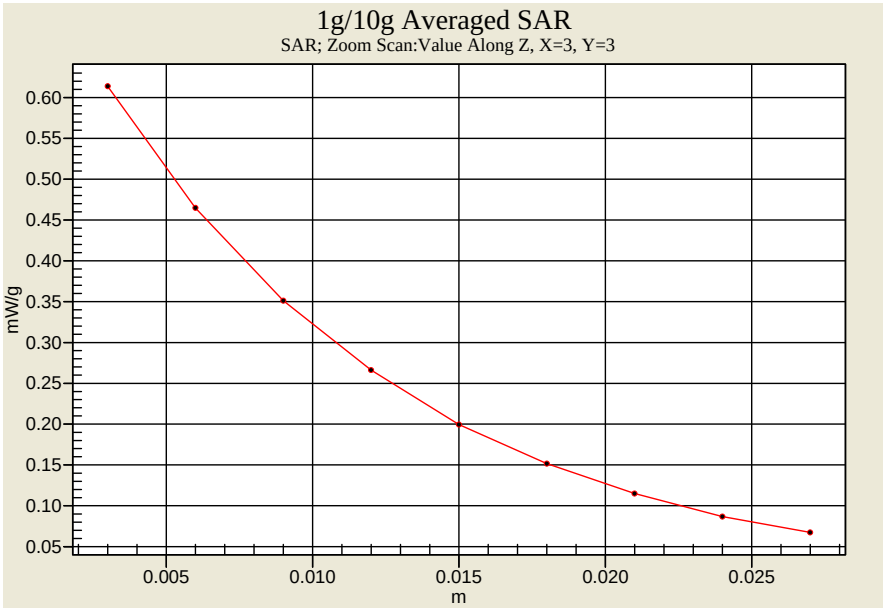
Liquid：

Mixture Type：	MSL1900	Liquid Temperature (℃) ：	22.0
		Depth of liquid (cm)：	15

Measurement：

Duty Cycle：	1:8.3	Probe S/N：	3578
	3Down2Up -- 1:4.2		

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
1909.8	810	PCS 1900	21.06	Flat	PIFA	Headset	0.181	0.056	-----
1850.2	512	PCS 1900	21.31	Flat	PIFA	Headset	0.340	-0.052	#2 GSM power Amplifier
1909.8	810	GPRS 1900 3Down2Up	23.36	Flat	PIFA	Headset	0.402	-0.074	-----
1909.8	810	GPRS 1900 3Down2Up	23.37	Flat	PIFA	Headset	**0.512**	-0.105	#2 GSM power Amplifier
Std. C95.1-2005 / RSS-102-2009 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						**1.6 W/kg (mW/g) Averaged over 1 gram**			



Z-axis Plot of Flat GPRS 1900 CH 810 (3Down2Up)_ #2 GSM power Amplifier

9.7 WCDMA (RMC 12.2K) Band II - Body SAR (EUT 15 mm separation to Phantom)

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

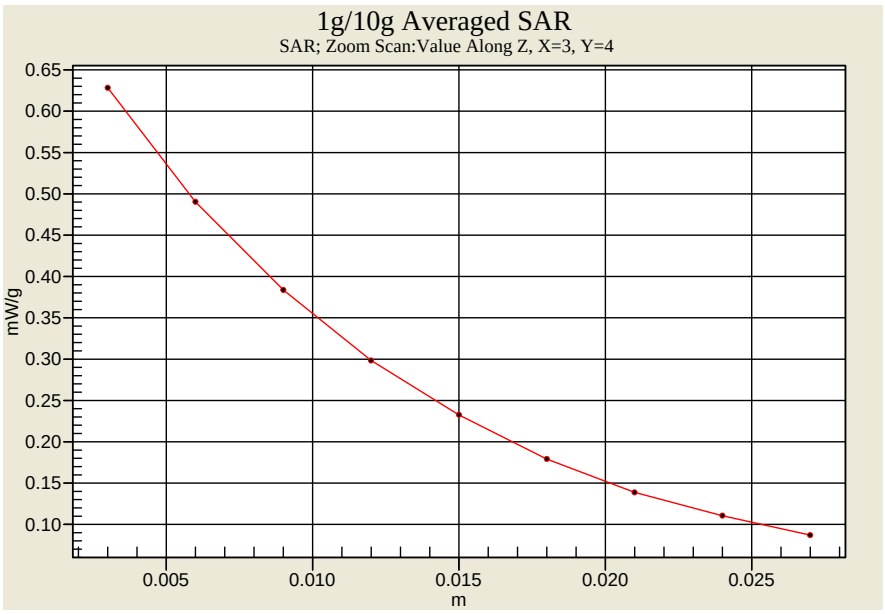
Liquid：

Mixture Type：	MSL1900	Liquid Temperature (℃) ：	22.0
		Depth of liquid (cm)：	15

Measurement：

Duty Cycle：	1:1	Probe S/N：	3578

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
1880.0	9400	Band II	23.54	Flat	PIFA	Headset	**0.534**	0.119	-----
Std. C95.1-2005 / RSS-102-2009 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			



Z-axis Plot of Flat WCDMA (RMC 12.2K) Band II CH9400

9.8 WCDMA (RMC 12.2K) Band V - Body SAR (EUT 15 mm separation to Phantom)

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

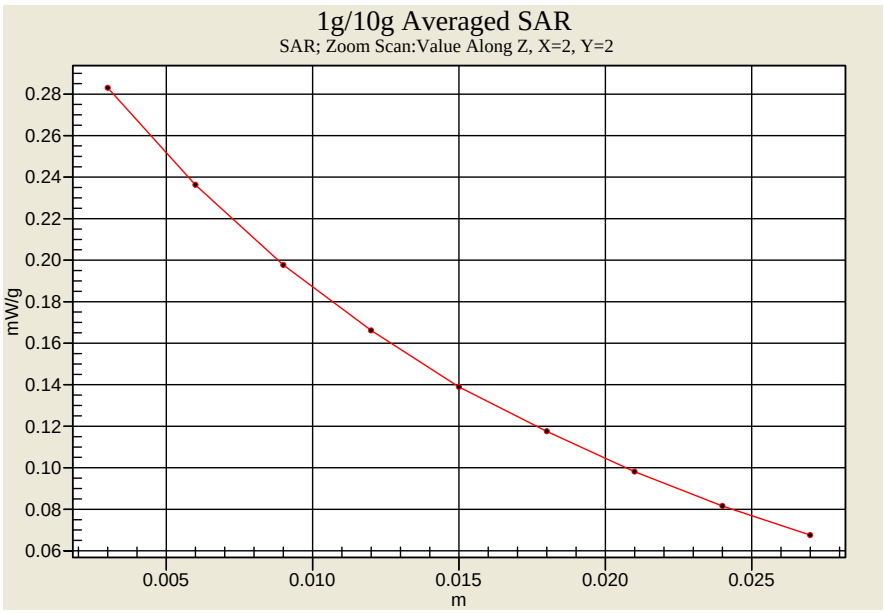
Liquid：

Mixture Type：	MSL835	Liquid Temperature (℃) ：	22.0
		Depth of liquid (cm)：	15

Measurement：

Duty Cycle：	1:1	Probe S/N：	3578

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
846.4	4233	Band V	24.01	Flat	PIFA	Headset	**0.255**	0.002	-----
Std. C95.1-2005 / RSS-102-2009 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						**1.6 W/kg (mW/g) Averaged over 1 gram**			



Z-axis Plot of Flat WCDMA (RMC 12.2K) Band V CH4233

9.9 IEEE 802.11b / Draft 802.11n 2.4GHz Standard-20MHz - Body SAR (EUT 15 mm separation to Phantom)

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

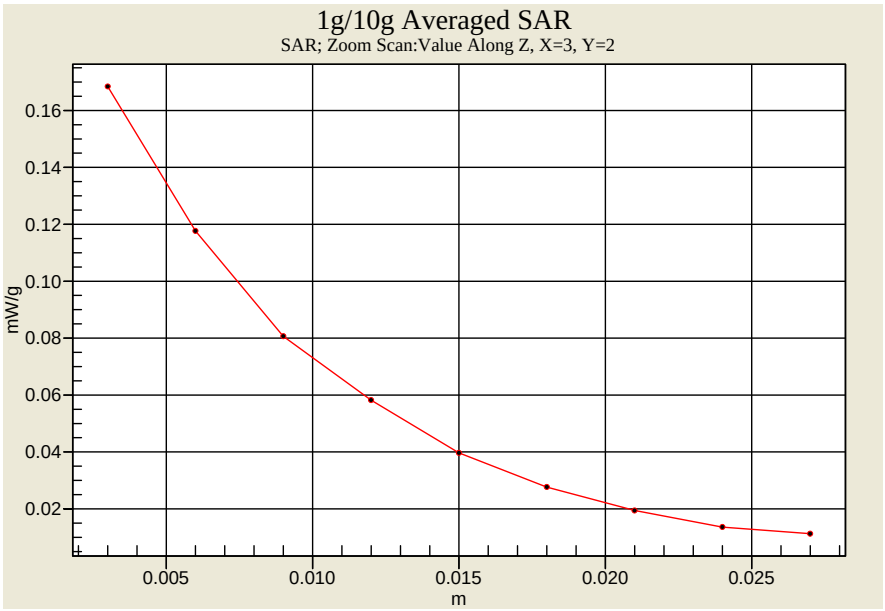
Liquid：

Mixture Type：	MSL2450	Liquid Temperature (℃) ：	22.0
		Depth of liquid (cm)：	15

Measurement：

Duty Cycle：	1:1	Probe S/N：	3578

Frequency		Band	Rate	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH									
2412	01	802.11b	2M	17.70	Flat	PIFA	Headset	**0.131**	-0.065	-----
2412	01	802.11n	6.5M	12.28	Flat	PIFA	Headset	0.032	0.150	-----
Std. C95.1-2005 / RSS-102-2009 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population							**1.6 W/kg (mW/g) Averaged over 1 gram**			



Z-axis Plot of Flat IEEE 802.11b CH 1 (Rate 2 M)

9.10 IEEE 802.11b / Draft 802.11n 2.4GHz Standard-20MHz for Wi-Fi Hotspot Function - Body SAR (EUT 10 mm separation to Phantom)

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

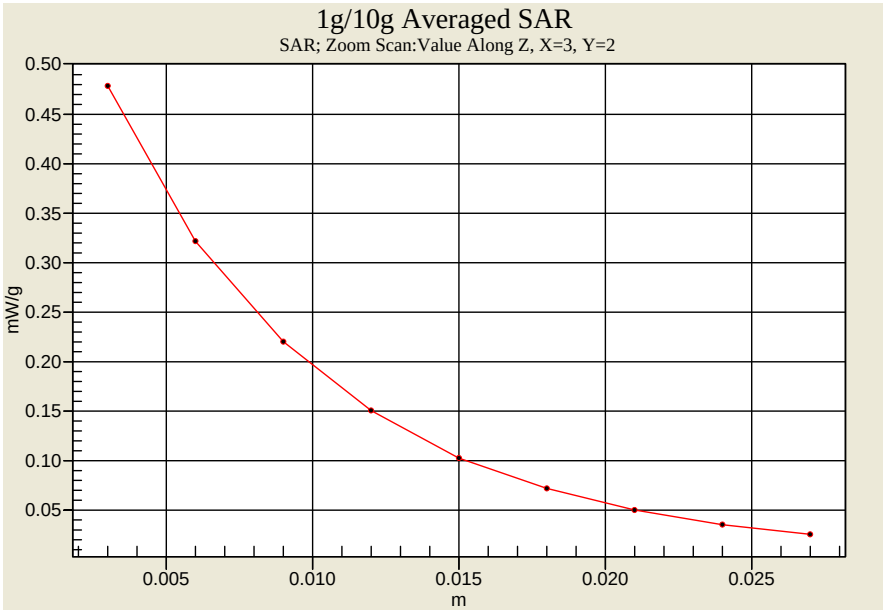
Liquid：

Mixture Type：	MSL2450	Liquid Temperature (℃) ：	22.0
		Depth of liquid (cm)：	15

Measurement：

Duty Cycle：	1:1	Probe S/N：	3519

Frequency		Band	Rate	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH									
2412	01	802.11b	2M	17.70	Flat	PIFA	Headset	**0.362**	0.009	-----
2412	01	802.11n	6.5M	12.28	Flat	PIFA	Headset	0.084	-0.148	-----
Std. C95.1-2005 / RSS-102-2009 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population							**1.6 W/kg (mW/g) Averaged over 1 gram**			



Z-axis Plot of Flat IEEE 802.11b CH 1 (Rate 2 M)

9.11 Std. C95.1-2005 RF Exposure Limit

Human Exposure	Population Uncontrolled	Occupational Controlled
	Exposure	Exposure
	(W/kg) or (mW/g)	(W/kg) or (mW/g)
Spatial Peak SAR*	1.60	8.00
(head)		
Spatial Peak SAR**	0.08	0.40
(Whole Body)		
Spatial Peak SAR***	1.60	8.00
(Partial-Body)		
Spatial Peak SAR******	4.00	20.00
(Hands / Feet / Ankle / Wrist)		

Table 5. Safety Limits for Partial Body Exposure

Notes：

***** The Spatial Peak value of the SAR averaged over any 1 gram of tissue.
(defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

****** The Spatial Average value of the SAR averaged over the whole – body.

******* The Spatial Average value of the SAR averaged over the partial – body.

******** The Spatial Peak value of the SAR averaged over any 10 grams of tissue.
(defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Population / Uncontrolled Environments： are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Occupational / Controlled Environments： are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

10. Conclusion

The SAR test values found for the portable mobile phone **HTC Corporation Trade Name：HTC Model(s)：PD98120** is below the maximum recommended level of 1.6 W/kg (mW/g).

11. References

[1] Std. C95.1-2005, "*American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300KHz to 100GHz",* New York.

[2] NCRP, National Council on Radiation Protection and Measurements, "*Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields"*, NCRP report NO. 86, 1986.

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[4] K. Pokovi ć, T. Schmid, and N. Kuster, "*Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequency*", in ICECOM'97, Dubrovnik, October 15-17, 1997, pp.120-124.

[5] K. Pokovi ć, T. Schmid, and N. Kuster, "*E-field probe with improved isotropy in brain simulating liquids*", in Proceedings of the ELMAR, Zadar, Croatia, 23-25 June, 1996, pp.172-175.

[6] N. Kuster, and Q. Balzano, "*Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz"*, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[7] Robert J. Renka, "*Multivariate Interpolation Of Large Sets Of Scattered Data*", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988 , pp. 139-148.

[8] N. Kuster, R. Kastle, T. Schmid, *Dosimetric evaluation of mobile communications equipment with known precision*, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[9] Std. C95.3-1991, "*IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave,* New York: IEEE, Aug. 1992.

[10] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), *Human Exposure to Electromagnetic Fields High-frequency*: 10KHz-300GHz, Jan. 1995.

[11] RSS-102, Issue 3 (June 2009), Radio Standards Specification 102.

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/2 AM 10:46:34

System Performance Check at 835MHz_20100902_Head

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.922 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

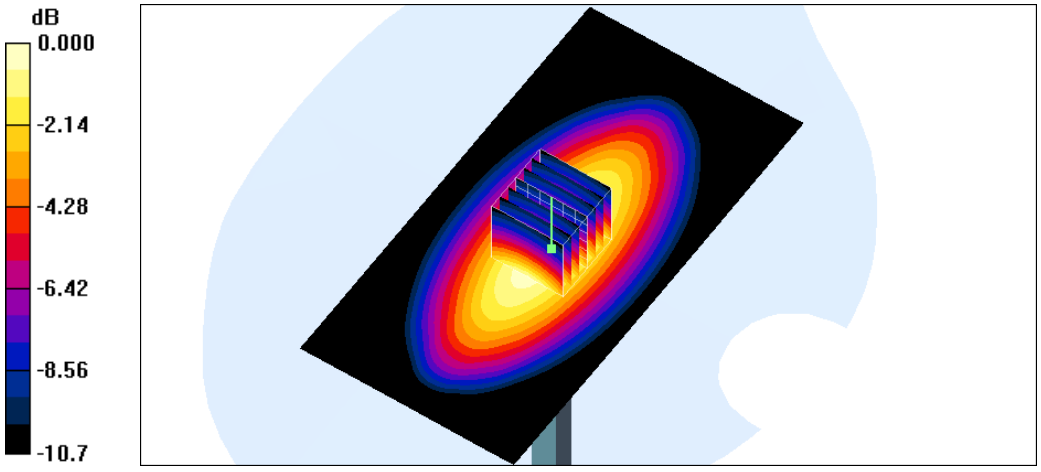
- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 835MHz/Area Scan (61x121x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.86 mW/g

System Performance Check at 835MHz/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.4 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 3.72 W/kg
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 2.87 mW/g



0 dB = 2.87mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 AM 09:01:27

System Performance Check at 835MHz_20101021_Head

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

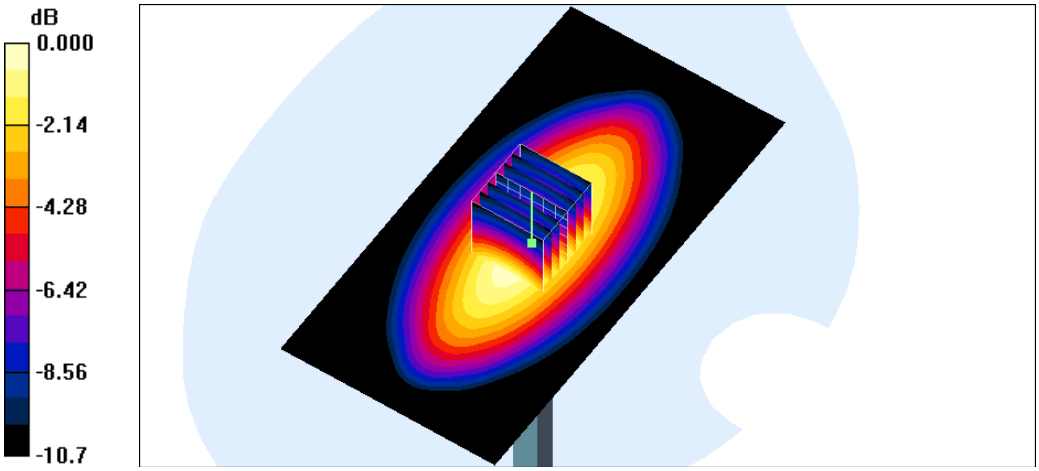
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.922 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 835MHz/Area Scan (61x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.86 mW/g

System Performance Check at 835MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.6 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 3.71 W/kg
SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 2.85 mW/g



0 dB = 2.85mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 AM 04:40:37

System Performance Check at 1900MHz_20100903_Head

DUT: Dipole D1900V2_SN5d111; Type: D1900V2; Serial: D1900V2 - SN:5d111

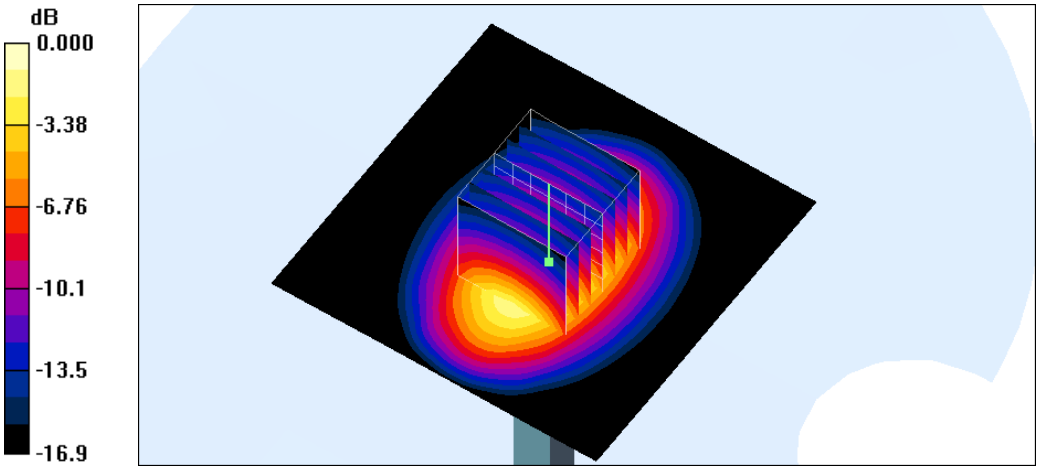
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.38 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 1900MHz/Area Scan (91x91x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 13.0 mW/g

System Performance Check at 1900MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.1 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.4 mW/g
Maximum value of SAR (measured) = 13.1 mW/g



0 dB = 13.1mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/20 AM 08:59:15

System Performance Check at 1900MHz_20101020_Head

DUT: Dipole D1900V2_SN5d111; Type: D1900V2; Serial: D1900V2 - SN:5d111

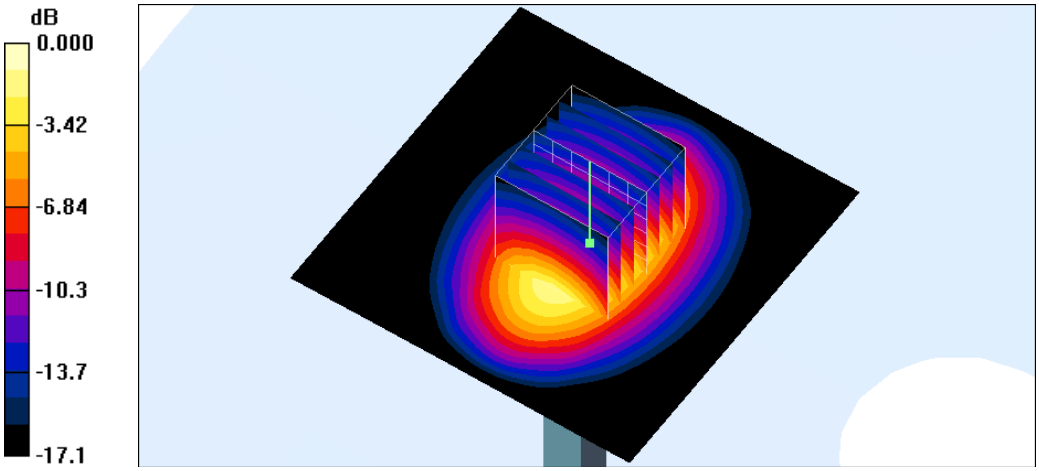
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.38 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 1900MHz/Area Scan (91x91x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 13.4 mW/g

System Performance Check at 1900MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.6 V/m; Power Drift = -0.022 dB
Peak SAR (extrapolated) = 19.3 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.52 mW/g
Maximum value of SAR (measured) = 13.3 mW/g



0 dB = 13.3mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 AM 03:49:49

System Performance Check at 835MHz_20100903_Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

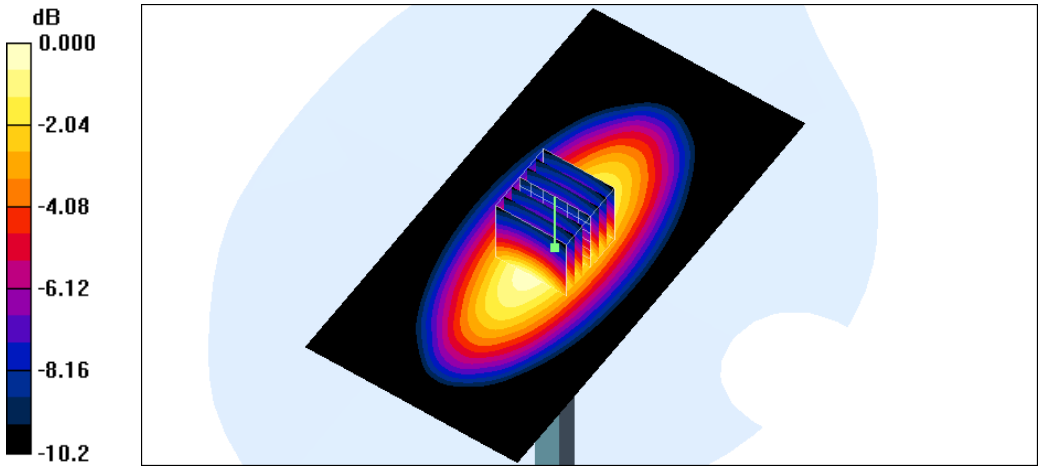
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.981 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.55, 8.55, 8.55); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 835MHz/Area Scan (61x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.94 mW/g

System Performance Check at 835MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.1 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 3.71 W/kg
SAR(1 g) = 2.49 mW/g; SAR(10 g) = 1.64 mW/g
Maximum value of SAR (measured) = 2.90 mW/g



0 dB = 2.90mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 AM 08:22:20

System Performance Check at 835MHz_20101021_Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

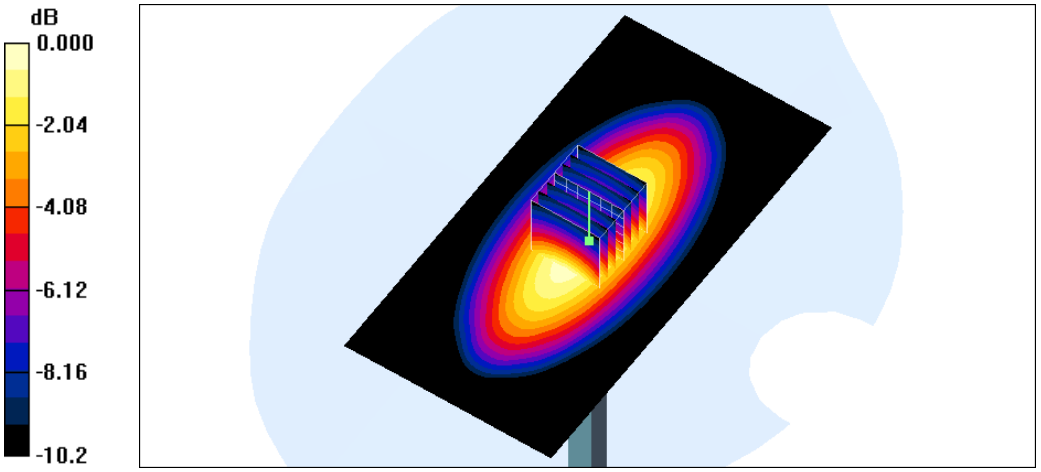
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.981 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.55, 8.55, 8.55); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 835MHz/Area Scan (61x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.03 mW/g

System Performance Check at 835MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.4 V/m; Power Drift = 0.028 dB
Peak SAR (extrapolated) = 3.87 W/kg
SAR(1 g) = 2.6 mW/g; SAR(10 g) = 1.72 mW/g
Maximum value of SAR (measured) = 3.03 mW/g



0 dB = 3.03mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/6 AM 07:39:05

System Performance Check at 1900MHz_20100906_Body

DUT: Dipole D1900V2_SN5d111; Type: D1900V2; Serial: D1900V2 - SN:5d111

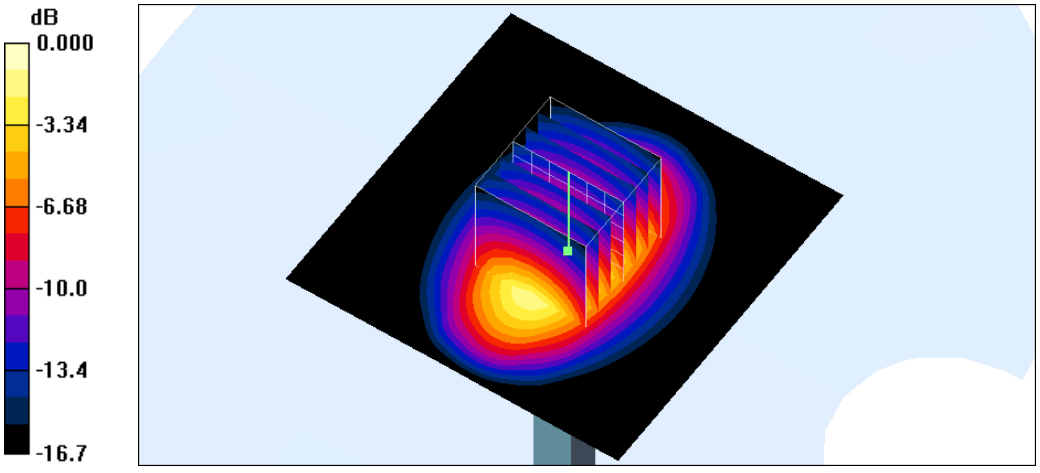
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.51 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.7, 6.7, 6.7); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 1900MHz/Area Scan (91x91x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 13.4 mW/g

System Performance Check at 1900MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.7 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.57 mW/g
Maximum value of SAR (measured) = 13.3 mW/g



0 dB = 13.3mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 PM 07:39:47

System Performance Check at 1900MHz_20101021_Body

DUT: Dipole D1900V2_SN5d111; Type: D1900V2; Serial: D1900V2 - SN:5d111

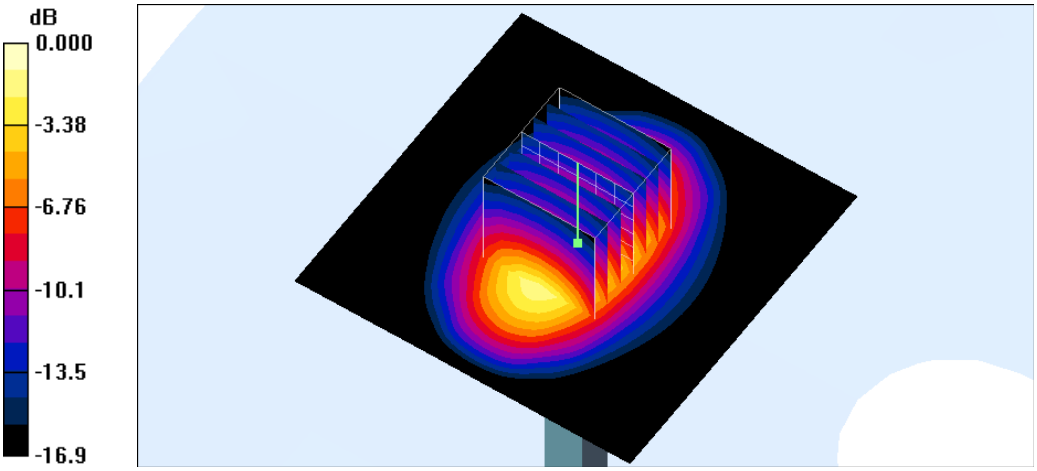
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.51 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.7, 6.7, 6.7); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 1900MHz/Area Scan (91x91x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 13.5 mW/g

System Performance Check at 1900MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.7 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 19.2 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.51 mW/g
Maximum value of SAR (measured) = 13.4 mW/g



0 dB = 13.4mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/6 PM 02:33:39

System Performance Check at 2450MHz_20100906_Body

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:712

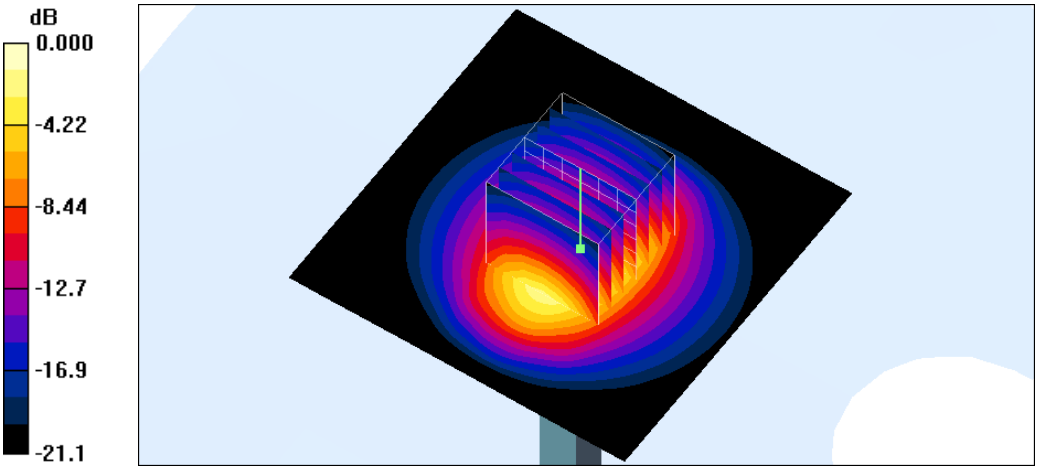
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.94 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.51, 6.51, 6.51); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 2450MHz/Area Scan (91x91x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 17.0 mW/g

System Performance Check at 2450MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.5 V/m; Power Drift = -0.027 dB
Peak SAR (extrapolated) = 25.5 W/kg
SAR(1 g) = 12.7 mW/g; SAR(10 g) = 5.98 mW/g
Maximum value of SAR (measured) = 16.6 mW/g



0 dB = 16.6mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/11/19 AM 10:58:52

System Performance Check at 2450MHz_20101119_Body

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:712

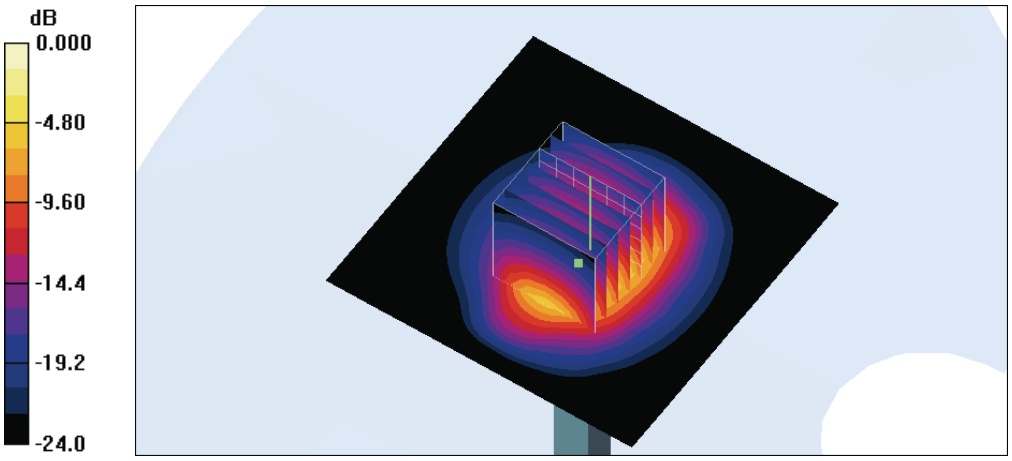
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.96 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV3 - SN3519; ConvF(8.1, 8.1, 8.1); Calibrated: 2010/2/23
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 2450MHz/Area Scan (61x61x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 19.0 mW/g

System Performance Check at 2450MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.9 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 29.7 W/kg
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 5.72 mW/g
Maximum value of SAR (measured) = 18.0 mW/g



0 dB = 18.0mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/2 AM 11:14:01

RC_GSM850 CH128

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

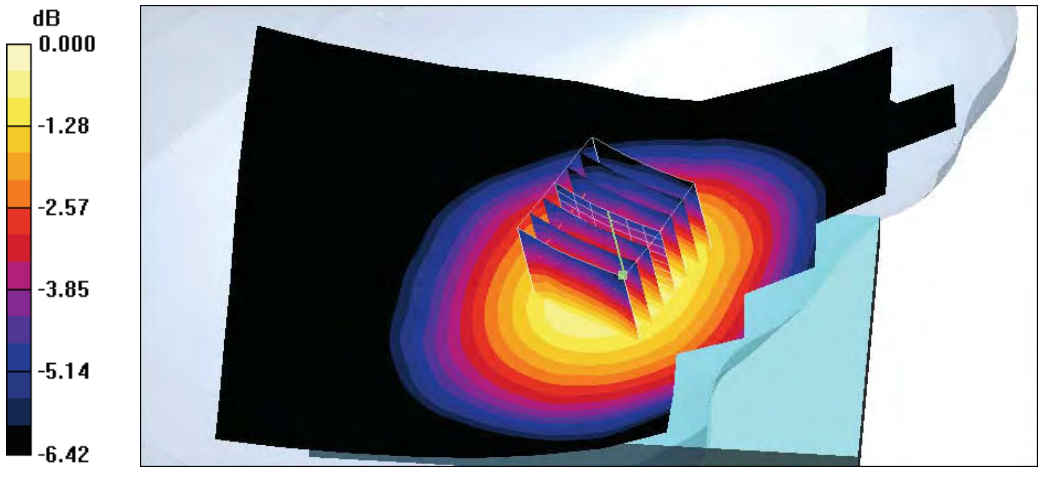
Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.912 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Cheek/Area Scan (71x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.359 mW/g

Right Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 7.80 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 0.457 W/kg
SAR(1 g) = 0.331 mW/g; SAR(10 g) = 0.251 mW/g
Maximum value of SAR (measured) = 0.369 mW/g



0 dB = 0.369mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 PM 12:23:21

RC_GSM850 CH128_#2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

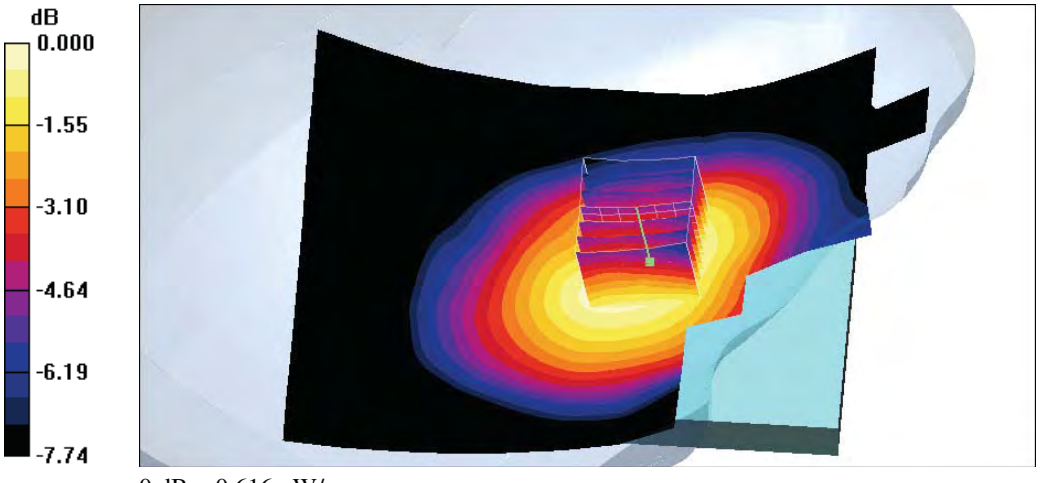
Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.912 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Cheek/Area Scan (81x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.640 mW/g

Right Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 10.4 V/m; Power Drift = -0.015 dB
Peak SAR (extrapolated) = 0.738 W/kg
SAR(1 g) = 0.560 mW/g; SAR(10 g) = 0.429 mW/g
Maximum value of SAR (measured) = 0.616 mW/g



0 dB = 0.616mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/2 AM 11:33:29

RT_GSM850 CH128

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

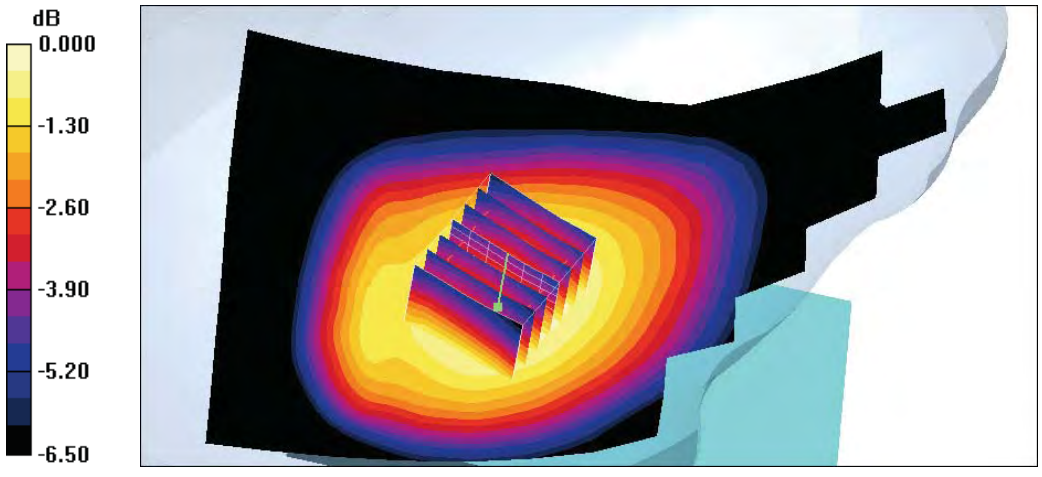
Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.912 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Tilted/Area Scan (71x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.227 mW/g

Right Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 12.4 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 0.251 W/kg
SAR(1 g) = 0.199 mW/g; SAR(10 g) = 0.155 mW/g
Maximum value of SAR (measured) = 0.218 mW/g



0 dB = 0.218mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 PM 12:46:28

RT_GSM850 CH128_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

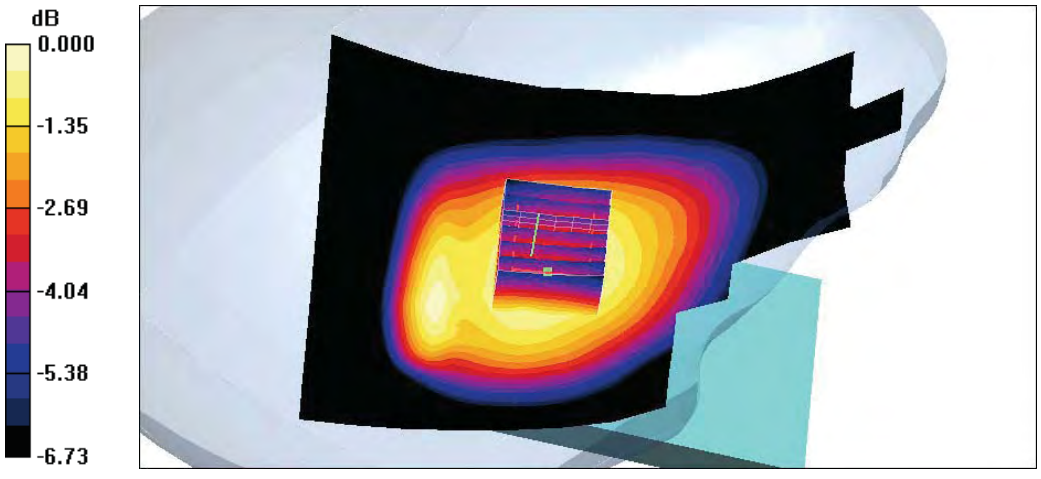
Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.912 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Tilted/Area Scan (81x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.420 mW/g

Right Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 15.9 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 0.491 W/kg
SAR(1 g) = 0.375 mW/g; SAR(10 g) = 0.290 mW/g
Maximum value of SAR (measured) = 0.418 mW/g



0 dB = 0.418mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/2 PM 12:03:57

LC_GSM850 CH128

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

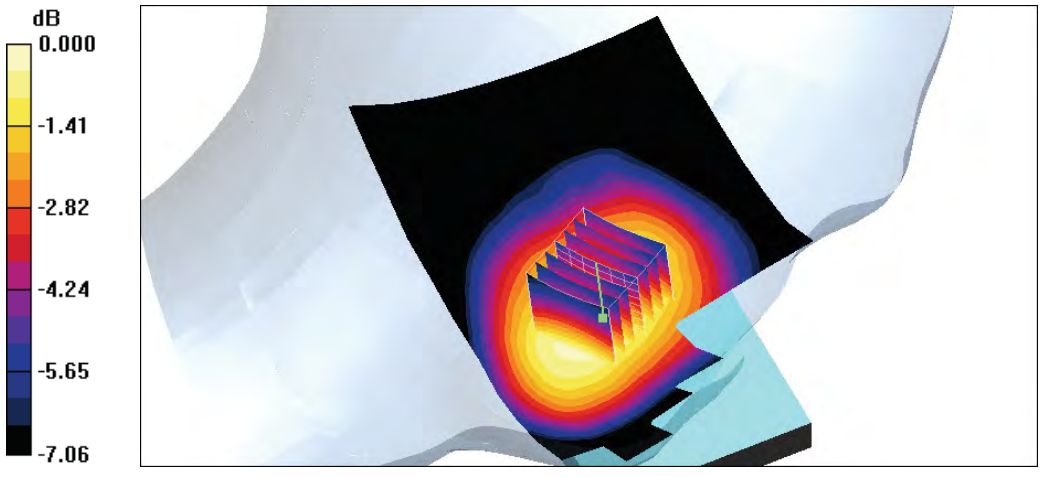
Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.912 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Cheek/Area Scan (71x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.301 mW/g

Left Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 6.52 V/m; Power Drift = 0.070 dB
Peak SAR (extrapolated) = 0.354 W/kg
SAR(1 g) = 0.275 mW/g; SAR(10 g) = 0.210 mW/g
Maximum value of SAR (measured) = 0.302 mW/g



0 dB = 0.302mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 PM 01:11:10

LC_GSM850 CH128_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

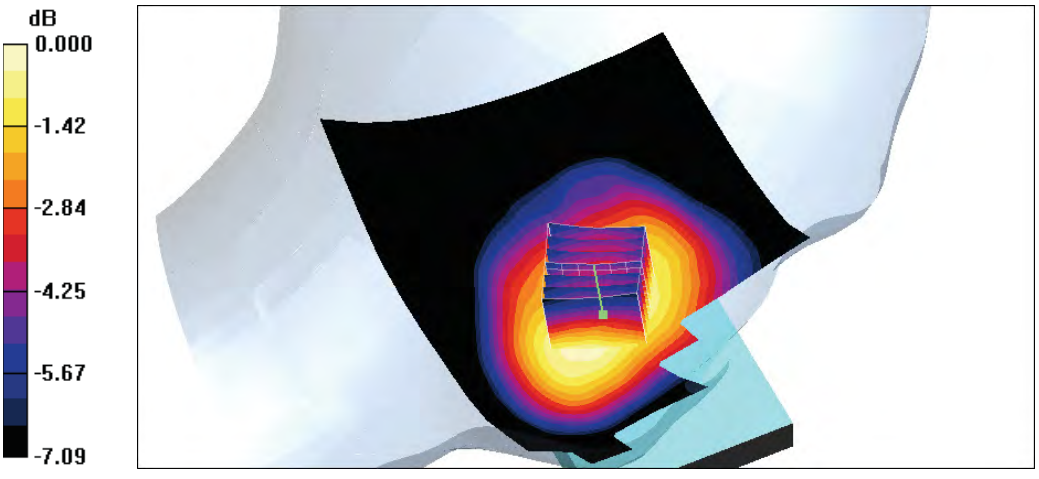
Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.912 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Cheek/Area Scan (81x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.511 mW/g

Left Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 8.69 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 0.601 W/kg
SAR(1 g) = 0.468 mW/g; SAR(10 g) = 0.356 mW/g
Maximum value of SAR (measured) = 0.516 mW/g



0 dB = 0.516mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/2 PM 12:27:55

LT_GSM850 CH128

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

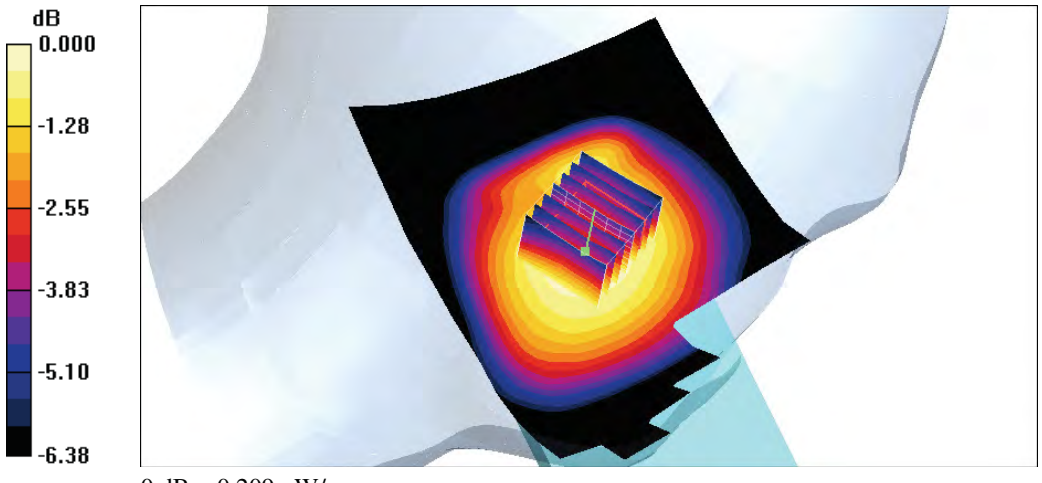
Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.912 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Tilted/Area Scan (71x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.213 mW/g

Left Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 9.95 V/m; Power Drift = 0.078 dB
Peak SAR (extrapolated) = 0.245 W/kg
SAR(1 g) = 0.192 mW/g; SAR(10 g) = 0.150 mW/g
Maximum value of SAR (measured) = 0.209 mW/g



0 dB = 0.209mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 PM 01:33:51

LT_GSM850 CH128_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

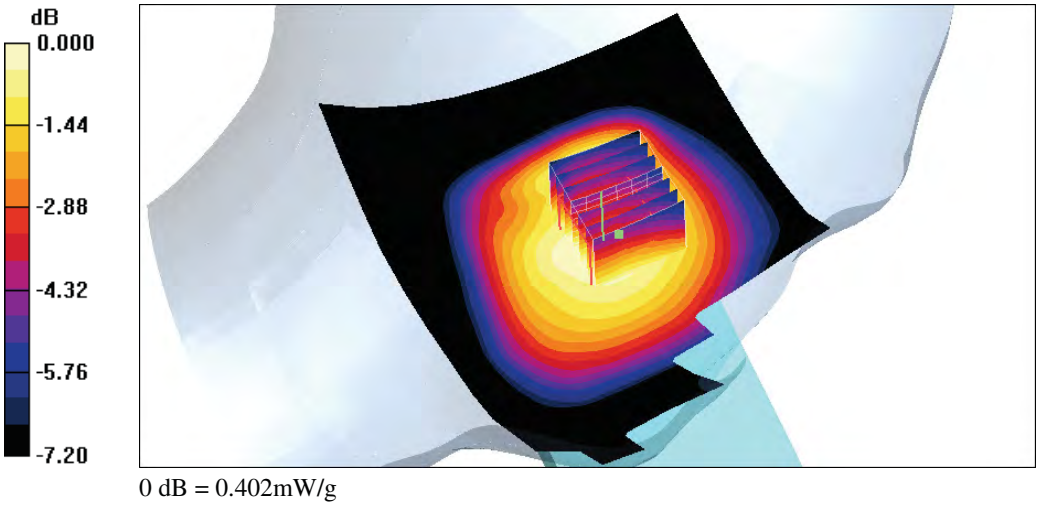
Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.912 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Tilted/Area Scan (81x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.416 mW/g

Left Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 14.8 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 0.452 W/kg
SAR(1 g) = 0.366 mW/g; SAR(10 g) = 0.283 mW/g
Maximum value of SAR (measured) = 0.402 mW/g



0 dB = 0.402mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 AM 02:39:13

RC_PCS CH512_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

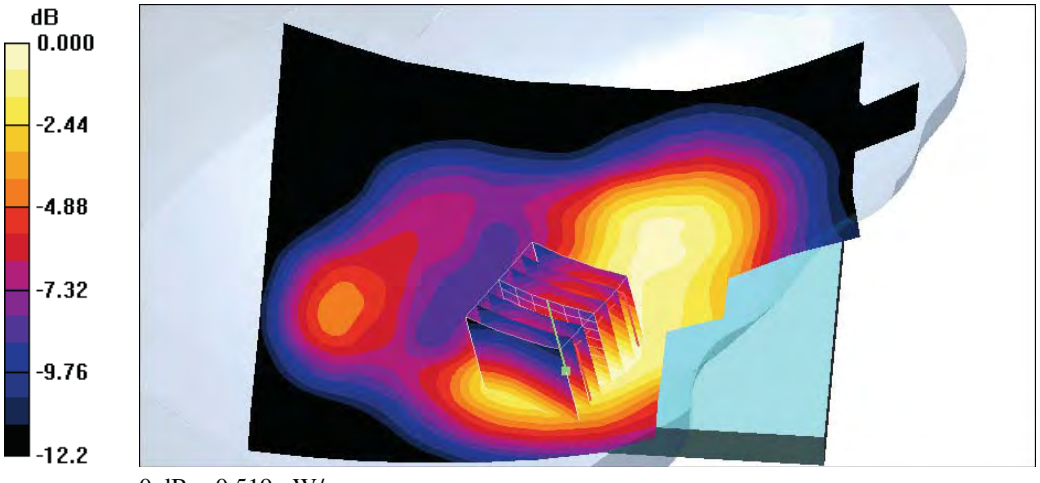
Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.34 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Cheek/Area Scan (81x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.574 mW/g

Right Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 11.2 V/m; Power Drift = -0.065 dB
Peak SAR (extrapolated) = 0.694 W/kg
SAR(1 g) = 0.454 mW/g; SAR(10 g) = 0.301 mW/g
Maximum value of SAR (measured) = 0.519 mW/g



0 dB = 0.519mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 AM 02:59:34

RT_PCS CH512_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

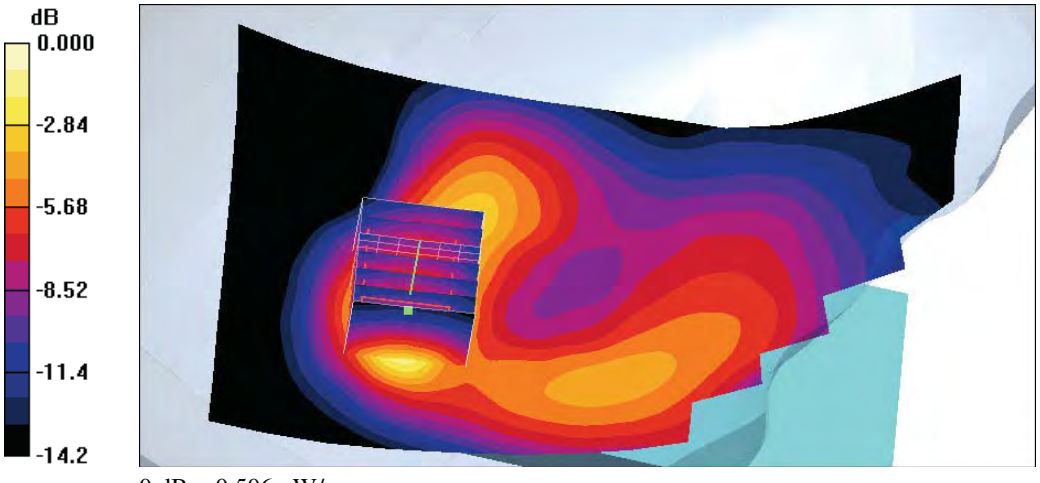
Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.34 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Tilted/Area Scan (71x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.521 mW/g

Right Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 17.0 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 0.749 W/kg
SAR(1 g) = 0.415 mW/g; SAR(10 g) = 0.223 mW/g
Maximum value of SAR (measured) = 0.506 mW/g



0 dB = 0.506mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 AM 03:49:17

LC_PCS CH512_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

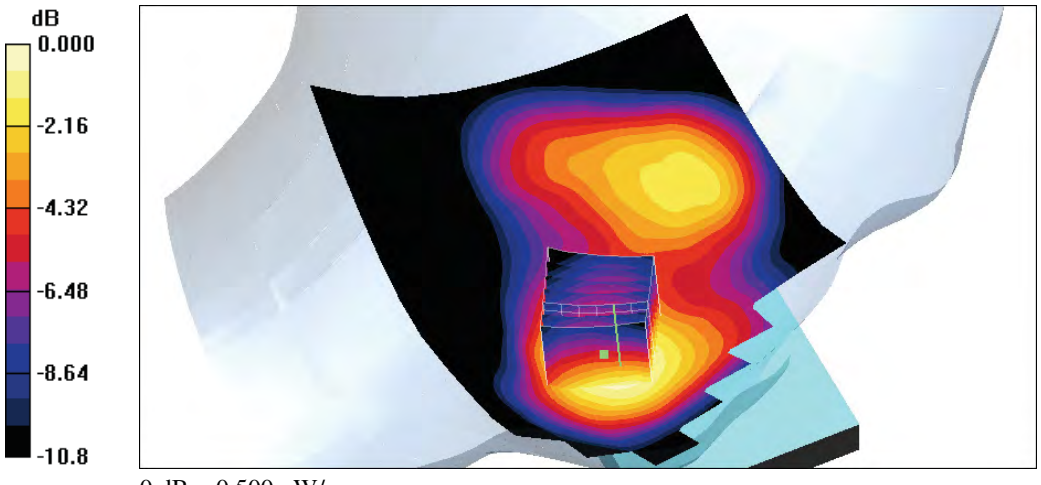
Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.34 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Cheek/Area Scan (81x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.514 mW/g

Left Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 11.4 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 0.661 W/kg
SAR(1 g) = 0.431 mW/g; SAR(10 g) = 0.284 mW/g
Maximum value of SAR (measured) = 0.500 mW/g



0 dB = 0.500mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 AM 04:15:06

LT_PCS CH512_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

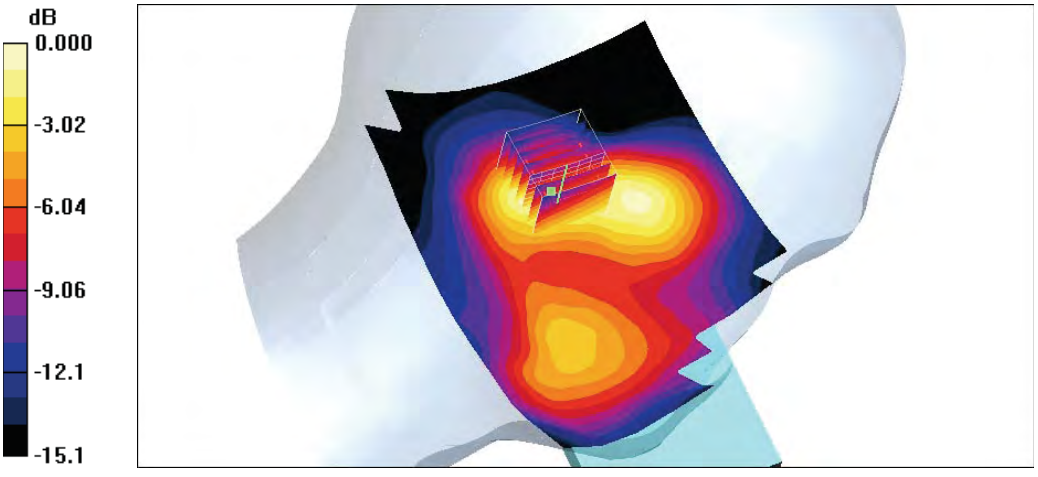
Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.34 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Tilted/Area Scan (81x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.444 mW/g

Left Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 17.7 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 0.581 W/kg
SAR(1 g) = 0.341 mW/g; SAR(10 g) = 0.196 mW/g
Maximum value of SAR (measured) = 0.407 mW/g



0 dB = 0.407mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 PM 04:48:36

RC_PCS CH810

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

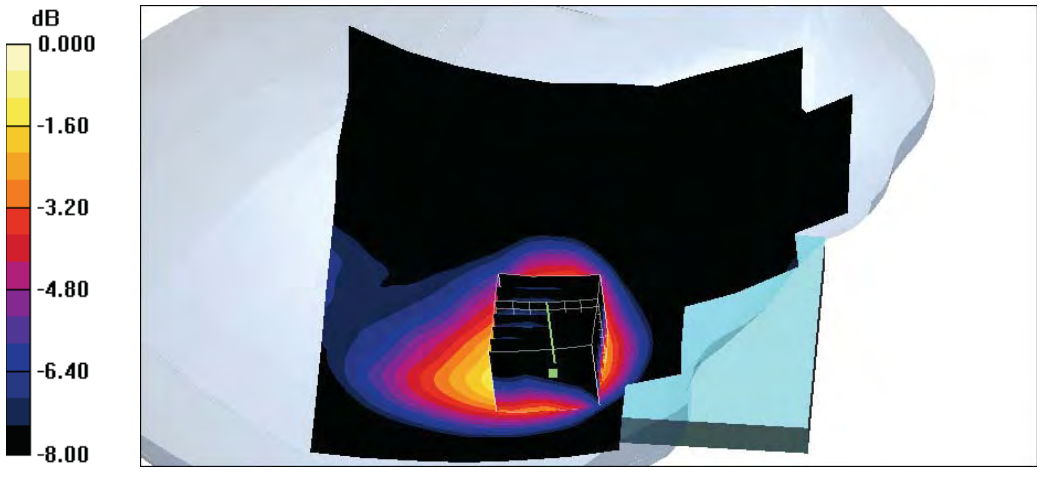
Communication System: PCS; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Cheek/Area Scan (91x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.537 mW/g

Right Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 8.21 V/m; Power Drift = 0.049 dB
Peak SAR (extrapolated) = 0.752 W/kg
SAR(1 g) = 0.456 mW/g; SAR(10 g) = 0.284 mW/g
Maximum value of SAR (measured) = 0.541 mW/g



0 dB = 0.541mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 PM 05:16:57

RT_PCS CH810

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

Communication System: PCS; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Tilted/Area Scan (81x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.335 mW/g

Right Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.4 V/m; Power Drift = 0.038 dB
Peak SAR (extrapolated) = 0.451 W/kg
SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.148 mW/g
Maximum value of SAR (measured) = 0.329 mW/g

0 dB = 0.329mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 PM 05:41:46

LC_PCS CH810

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

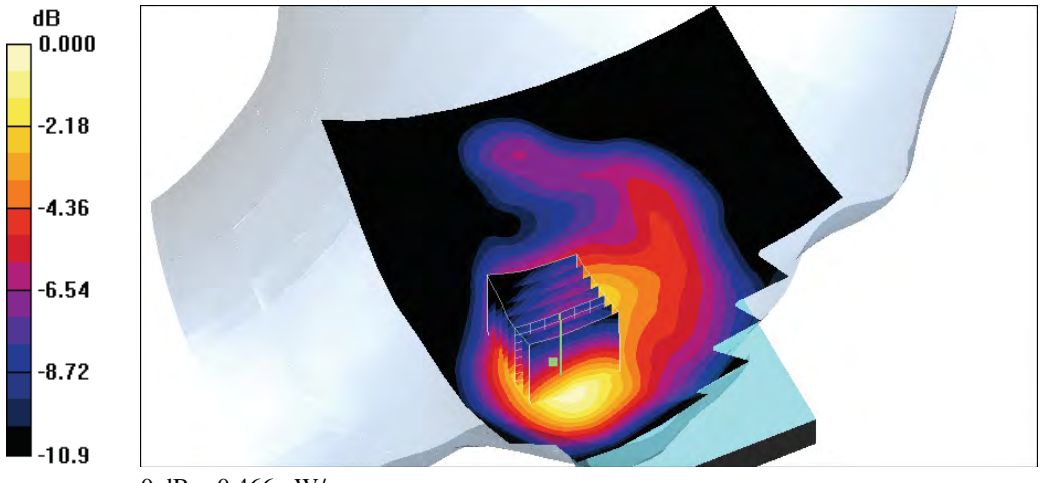
Communication System: PCS; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Cheek/Area Scan (91x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.514 mW/g

Left Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 8.87 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 0.598 W/kg
SAR(1 g) = 0.392 mW/g; SAR(10 g) = 0.247 mW/g
Maximum value of SAR (measured) = 0.466 mW/g



0 dB = 0.466mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 PM 06:14:58

LT_PCS CH810

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

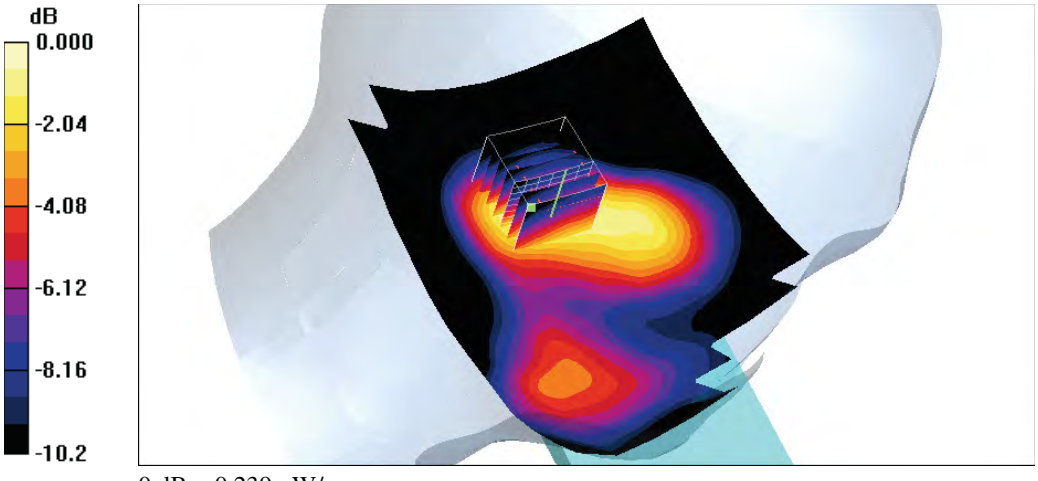
Communication System: PCS; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Tilted/Area Scan (81x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.243 mW/g

Left Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 12.4 V/m; Power Drift = 0.008 dB
Peak SAR (extrapolated) = 0.325 W/kg
SAR(1 g) = 0.201 mW/g; SAR(10 g) = 0.120 mW/g
Maximum value of SAR (measured) = 0.239 mW/g



0 dB = 0.239mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 AM 11:47:00

RC_WCDMA Band II CH9400

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

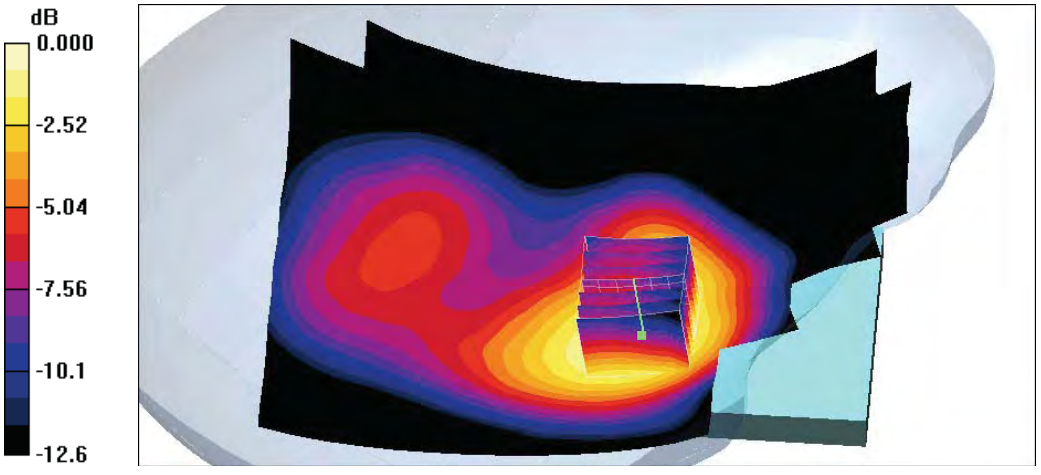
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Cheek/Area Scan (131x181x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.15 mW/g

Right Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.6 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.652 mW/g
Maximum value of SAR (measured) = 1.18 mW/g



0 dB = 1.18mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 PM 12:37:50

RT_WCDMA Band II CH9400

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

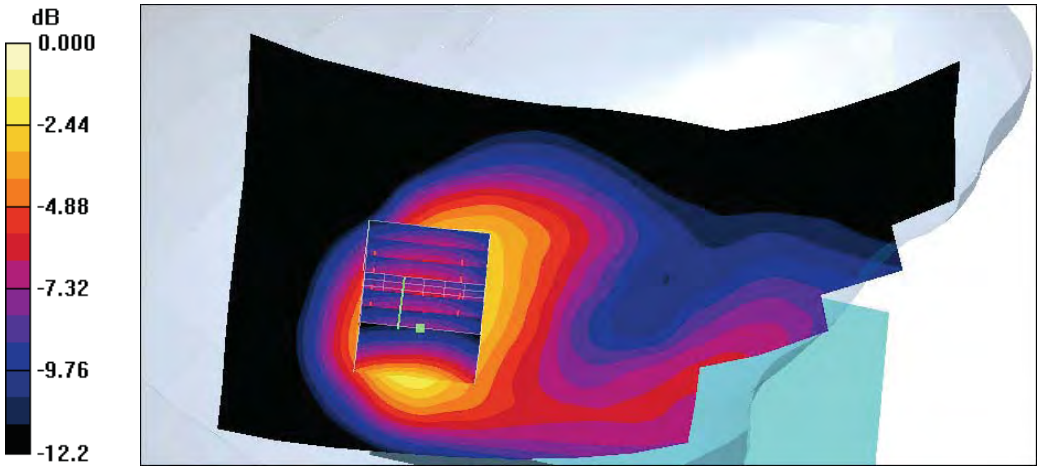
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Tilted/Area Scan (71x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.686 mW/g

Right Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 21.5 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 0.924 W/kg
SAR(1 g) = 0.574 mW/g; SAR(10 g) = 0.341 mW/g
Maximum value of SAR (measured) = 0.688 mW/g



0 dB = 0.688mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 PM 02:44:50

LC_WCDMA Band II CH9262

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

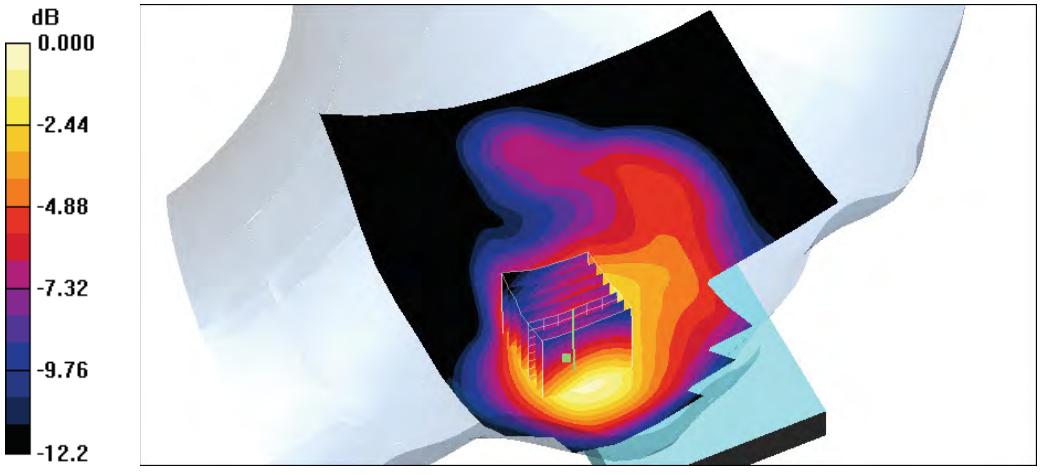
Communication System: WCDMA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.34 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Cheek/Area Scan (91x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.24 mW/g

Left Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 15.0 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 1.56 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.652 mW/g
Maximum value of SAR (measured) = 1.17 mW/g



0 dB = 1.17mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 PM 01:23:02

LC_WCDMA Band II CH9400

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

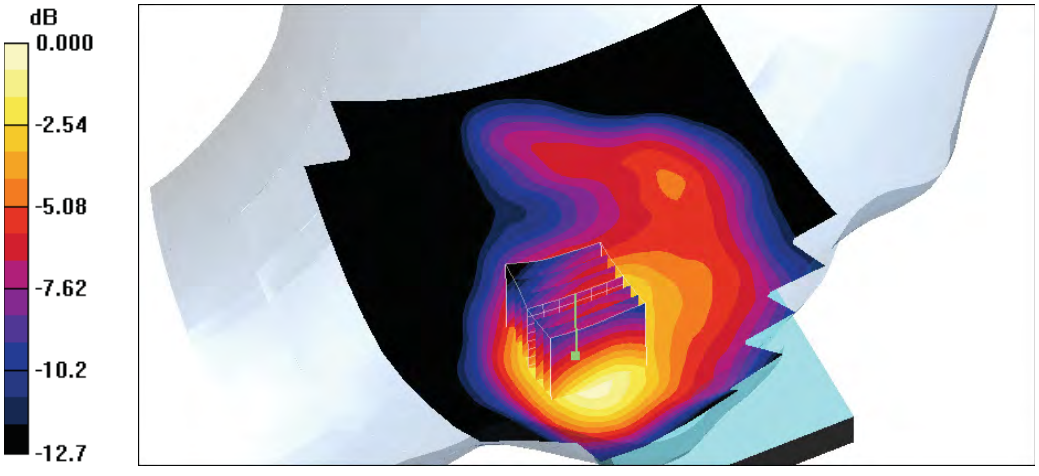
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Cheek/Area Scan (91x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.38 mW/g

Left Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 14.0 V/m; Power Drift = 0.150 dB
Peak SAR (extrapolated) = 1.72 W/kg
SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.742 mW/g
Maximum value of SAR (measured) = 1.32 mW/g



0 dB = 1.32mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 PM 03:10:09

LC_WCDMA Band II CH9538

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

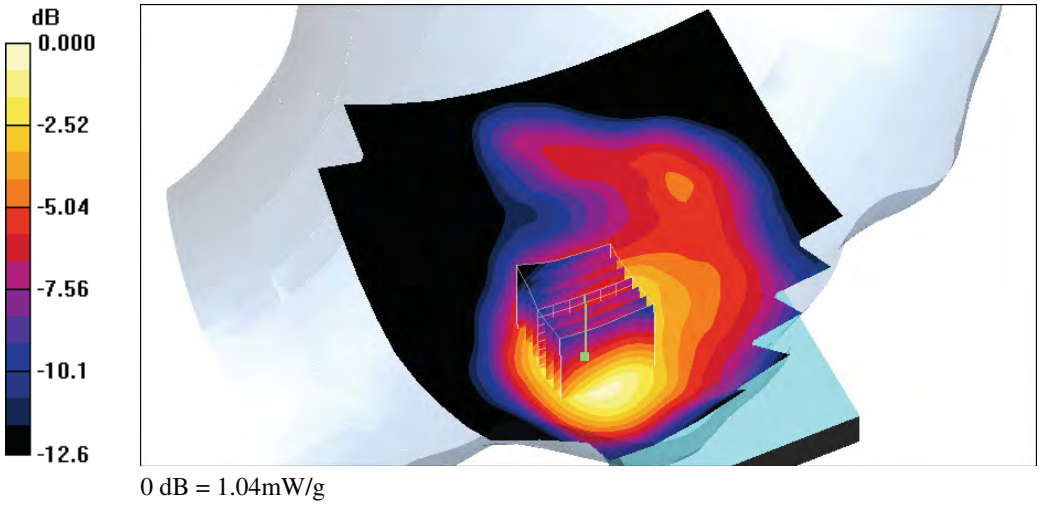
Communication System: WCDMA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Cheek/Area Scan (91x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.06 mW/g

Left Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.2 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.893 mW/g; SAR(10 g) = 0.574 mW/g
Maximum value of SAR (measured) = 1.04 mW/g



0 dB = 1.04mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 PM 02:00:58

LT_WCDMA Band II CH9400

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

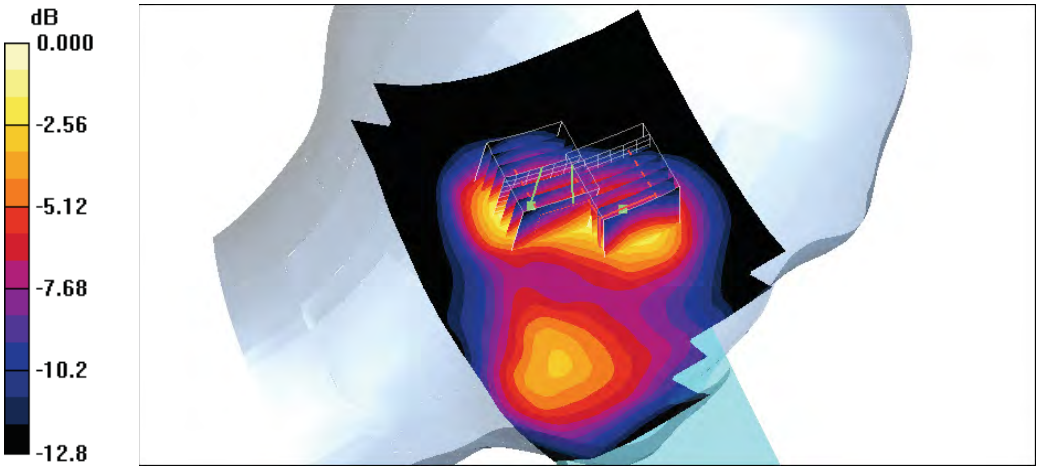
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(7.05, 7.05, 7.05); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Tilted/Area Scan (81x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.748 mW/g

Left Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 20.5 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 0.895 W/kg
SAR(1 g) = 0.559 mW/g; SAR(10 g) = 0.353 mW/g
Maximum value of SAR (measured) = 0.682 mW/g

Left Tilted/Zoom Scan (7x7x9)/Cube 1:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 20.5 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.623 mW/g; SAR(10 g) = 0.358 mW/g
Maximum value of SAR (measured) = 0.759 mW/g



0 dB = 0.759mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/2 PM 01:18:30

RC_WCDMA Band V CH4233

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

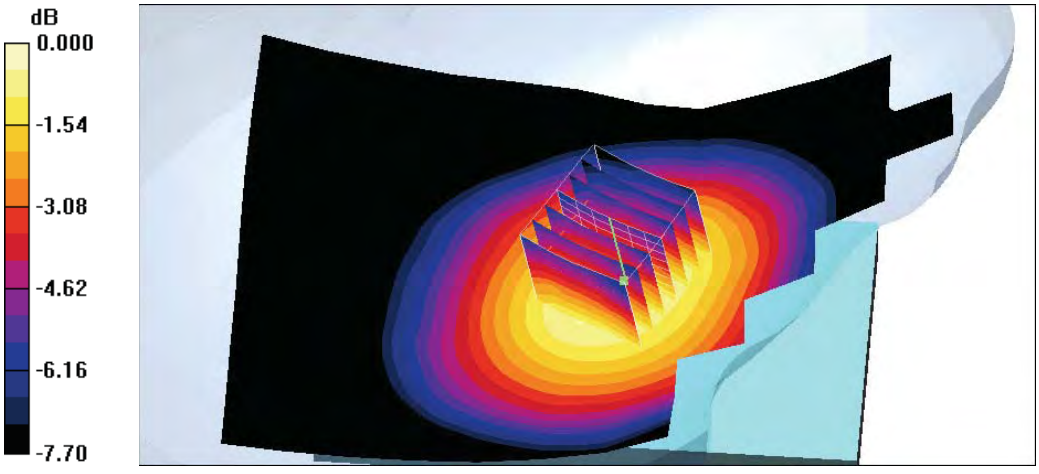
Communication System: WCDMA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 847 MHz; σ = 0.935 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Cheek/Area Scan (71x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.641 mW/g

Right Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 10.6 V/m; Power Drift = -0.162 dB
Peak SAR (extrapolated) = 0.745 W/kg
SAR(1 g) = 0.595 mW/g; SAR(10 g) = 0.455 mW/g
Maximum value of SAR (measured) = 0.655 mW/g



0 dB = 0.655mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/2 PM 02:00:31

RT_WCDMA Band V CH4233

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

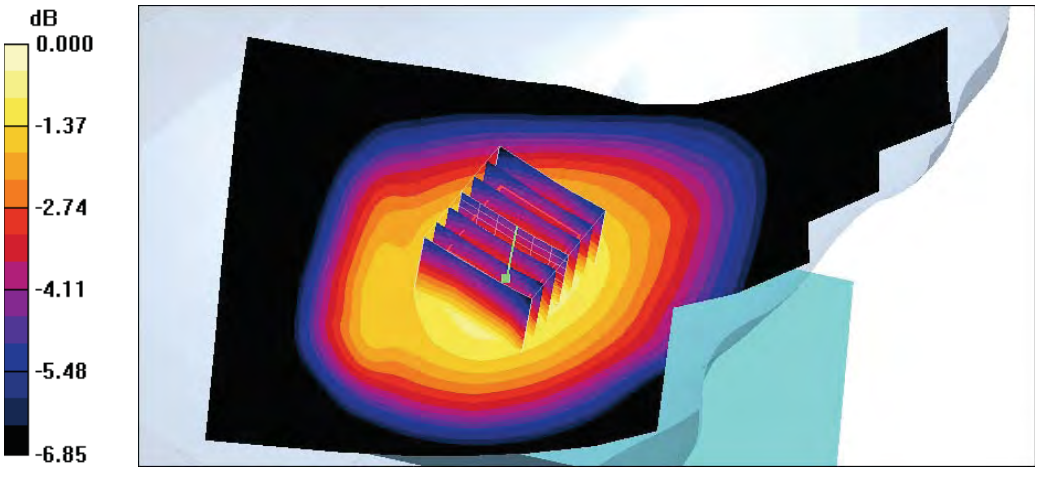
Communication System: WCDMA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 847 MHz; σ = 0.935 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Right Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Right Tilted/Area Scan (71x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.391 mW/g

Right Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 15.6 V/m; Power Drift = 0.081 dB
Peak SAR (extrapolated) = 0.506 W/kg
SAR(1 g) = 0.384 mW/g; SAR(10 g) = 0.296 mW/g
Maximum value of SAR (measured) = 0.423 mW/g



0 dB = 0.423mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/2 PM 02:37:39

LC_WCDMA Band V CH4233

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

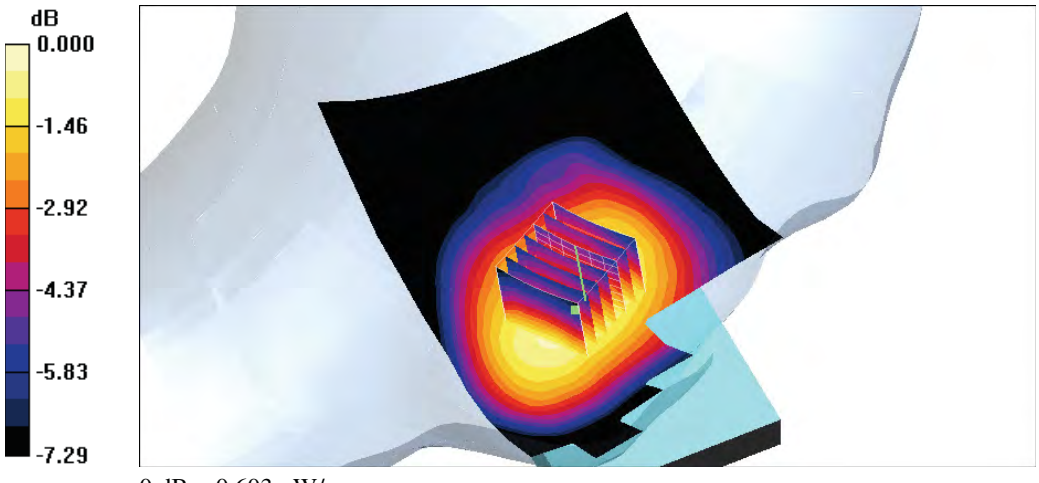
Communication System: WCDMA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 847 MHz; σ = 0.935 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Cheek/Area Scan (71x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.592 mW/g

Left Cheek/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 9.67 V/m; Power Drift = -0.130 dB
Peak SAR (extrapolated) = 0.685 W/kg
SAR(1 g) = 0.540 mW/g; SAR(10 g) = 0.410 mW/g
Maximum value of SAR (measured) = 0.603 mW/g



0 dB = 0.603mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/2 PM 03:01:30

LT_WCDMA Band V CH4233

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

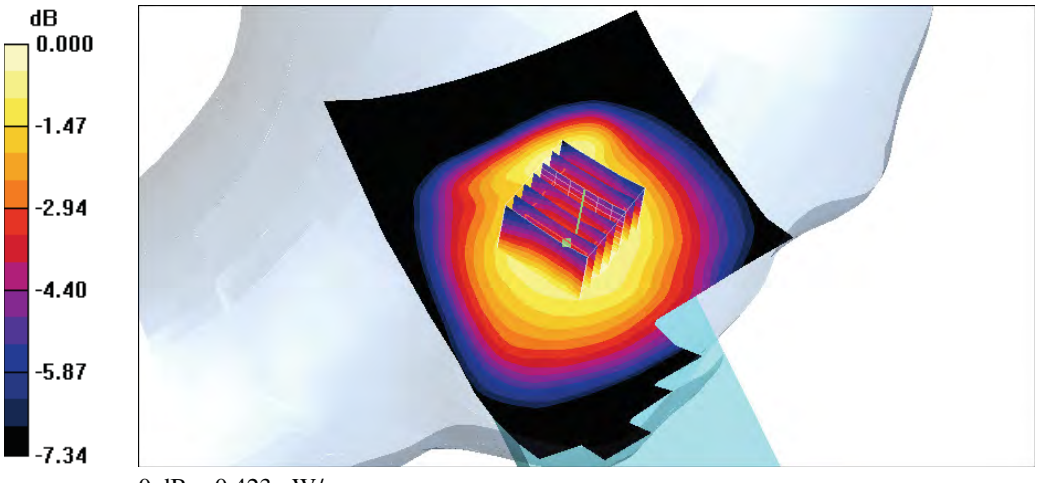
Communication System: WCDMA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 847 MHz; σ = 0.935 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Left Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.44, 8.44, 8.44); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Left Tilted/Area Scan (71x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.423 mW/g

Left Tilted/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 15.3 V/m; Power Drift = 0.096 dB
Peak SAR (extrapolated) = 0.499 W/kg
SAR(1 g) = 0.387 mW/g; SAR(10 g) = 0.296 mW/g
Maximum value of SAR (measured) = 0.423 mW/g



0 dB = 0.423mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 AM 10:31:48

Flat_GSM850 CH128_Headset_To Phantom 15mm

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

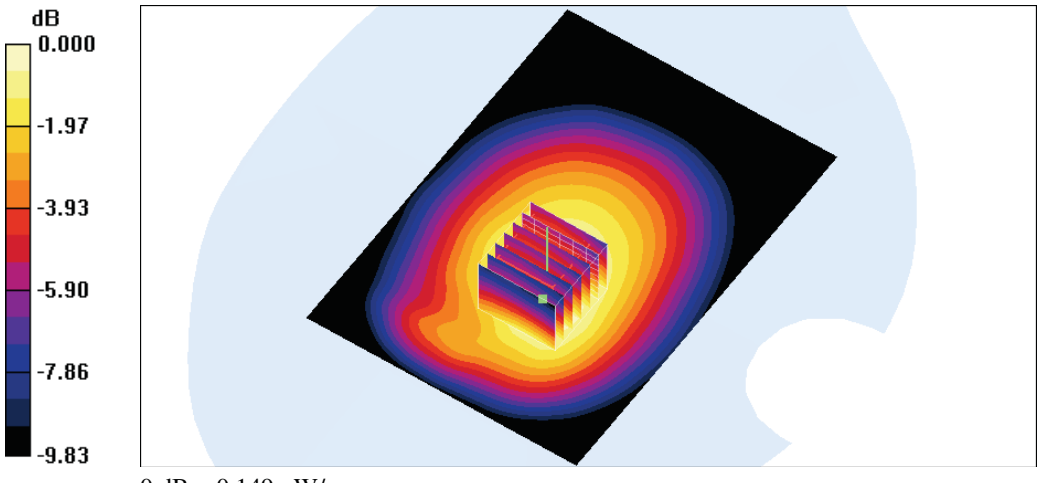
Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.968 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.55, 8.55, 8.55); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (71x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.153 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 11.3 V/m; Power Drift = 0.036 dB
Peak SAR (extrapolated) = 0.191 W/kg
SAR(1 g) = 0.132 mW/g; SAR(10 g) = 0.095 mW/g
Maximum value of SAR (measured) = 0.149 mW/g



0 dB = 0.149mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 AM 10:49:27

Flat_GSM850 CH128_Headset_To Phantom 15mm_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

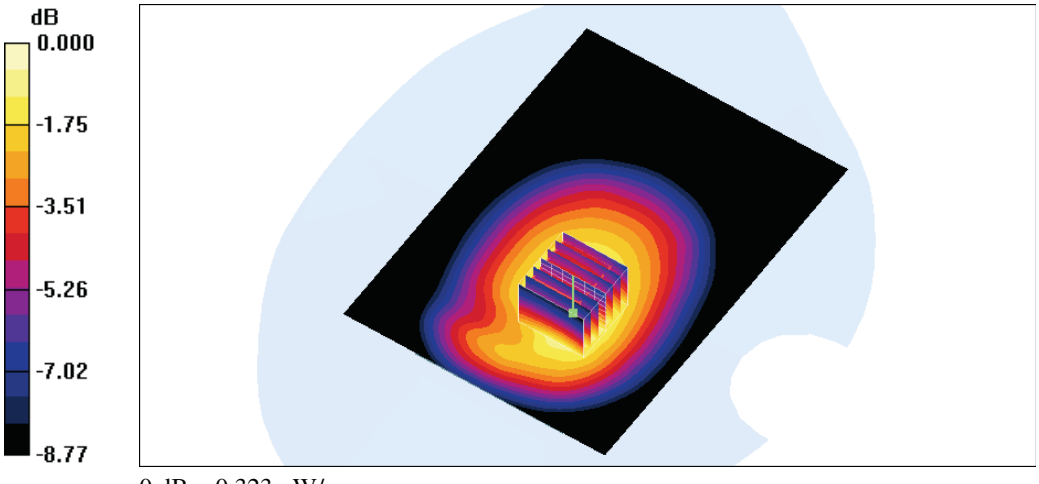
Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.968 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.55, 8.55, 8.55); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (81x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.319 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 16.5 V/m; Power Drift = -0.076 dB
Peak SAR (extrapolated) = 0.398 W/kg
SAR(1 g) = 0.278 mW/g; SAR(10 g) = 0.201 mW/g
Maximum value of SAR (measured) = 0.323 mW/g



0 dB = 0.323mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 AM 10:12:11

Flat_GPRS850 CH251_3Down2Up_Headset_To Phantom 15mm

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

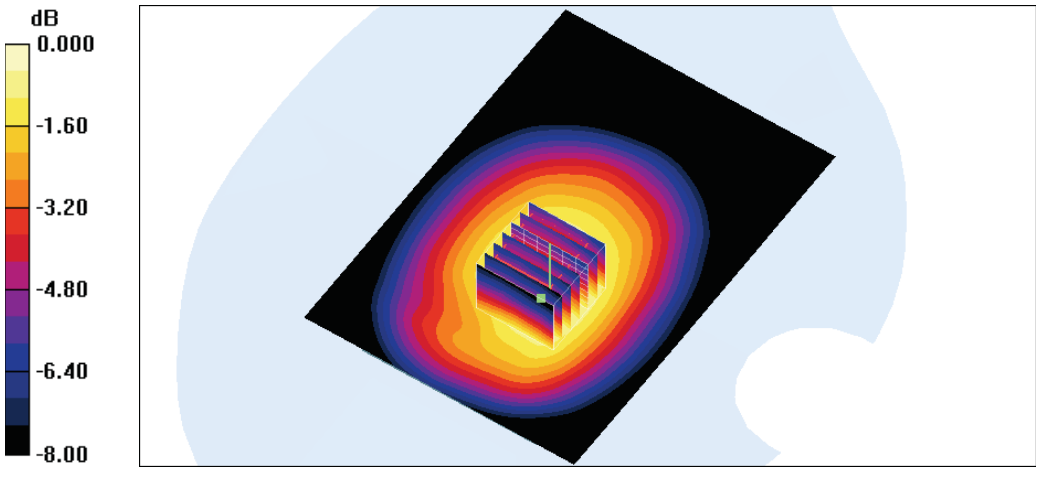
Communication System: GPRS 850 (3Down, 2Up); Frequency: 848.8 MHz;Duty Cycle: 1:4.2
Medium parameters used: f = 849 MHz; σ = 1 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.55, 8.55, 8.55); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (71x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.420 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 19.4 V/m; Power Drift = 0.070 dB
Peak SAR (extrapolated) = 0.492 W/kg
SAR(1 g) = 0.362 mW/g; SAR(10 g) = 0.264 mW/g
Maximum value of SAR (measured) = 0.411 mW/g



0 dB = 0.411mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 AM 10:20:40

Flat_GPRS850 CH128_3Down2Up_Headset_To Phantom 15mm_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

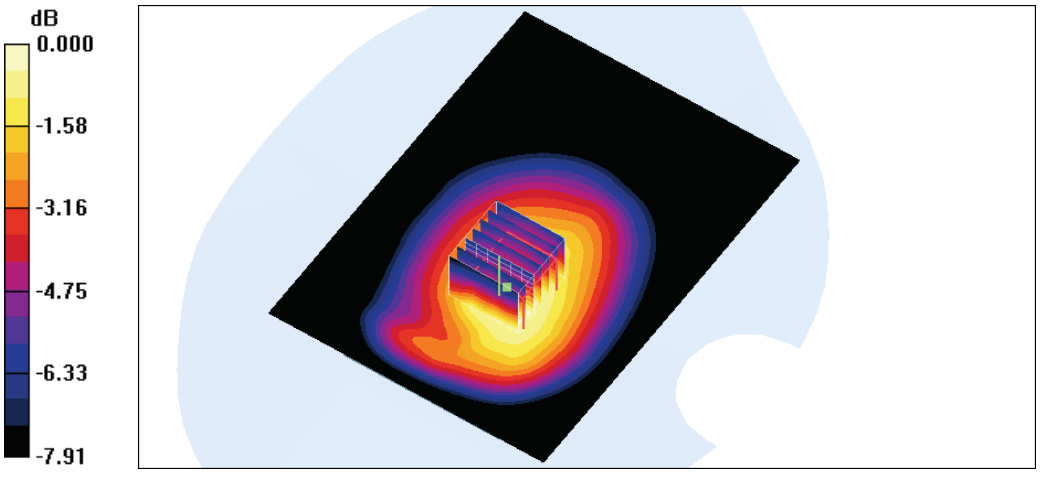
Communication System: GPRS 850 (3Down, 2Up); Frequency: 848.8 MHz;Duty Cycle: 1:4.2
Medium parameters used: f = 849 MHz; σ = 1 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.55, 8.55, 8.55); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (81x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.562 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 22.3 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 0.650 W/kg
SAR(1 g) = 0.466 mW/g; SAR(10 g) = 0.339 mW/g
Maximum value of SAR (measured) = 0.547 mW/g



0 dB = 0.547mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 PM 10:07:10

Flat_PCS CH512_Headset_To Phantom 15mm_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

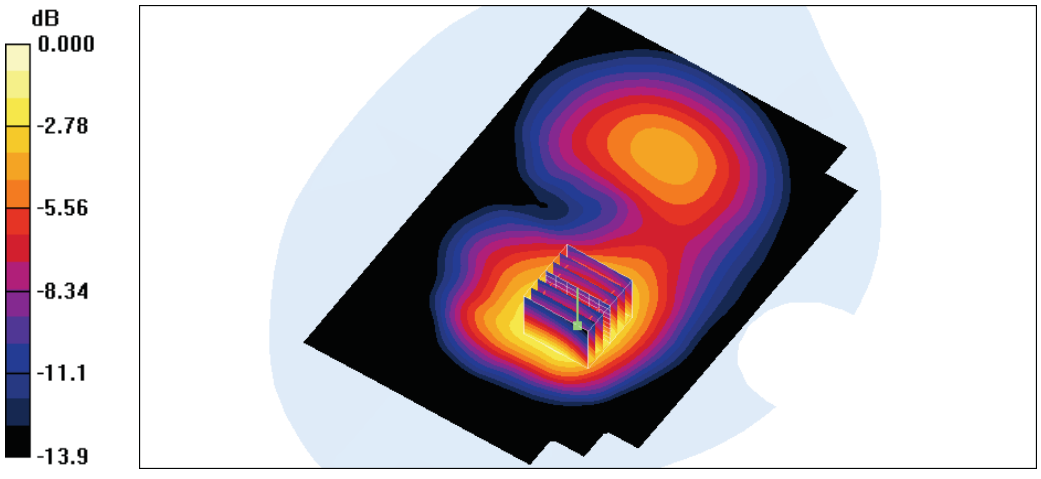
Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.46 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.7, 6.7, 6.7); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (91x131x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.409 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 5.49 V/m; Power Drift = -0.052 dB
Peak SAR (extrapolated) = 0.552 W/kg
SAR(1 g) = 0.340 mW/g; SAR(10 g) = 0.207 mW/g
Maximum value of SAR (measured) = 0.407 mW/g



0 dB = 0.407mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/10/21 PM 09:33:24

Flat_GPRS1900 CH512_3Down2Up_Headset_To Phantom 15mm_ #2nd GSM Power Amplifier

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

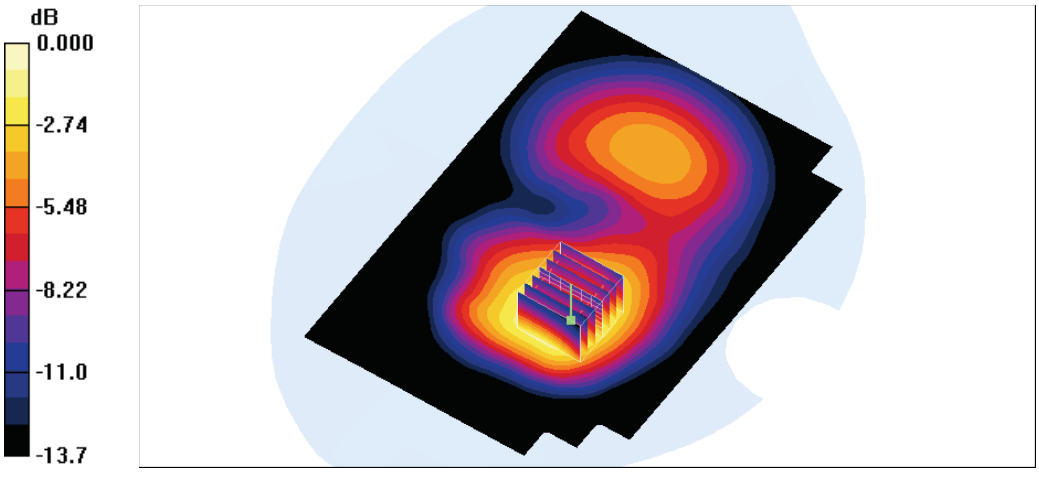
Communication System: GPRS PCS (3Down,2Up); Frequency: 1850.2 MHz;Duty Cycle: 1:4.2
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.46 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.7, 6.7, 6.7); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (91x131x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.621 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 7.07 V/m; Power Drift = -0.105 dB
Peak SAR (extrapolated) = 0.845 W/kg
SAR(1 g) = 0.512 mW/g; SAR(10 g) = 0.315 mW/g
Maximum value of SAR (measured) = 0.610 mW/g



0 dB = 0.610mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/6 AM 09:47:33

Flat_PCS CH810_Headset_To Phantom 15mm

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

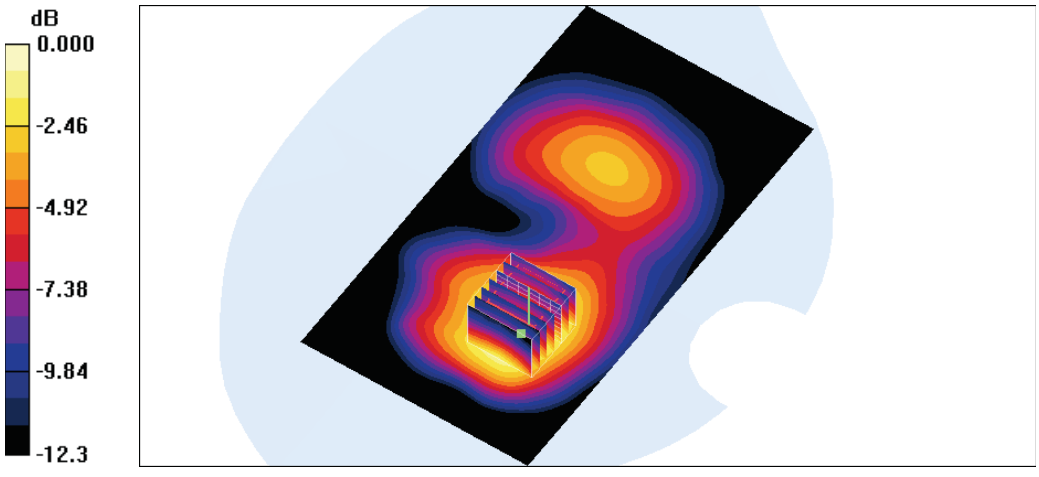
Communication System: PCS; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1910 MHz; σ = 1.53 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.7, 6.7, 6.7); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (71x131x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.217 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.50 V/m; Power Drift = 0.056 dB
Peak SAR (extrapolated) = 0.290 W/kg
SAR(1 g) = 0.181 mW/g; SAR(10 g) = 0.113 mW/g
Maximum value of SAR (measured) = 0.215 mW/g



0 dB = 0.215mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/6 AM 09:24:46

Flat_GPRS1900 CH810_3Down2Up_Headset_To Phantom 15mm

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

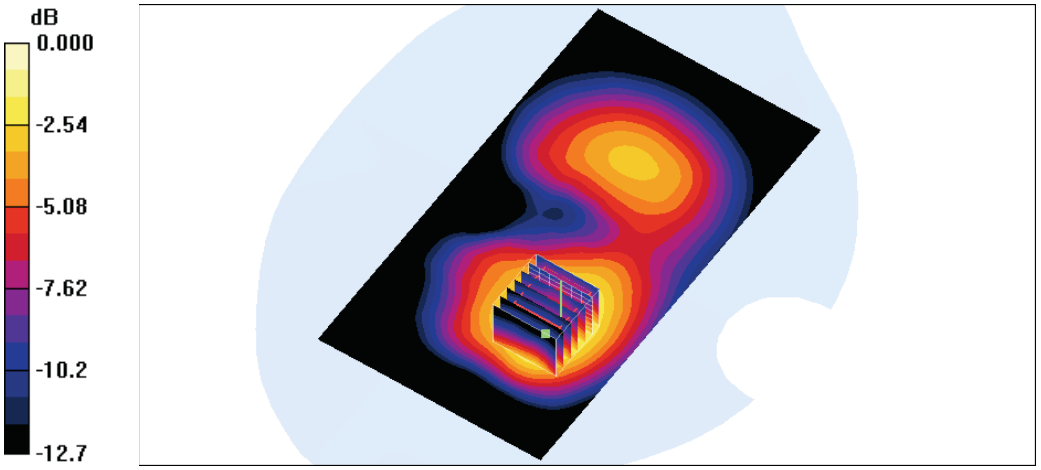
Communication System: GPRS PCS (3Down,2Up); Frequency: 1909.8 MHz;Duty Cycle: 1:4.2
Medium parameters used: f = 1910 MHz; σ = 1.53 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.7, 6.7, 6.7); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (71x131x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.507 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 5.53 V/m; Power Drift = -0.074 dB
Peak SAR (extrapolated) = 0.647 W/kg
SAR(1 g) = 0.402 mW/g; SAR(10 g) = 0.224 mW/g
Maximum value of SAR (measured) = 0.501 mW/g



0 dB = 0.501mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/6 AM 10:17:30

Flat_WCDMA Band II CH9400_Headset_To Phantom 15mm

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

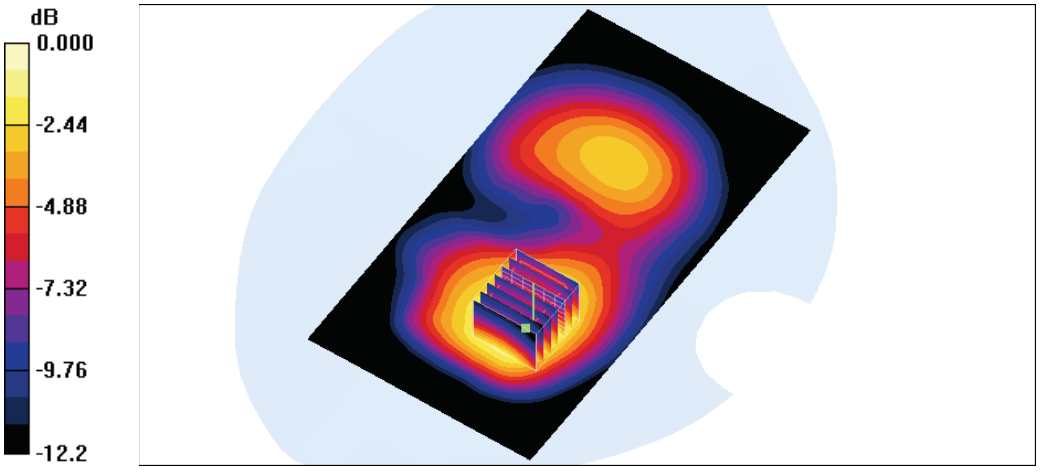
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.7, 6.7, 6.7); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (71x131x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.655 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 6.36 V/m; Power Drift = 0.119 dB
Peak SAR (extrapolated) = 0.824 W/kg
SAR(1 g) = 0.534 mW/g; SAR(10 g) = 0.334 mW/g
Maximum value of SAR (measured) = 0.625 mW/g



0 dB = 0.625mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/3 AM 10:55:47

Flat_WCDMA Band V CH4233_Headset_To Phantom 15mm

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

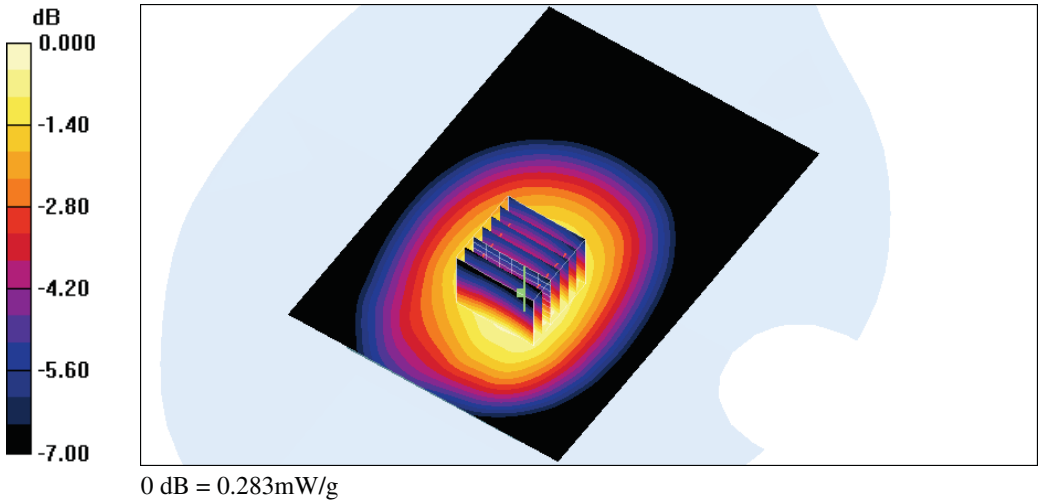
Communication System: WCDMA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 847 MHz; σ = 0.997 mho/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.55, 8.55, 8.55); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (71x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.290 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 16.0 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 0.337 W/kg
SAR(1 g) = 0.255 mW/g; SAR(10 g) = 0.187 mW/g
Maximum value of SAR (measured) = 0.283 mW/g



0 dB = 0.283mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/6 PM 04:02:16

Flat_802.11b CH1_2M_Headset_To Phantom 15mm

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

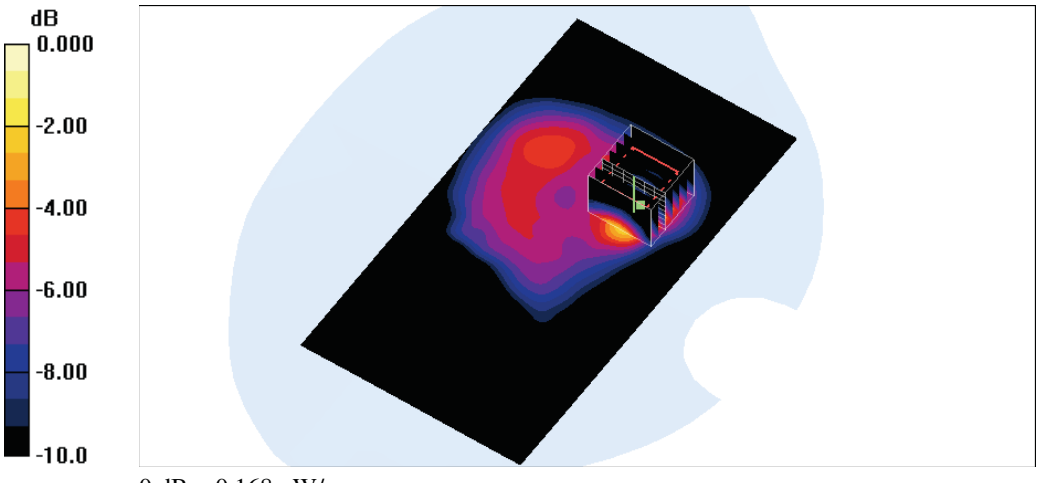
Communication System: IEEE 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.89 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.51, 6.51, 6.51); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (71x131x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.157 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 5.26 V/m; Power Drift = -0.065 dB
Peak SAR (extrapolated) = 0.252 W/kg
SAR(1 g) = 0.131 mW/g; SAR(10 g) = 0.064 mW/g
Maximum value of SAR (measured) = 0.168 mW/g



0 dB = 0.168mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/9/6 PM 05:07:28

Flat_802.11n_HT20 CH1_6.5M_Headset_To Phantom 15mm

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

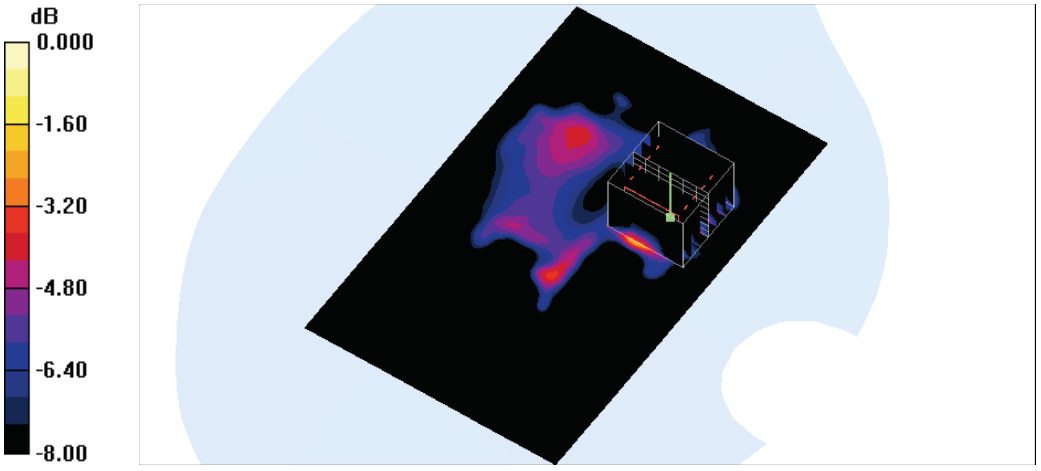
Communication System: IEEE 802.11n_HT20; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.89 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.51, 6.51, 6.51); Calibrated: 2010/6/22
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (101x161x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.055 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.94 V/m; Power Drift = 0.150 dB
Peak SAR (extrapolated) = 0.064 W/kg
SAR(1 g) = 0.032 mW/g; SAR(10 g) = 0.015 mW/g
Maximum value of SAR (measured) = 0.040 mW/g



0 dB = 0.040mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 2010/11/19 PM 01:50:25

Flat_802.11b CH1_2M_Headset_To Phantom 10mm (Wi-Fi Hotspot Function)

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

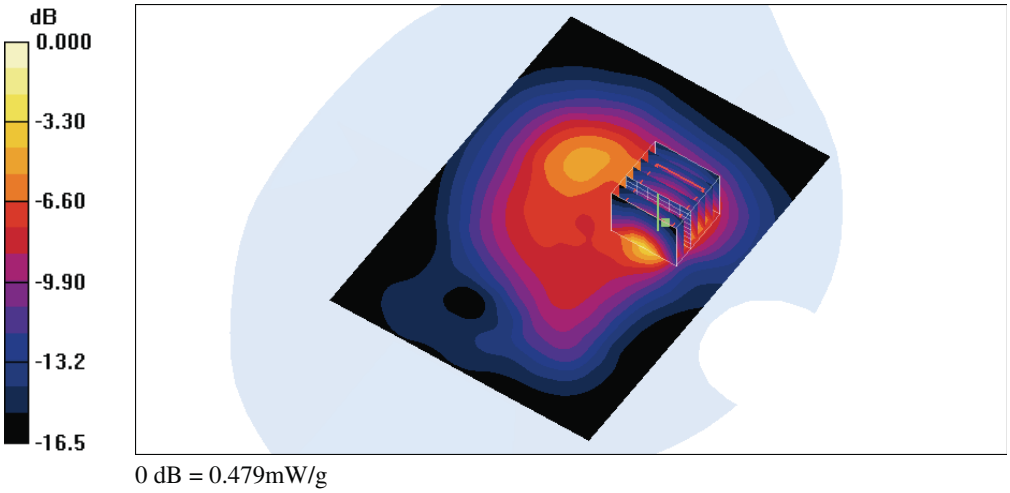
Communication System: IEEE 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.9 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV3 - SN3519; ConvF(8.1, 8.1, 8.1); Calibrated: 2010/2/23
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (81x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.423 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 6.88 V/m; Power Drift = 0.009 dB
Peak SAR (extrapolated) = 0.757 W/kg
SAR(1 g) = 0.362 mW/g; SAR(10 g) = 0.163 mW/g
Maximum value of SAR (measured) = 0.479 mW/g



0 dB = 0.479mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 2010/11/19 PM 02:36:25

Flat_802.11n(2.4GHz) CH1_6.5M_HT20_Headset_To Phantom 10mm (Wi-Fi Hotspot Function)

DUT: PD98120; Type: Mobile Phone; FCC ID:NM8PD98120

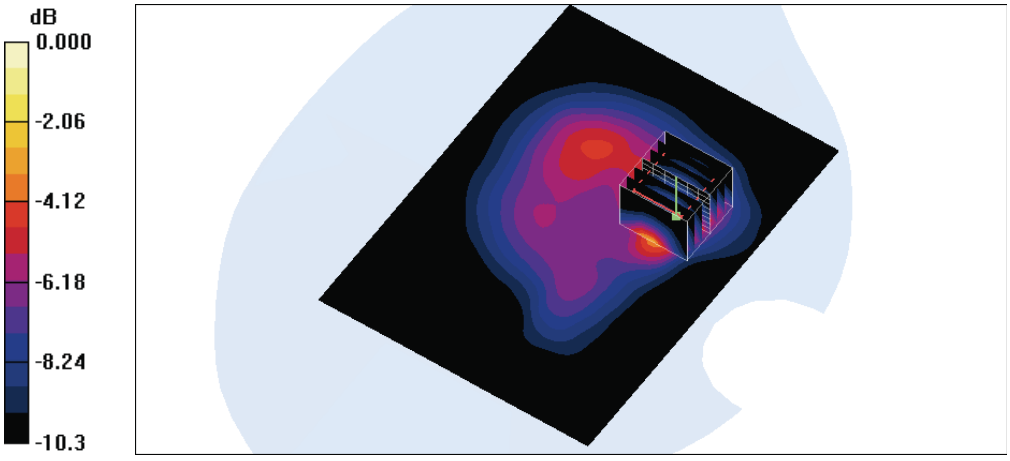
Communication System: IEEE 802.11n(2.4GHz); Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.9 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV3 - SN3519; ConvF(8.1, 8.1, 8.1); Calibrated: 2010/2/23
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn541; Calibrated: 2010/7/21
- Phantom: SAM 12; Type: SAM v4.0; Serial: TP:1009
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (81x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.104 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.70 V/m; Power Drift = -0.148 dB
Peak SAR (extrapolated) = 0.173 W/kg
SAR(1 g) = 0.084 mW/g; SAR(10 g) = 0.040 mW/g
Maximum value of SAR (measured) = 0.108 mW/g



0 dB = 0.108mW/g

Appendix C - Calibration

All of the instruments Calibration information are listed below.

- Dipole _ D835V2 SN:4d082 Calibration No.D835V2-4d082 _Jul10
- Dipole _ D1900V2 SN:5d111 Calibration No.D1900V2-5d111_Jul10
- Dipole _ D2450V2 SN:712 Calibration No.D2450V2-712_Feb10
- Probe _ EX3DV4 SN:3578 Calibration No.EX3-3578_Jun10
- Probe _ EX3DV3 SN:3519 Calibration No.EX3-3519_Feb10
- DAE _ DAE4 SN:541 Calibration No.DAE4-541_Jul10

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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S Swiss Calibration Service

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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 ATL (Auden)

Certificate No: D835V2-4d082_Jul10

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d082
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	July 20, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

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

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

Issued: July 20, 2010

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

S Schweizerischer Kalibrierdienst
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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.0 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature during test	(23.1 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.40 mW / g
SAR normalized	normalized to 1W	9.60 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.65 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.56 mW / g
SAR normalized	normalized to 1W	6.24 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.26 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.0 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.58 mW / g
SAR normalized	normalized to 1W	10.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**10.0 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.69 mW / g
SAR normalized	normalized to 1W	6.76 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.60 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω - 3.2 jΩ
Return Loss	- 29.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.3 Ω - 4.6 jΩ
Return Loss	- 26.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.389ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 17, 2008

DASY5 Validation Report for Head TSL

Date/Time: 20.07.2010 15:48:57

Test Laboratory: SPEAG, Zurich, Switzerland

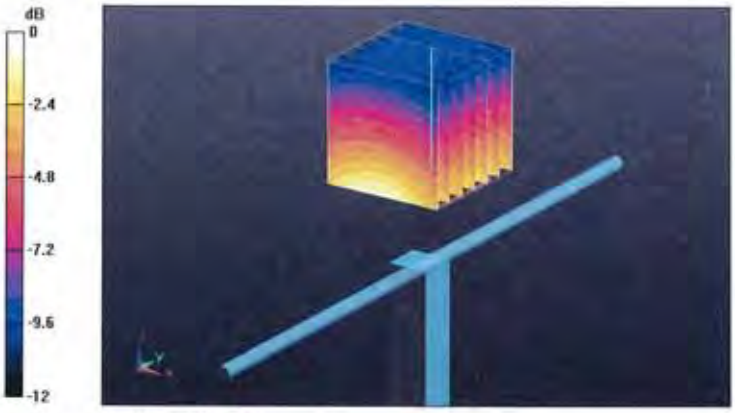
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 42.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

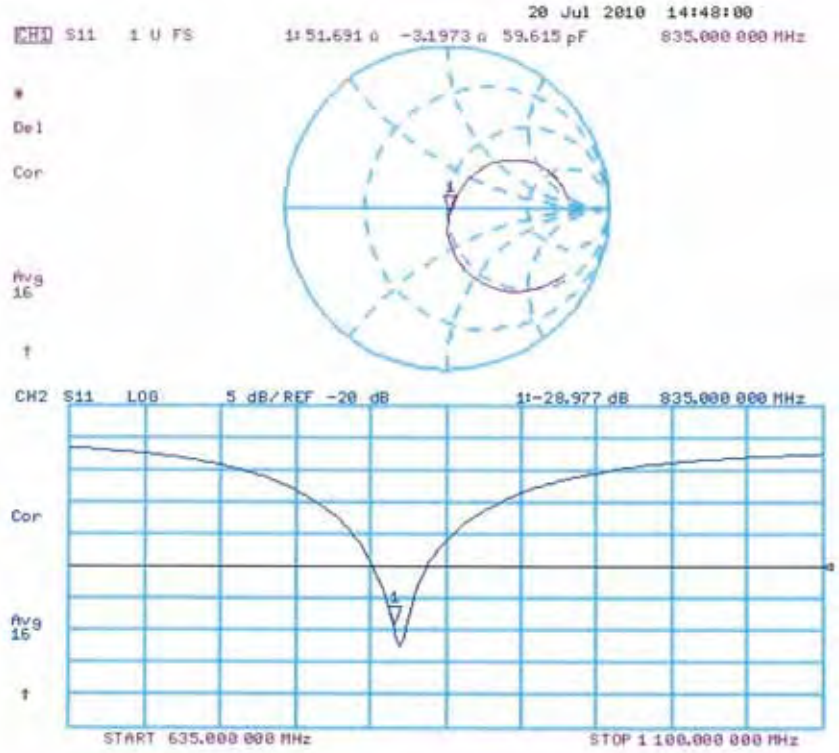
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.1 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 3.63 W/kg
SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.56 mW/g
Maximum value of SAR (measured) = 2.8 mW/g



0 dB = 2.8mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 20.07.2010 12:03:13

Test Laboratory: SPEAG, Zurich, Switzerland

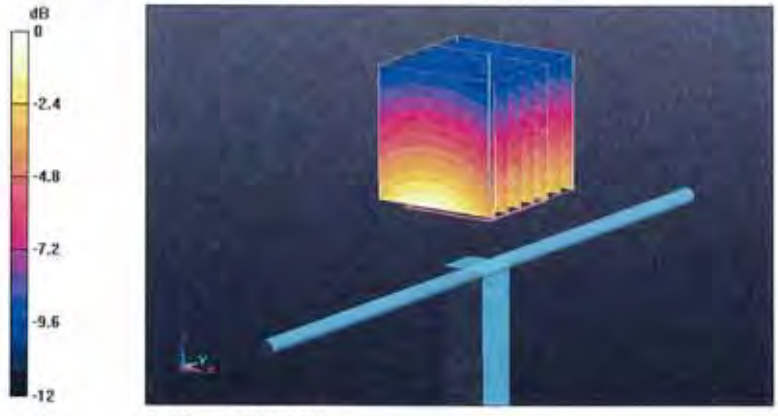
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 55; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

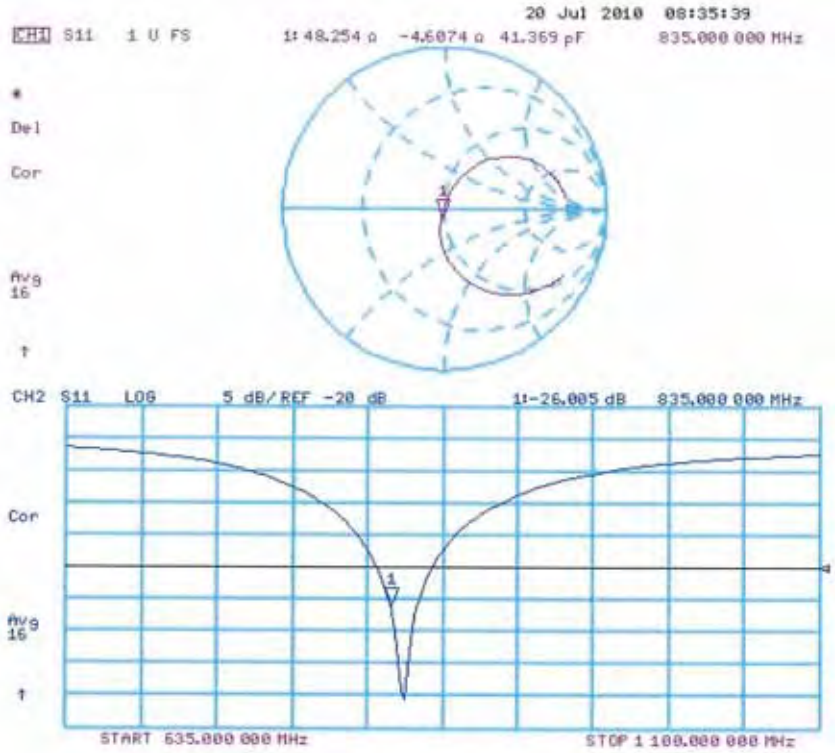
- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.1 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 3.81 W/kg
SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.69 mW/g
Maximum value of SAR (measured) = 2.98 mW/g



0 dB = 2.98mW/g

Impedance Measurement Plot for Body TSL



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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 ATL (Auden)

Certificate No: D1900V2-5d111_Jul10

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d111
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	July 16, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

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

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

Issued: July 19, 2010

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.3 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature during test	(22.4 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR normalized	normalized to 1W	40.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.9 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.28 mW / g
SAR normalized	normalized to 1W	21.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**21.0 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.3 ± 6 %	1.55 mho/m ± 6 %
Body TSL temperature during test	(22.4 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.6 mW / g
SAR normalized	normalized to 1W	42.4 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**41.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.66 mW / g
SAR normalized	normalized to 1W	22.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.5 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.7 Ω + 6.6 jΩ
Return Loss	- 23.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.7 Ω + 6.5 jΩ
Return Loss	- 22.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.202 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 28, 2008

DASY5 Validation Report for Head TSL

Date/Time: 16.07.2010 13:15:00

Test Laboratory: SPEAG, Zurich, Switzerland

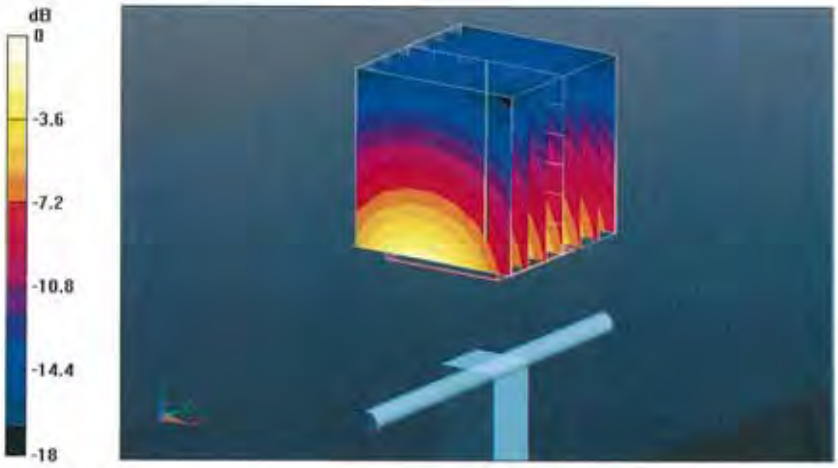
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d111

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

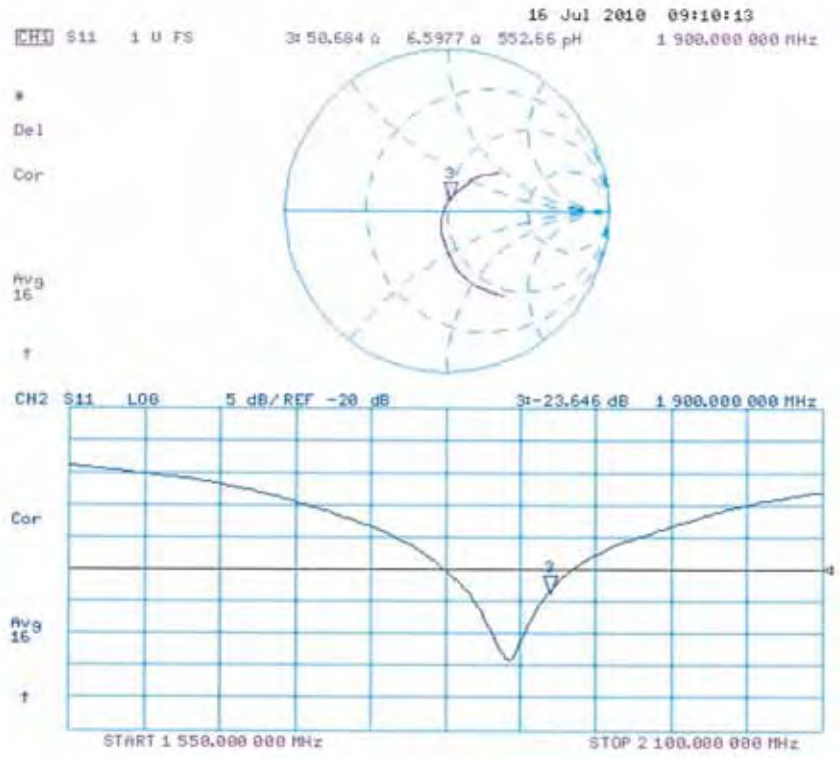
- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.6 V/m; Power Drift = 0.029 dB
Peak SAR (extrapolated) = 18.4 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.28 mW/g
Maximum value of SAR (measured) = 12.4 mW/g



0 dB = 12.4mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 13.07.2010 12:57:16

Test Laboratory: SPEAG, Zurich, Switzerland

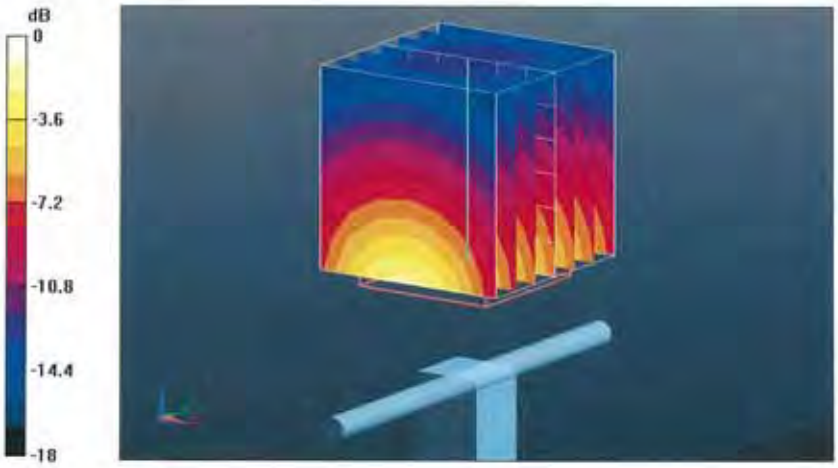
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d111

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL U11 BB
Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

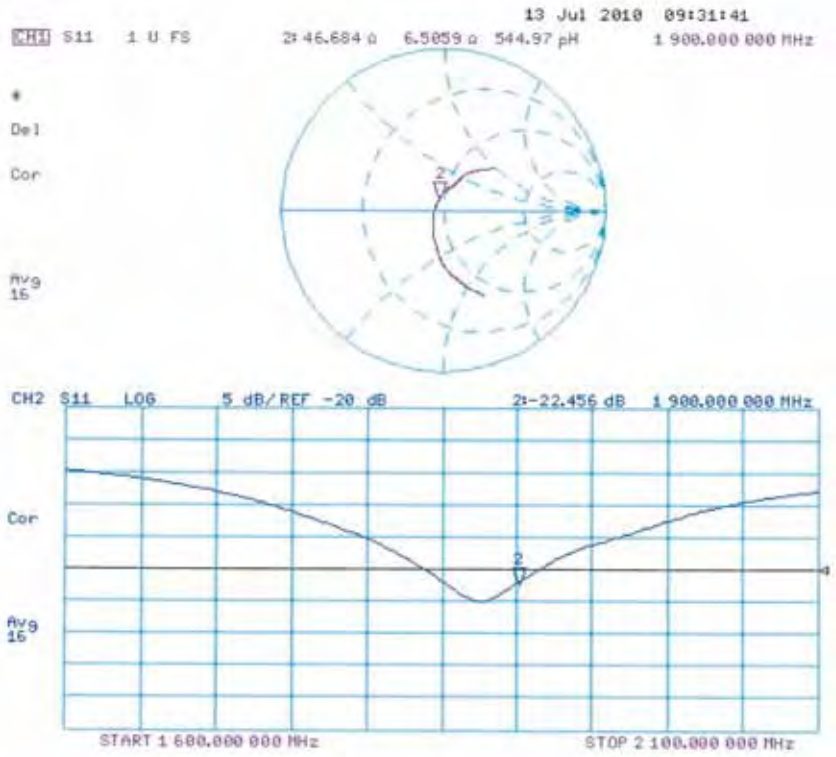
- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.7 V/m; Power Drift = 0.00345 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.66 mW/g
Maximum value of SAR (measured) = 13.3 mW/g



0 dB = 13.3mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client ATL (Auden)

Certificate No: D2450V2-712_Feb10

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 712
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	February 19, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV3	SN: 3205	26-Jun-09 (No. ES3-3205_Jun09)	Jun-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10

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

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

Issued: February 19, 2010

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V5.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.5 ± 6 %	1.76 mho/m ± 6 %
Head TSL temperature during test	(21.0 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.3 mW / g
SAR normalized	normalized to 1W	53.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**53.5 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.24 mW / g
SAR normalized	normalized to 1W	25.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.0 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.7 ± 6 %	2.00 mho/m ± 6 %
Body TSL temperature during test	(21.2 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR normalized	normalized to 1W	52.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**51.1 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.97 mW / g
SAR normalized	normalized to 1W	23.9 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**23.7 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.2 Ω + 1.9 jΩ
Return Loss	- 27.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.1 Ω + 5.2 jΩ
Return Loss	- 25.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.144 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 05, 2002

DASY5 Validation Report for Head TSL

Date/Time: 17.02.2010 13:12:38

Test Laboratory: SPEAG, Zurich, Switzerland

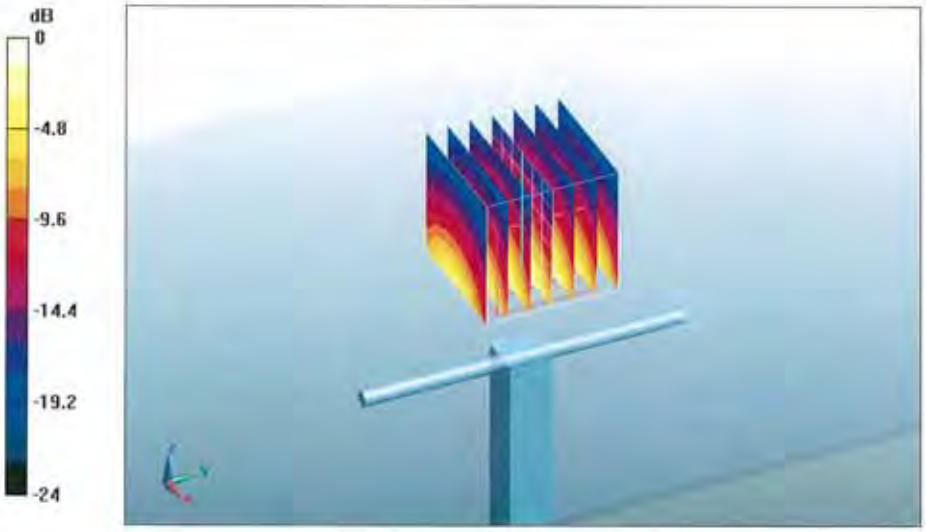
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:712

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U11 BB
Medium parameters used: f = 2450 MHz; σ = 1.77 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

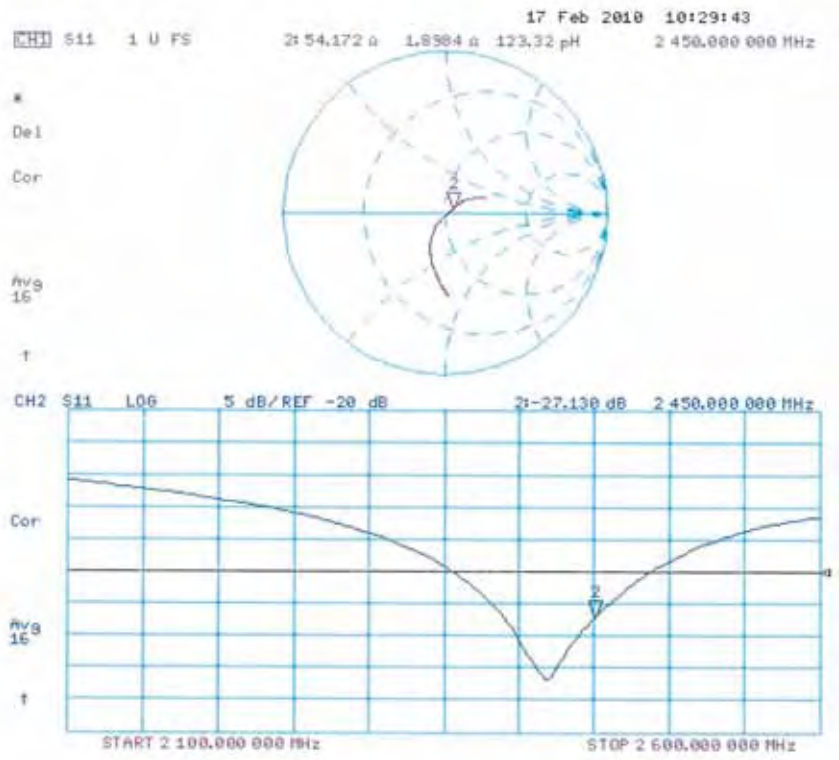
- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.1 V/m; Power Drift = 0.032 dB
Peak SAR (extrapolated) = 27.2 W/kg
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.24 mW/g
Maximum value of SAR (measured) = 17.1 mW/g



0 dB = 17.1mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 19.02.2010 13:05:49

Test Laboratory: SPEAG, Zurich, Switzerland

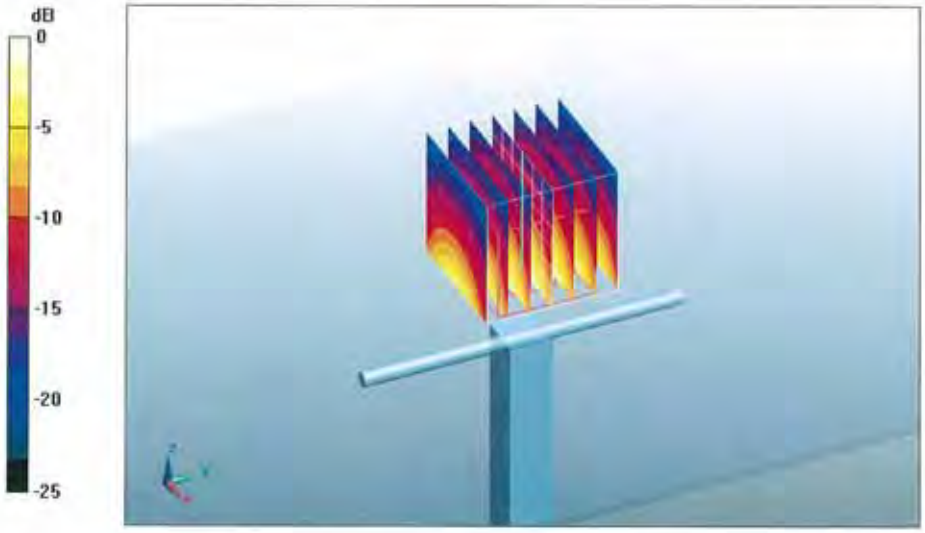
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:712

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: MSL U10 BB
Medium parameters used: f = 2450 MHz; σ = 2.01 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

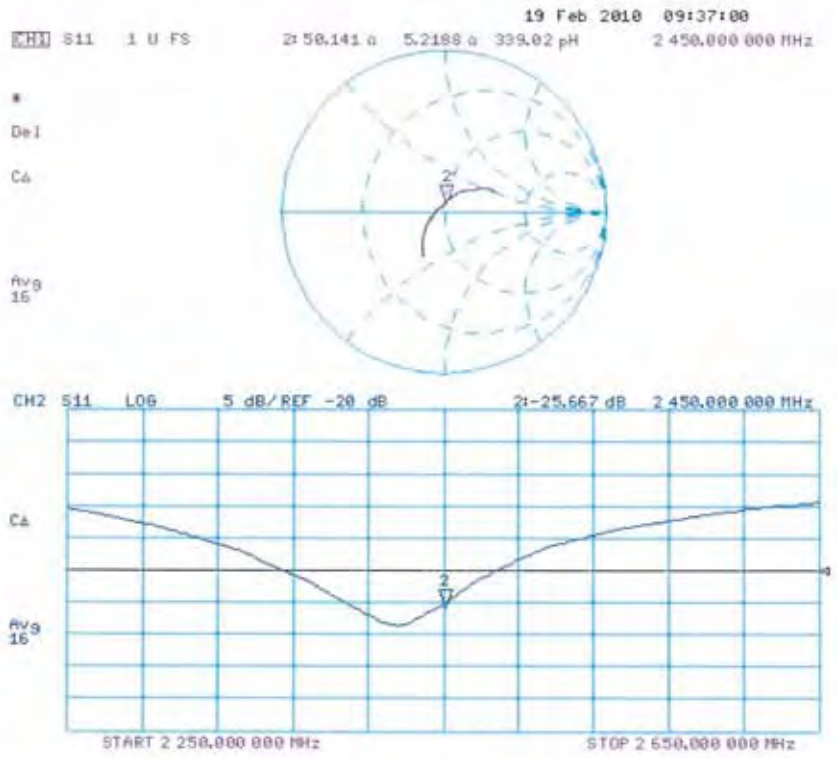
- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 157; SEMCAD X Version 14.0 Build 57

Pin250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.5 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 29.5 W/kg
SAR(1 g) = 13 mW/g; SAR(10 g) = 5.97 mW/g
Maximum value of SAR (measured) = 17 mW/g



0 dB = 17mW/g

Impedance Measurement Plot for Body TSL



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

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

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

Accreditation No.: SCS 108

Client **Auden**

Certificate No: EX3-3578_Jun10

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3578

Calibration procedure(s) QA CAL-01.v6, QA CAL-14.v3, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes

Calibration date: June 22, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	**Katja Pokovic**	**Technical Manager**	
Approved by:	**Fin Bomholt**	**R&D Director**	

Issued: June 23, 2010

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

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

Accreditation No.: SCS 108

Glossary:

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 effect 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.
- *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 EX3DV4

SN:3578

Manufactured:	November 4, 2005
Last calibrated:	June 26, 2009
Recalibrated:	June 22, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 SN:3578

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.55	0.50	0.56	± 10.1%
DCP (mV)[B]	92.3	88.3	86.1	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300	± 1.5%
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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 maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 SN:3578

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
835	± 50 / ± 100	41.5 ± 5%	0.90 ± 5%	8.44	8.44	8.44	0.84	0.61 ± 11.0%
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	8.25	8.25	8.25	0.70	0.65 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	7.11	7.11	7.11	0.85	0.58 ± 11.0%
1900	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	7.05	7.05	7.05	0.79	0.60 ± 11.0%
2300	± 50 / ± 100	39.5 ± 5%	1.67 ± 5%	6.78	6.78	6.78	0.74	0.59 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	6.38	6.38	6.38	0.46	0.75 ± 11.0%
2600	± 50 / ± 100	39.0 ± 5%	1.96 ± 5%	6.41	6.41	6.41	0.40	0.85 ± 11.0%
3500	± 50 / ± 100	37.9 ± 5%	2.91 ± 5%	6.31	6.31	6.31	0.40	1.02 ± 13.1%
5200	± 50 / ± 100	36.0 ± 5%	4.66 ± 5%	4.18	4.18	4.18	0.45	1.80 ± 13.1%
5300	± 50 / ± 100	35.9 ± 5%	4.76 ± 5%	4.01	4.01	4.01	0.45	1.80 ± 13.1%
5500	± 50 / ± 100	35.6 ± 5%	4.96 ± 5%	3.90	3.90	3.90	0.50	1.80 ± 13.1%
5600	± 50 / ± 100	35.5 ± 5%	5.07 ± 5%	3.83	3.83	3.83	0.55	1.80 ± 13.1%
5800	± 50 / ± 100	35.3 ± 5%	5.27 ± 5%	3.72	3.72	3.72	0.50	1.80 ± 13.1%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

DASY/EASY - Parameters of Probe: EX3DV4 SN:3578

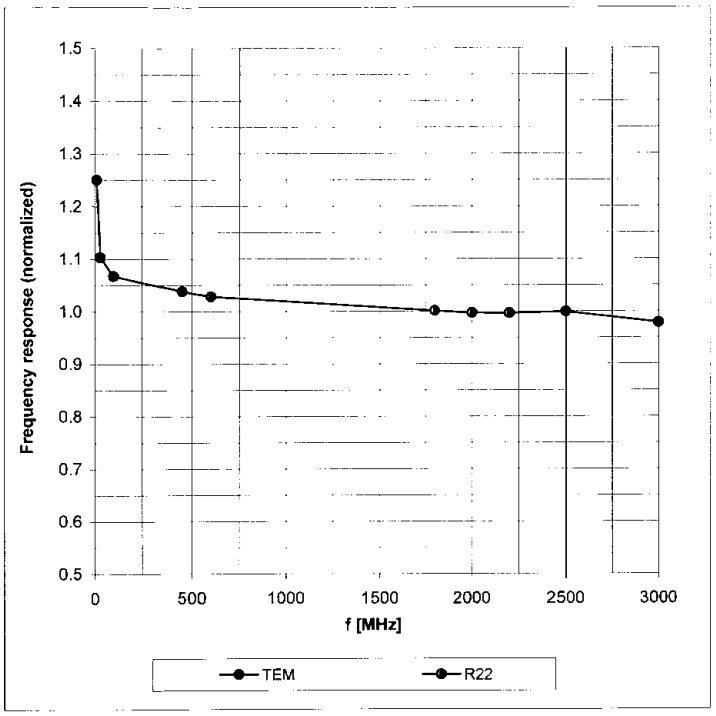
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	8.55	8.55	8.55	0.89	0.64 ± 11.0%
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	8.39	8.39	8.39	0.85	0.65 ± 11.0%
1810	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	6.81	6.81	6.81	0.81	0.64 ± 11.0%
1900	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	6.70	6.70	6.70	0.76	0.63 ± 11.0%
2300	± 50 / ± 100	52.8 ± 5%	1.85 ± 5%	6.67	6.67	6.67	0.34	0.92 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	6.51	6.51	6.51	0.62	0.67 ± 11.0%
2600	± 50 / ± 100	52.5 ± 5%	2.16 ± 5%	6.53	6.53	6.53	0.43	0.82 ± 11.0%
3500	± 50 / ± 100	51.3 ± 5%	3.31 ± 5%	5.59	5.59	5.59	0.37	1.26 ± 13.1%
5200	± 50 / ± 100	49.0 ± 5%	5.30 ± 5%	3.59	3.59	3.59	0.63	1.95 ± 13.1%
5300	± 50 / ± 100	48.5 ± 5%	5.42 ± 5%	3.39	3.39	3.39	0.63	1.95 ± 13.1%
5500	± 50 / ± 100	48.6 ± 5%	5.65 ± 5%	3.32	3.32	3.32	0.63	1.95 ± 13.1%
5600	± 50 / ± 100	48.5 ± 5%	5.77 ± 5%	3.09	3.09	3.09	0.65	1.95 ± 13.1%
5800	± 50 / ± 100	48.2 ± 5%	6.00 ± 5%	3.29	3.29	3.29	0.65	1.95 ± 13.1%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

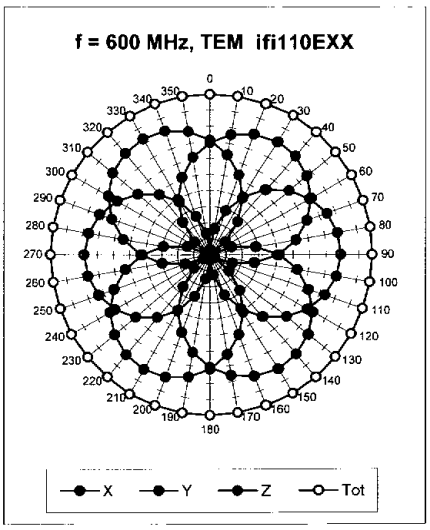
Frequency Response of E-Field

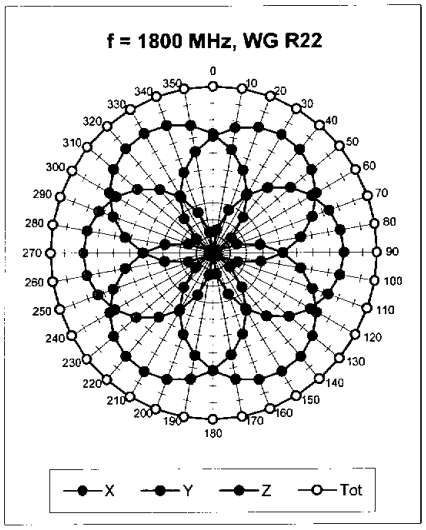
(TEM-Cell:ifi110 EXX, Waveguide: R22)

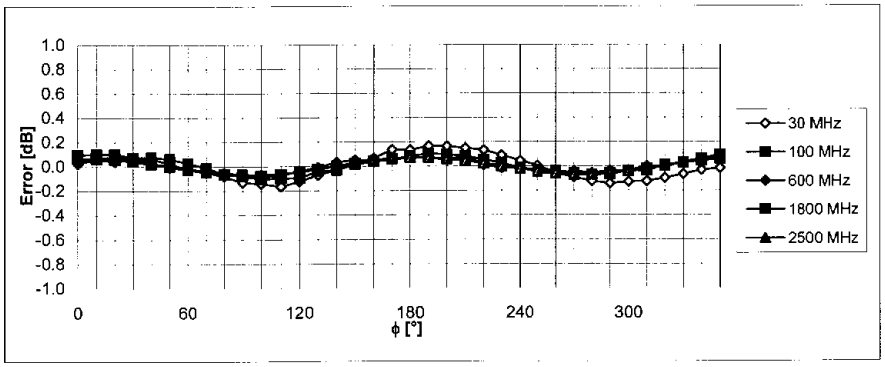


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



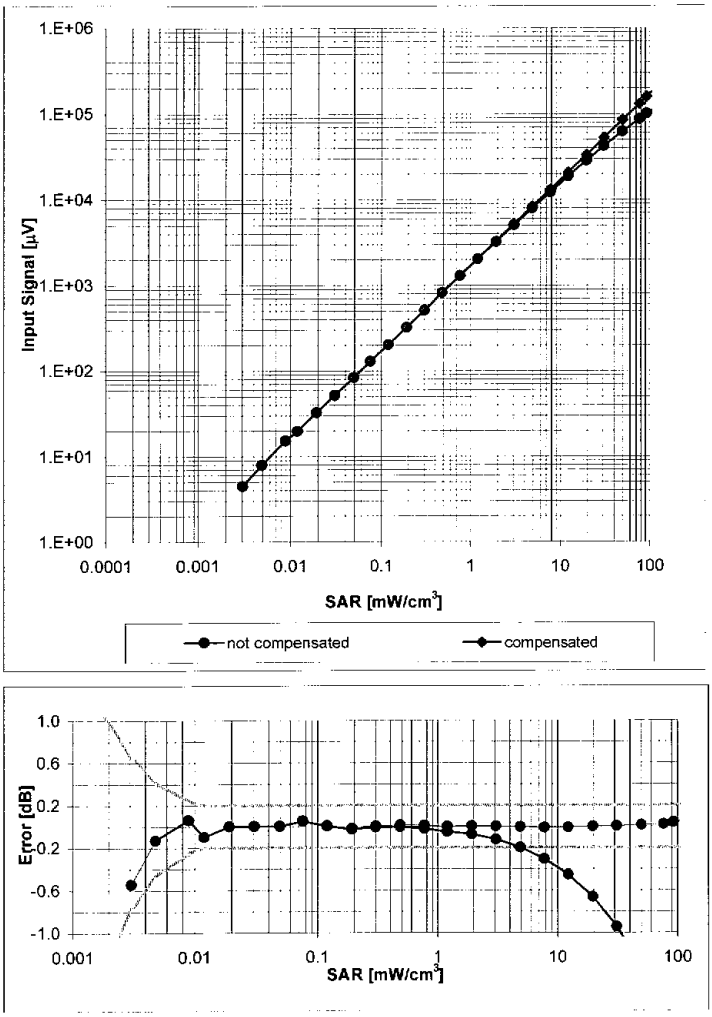




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

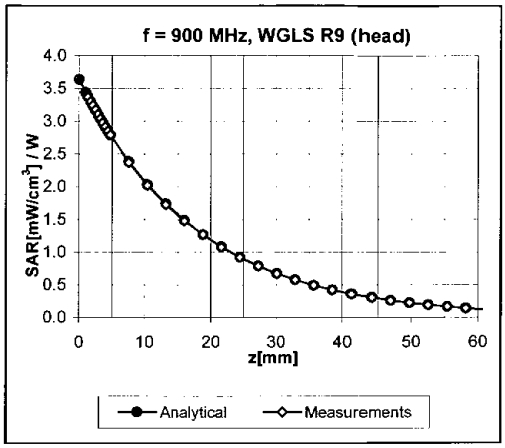
Dynamic Range f(SAR_{head})

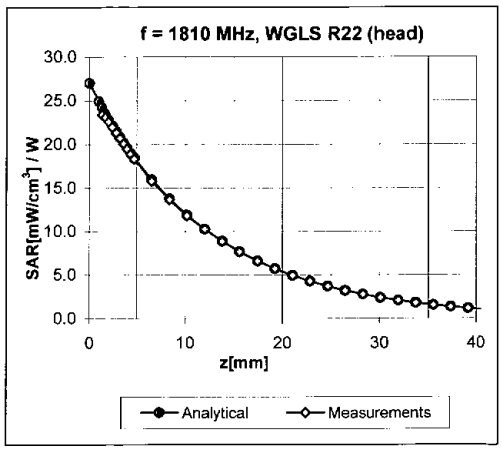
(Waveguide R22, f = 1800 MHz)



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

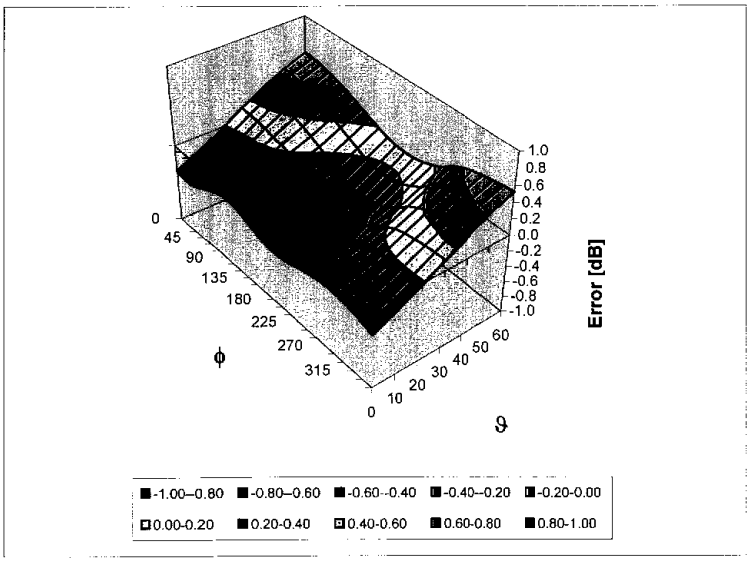
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

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

Accreditation No.: SCS 108

Client ATL (Auden)

Certificate No: EX3-3519_Feb10

CALIBRATION CERTIFICATE

Object EX3DV3 - SN:3519

Calibration procedure(s) QA CAL-01.v6, QA CAL-14.v3, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes

Calibration date: February 23, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	29-Sep-09 (No. DAE4-660_Sep09)	Sep-10

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: February 27, 2010

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 effect 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.
- *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 EX3DV3

SN:3519

Manufactured:	August 3, 2004
Last calibrated:	January 21, 2009
Recalibrated:	February 23, 2010

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: EX3DV3 SN:3519

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.81	0.70	0.73	± 10.1%
DCP (mV)[B]	92.4	92.7	91.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300	± 1.5%
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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 maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

DASY - Parameters of Probe: EX3DV3 SN:3519

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
5200	± 50 / ± 100	36.0 ± 5%	4.66 ± 5%	5.22	5.22	5.22	0.30	1.90 ± 13.1%
5500	± 50 / ± 100	35.6 ± 5%	4.96 ± 5%	4.55	4.55	4.55	0.40	1.90 ± 13.1%
5800	± 50 / ± 100	35.3 ± 5%	5.27 ± 5%	4.09	4.09	4.09	0.50	1.90 ± 13.1%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band

DASY - Parameters of Probe: EX3DV3 SN:3519

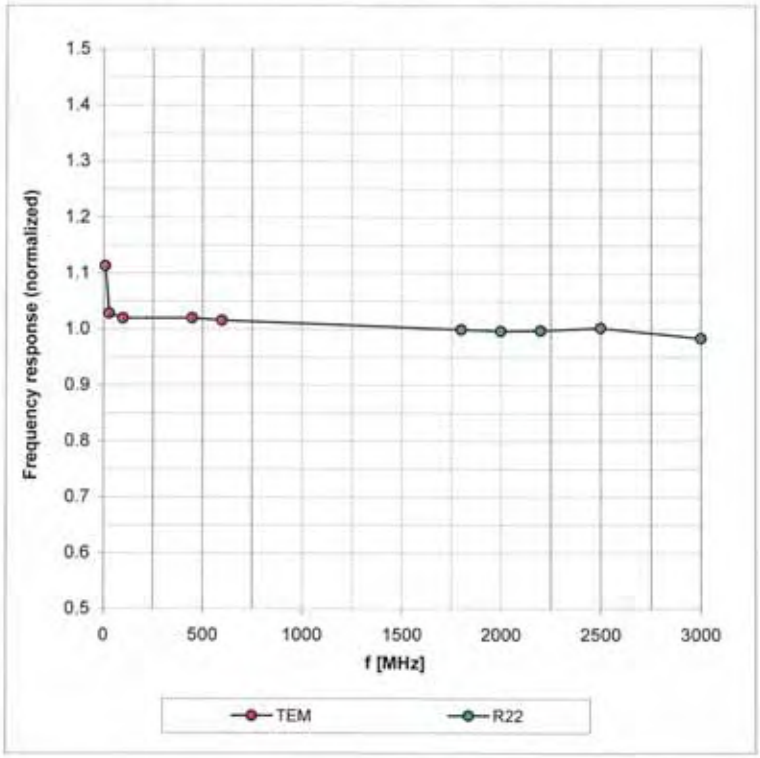
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
2300	± 50 / ± 100	52.8 ± 5%	1.85 ± 5%	8.60	8.60	8.60	0.34	0.93	± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	8.10	8.10	8.10	0.34	0.90	± 11.0%
2600	± 50 / ± 100	52.5 ± 5%	2.16 ± 5%	7.86	7.86	7.86	0.35	0.89	± 11.0%
3500	± 50 / ± 100	51.3 ± 5%	3.31 ± 5%	7.01	7.01	7.01	0.27	1.57	± 13.1%
5200	± 50 / ± 100	49.0 ± 5%	5.30 ± 5%	4.34	4.34	4.34	0.55	1.95	± 13.1%
5300	± 50 / ± 100	48.5 ± 5%	5.42 ± 5%	4.20	4.20	4.20	0.60	1.95	± 13.1%
5500	± 50 / ± 100	48.6 ± 5%	5.65 ± 5%	3.76	3.76	3.76	0.63	1.95	± 13.1%
5600	± 50 / ± 100	48.5 ± 5%	5.77 ± 5%	3.57	3.57	3.57	0.70	1.95	± 13.1%
5800	± 50 / ± 100	48.2 ± 5%	6.00 ± 5%	3.85	3.85	3.85	0.65	1.90	± 13.1%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band

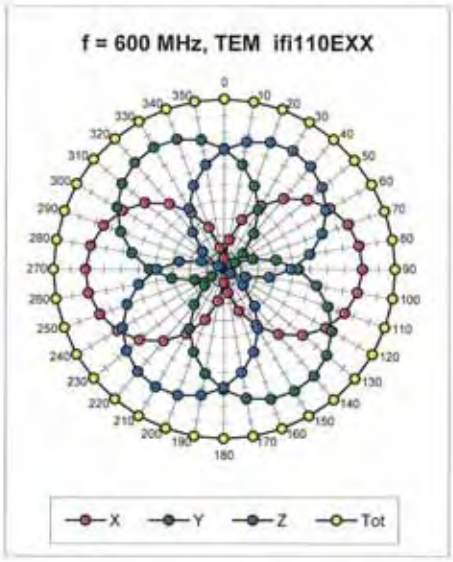
Frequency Response of E-Field

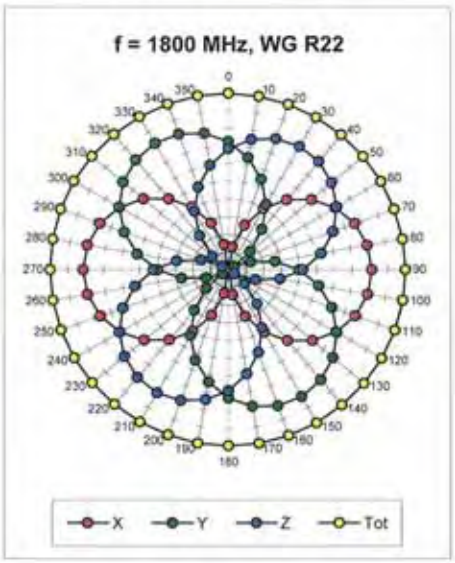
(TEM-Cell:ifi110 EXX, Waveguide: R22)

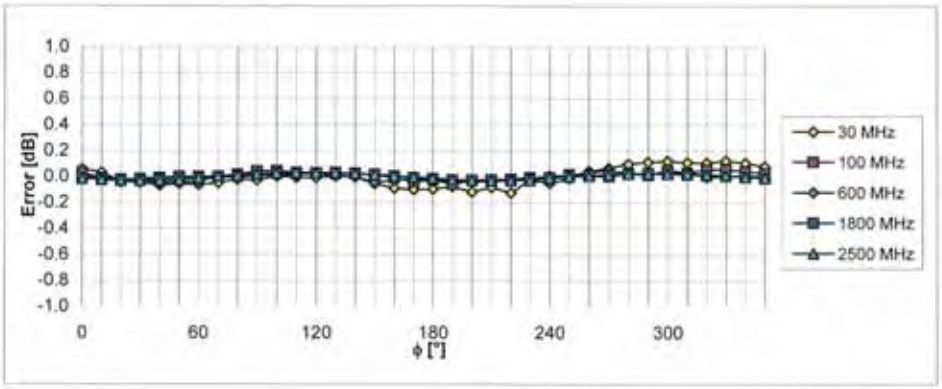


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



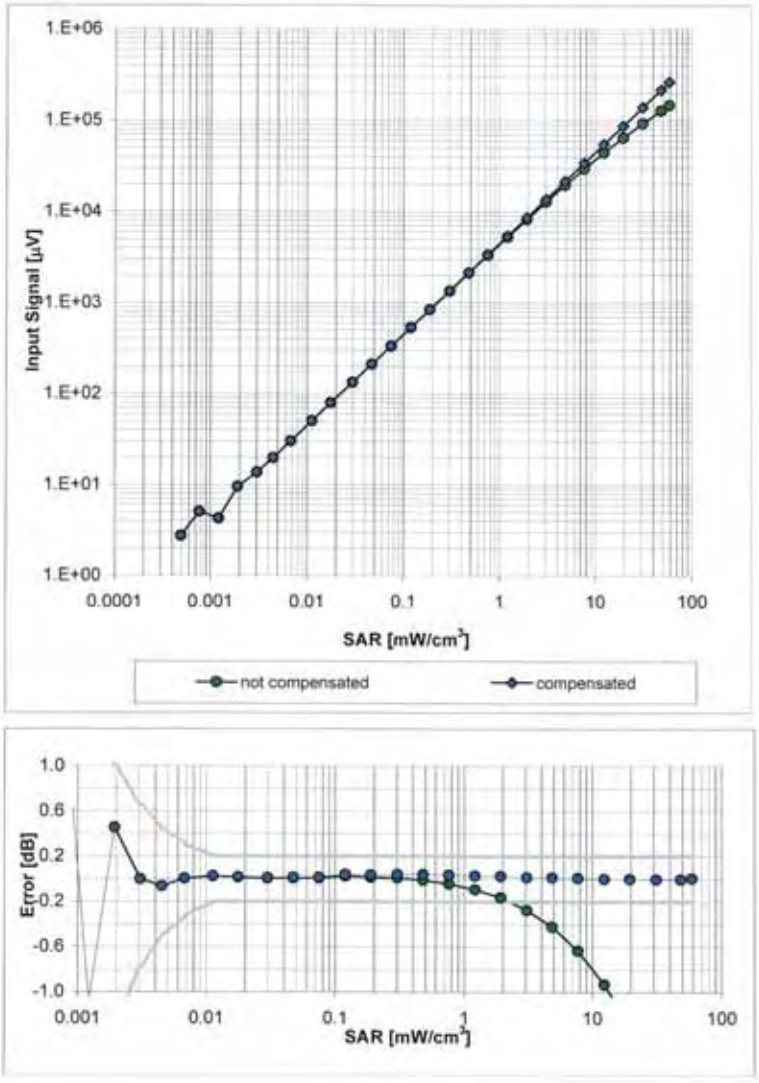




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

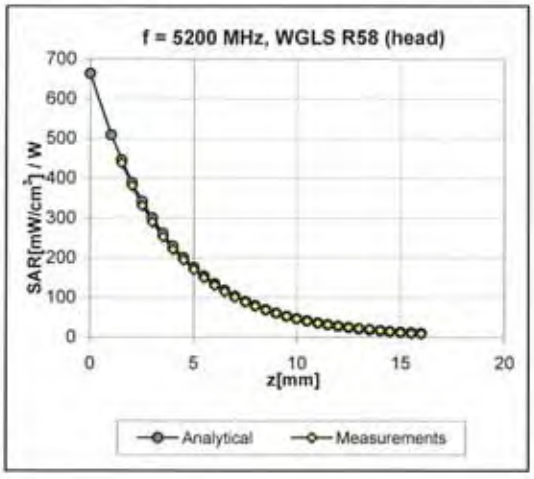
Dynamic Range f(SAR_{head})

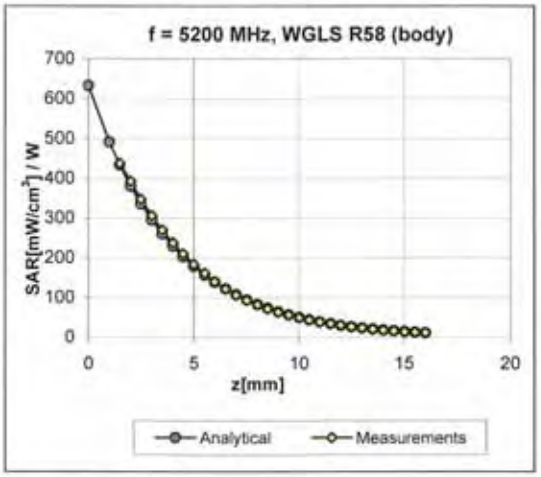
(Waveguide R22, f = 1800 MHz)



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

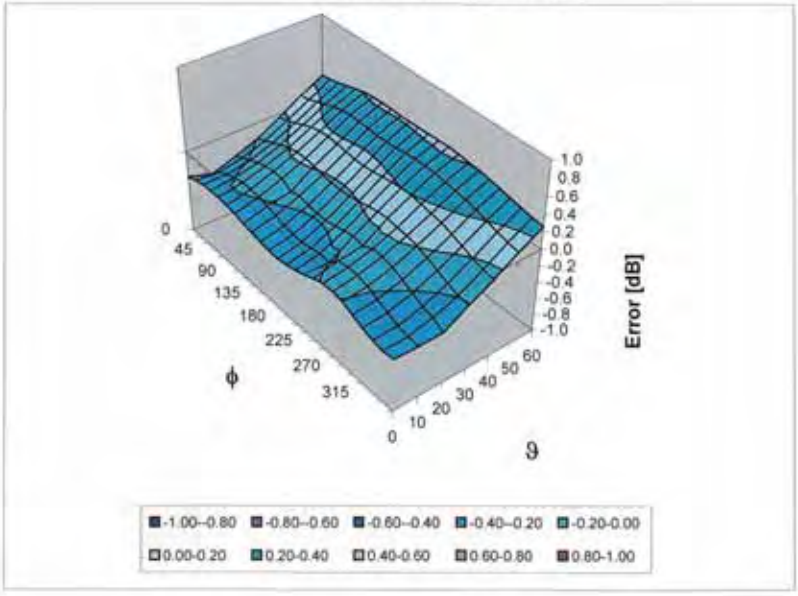
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

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

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

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

Accreditation No.: SCS 108

Client ATL (Auden)

Certificate No: DAE4-541_Jul10

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 541
Calibration procedure(s)	QA CAL-06.v21 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	July 21, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	1-Oct-09 (No: 9055)	Oct-10
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	07-Jun-10 (in house check)	In house check: Jun-11

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

Issued: July 21, 2010

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

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:* DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	404.537 ± 0.1% (k=2)	404.418 ± 0.1% (k=2)	404.182 ± 0.1% (k=2)
Low Range	3.96832 ± 0.7% (k=2)	3.93576 ± 0.7% (k=2)	3.97526 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	290.5 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200007.6	-2.45	-0.00
Channel X	+ Input	20002.71	3.11	0.02
Channel X	- Input	-19993.80	5.60	-0.03
Channel Y	+ Input	200009.7	0.90	0.00
Channel Y	+ Input	19997.49	-2.11	-0.01
Channel Y	- Input	-20001.06	-0.96	0.00
Channel Z	+ Input	200007.5	-0.73	-0.00
Channel Z	+ Input	20001.10	1.40	0.01
Channel Z	- Input	-19996.58	3.52	-0.02

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.2	0.31	0.02
Channel X	+ Input	199.75	-0.05	-0.03
Channel X	- Input	-200.44	-0.34	0.17
Channel Y	+ Input	2001.5	1.51	0.08
Channel Y	+ Input	199.36	-0.64	-0.32
Channel Y	- Input	-200.93	-0.93	0.47
Channel Z	+ Input	2000.3	0.13	0.01
Channel Z	+ Input	198.98	-1.02	-0.51
Channel Z	- Input	-201.02	-1.02	0.51

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	11.44	10.03
	- 200	-8.47	-10.20
Channel Y	200	1.54	1.18
	- 200	-2.96	-2.67
Channel Z	200	1.08	0.90
	- 200	-2.05	-2.13

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	1.55	-0.83
Channel Y	200	2.34	-	3.70
Channel Z	200	0.27	-0.67	-

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	16010	15908
Channel Y	15784	14840
Channel Z	15973	16097

5. Input Offset Measurement

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

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-0.03	-0.96	1.03	0.29
Channel Y	-0.54	-1.32	0.40	0.34
Channel Z	-0.86	-1.49	-0.32	0.26

6. Input Offset Current

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

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.2000	199.5
Channel Y	0.2000	203.1
Channel Z	0.2001	203.2

8. Low Battery Alarm Voltage (verified during pre test)

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

9. Power Consumption (verified during pre test)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.0	+6	+14
Supply (- Vcc)	-0.01	-8	-9