SAR TEST REPORT

The following samples were submitted and identified on behalf of the client as:

Equipment Under Test	Juno T41/5
Marketing Name	RH41G
Brand Name	Trimble
Model No.	JUNO/T41/5-BWC
Company Name	Trimble Navigation Limited
Company Address	345 SW Avery Avenue, Corvallis, OR 97333
Standards	FCC OET 65 supplement C, IEEE /ANSI C95.1 , C95.3, IEEE 1528
FCC ID	S9E-JNOBWC
Date of Receipt	May 28, 2012
Date of Test(s)	Jun. 10, 2012 ~ Jul. 28, 2012
Date of Issue	Aug. 03, 2012

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

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Taiwan Electronic & Communication Laboratory or testing done by SGS Taiwan Electronic & Communication Laboratory in connection with distribution or use of the product described in this repocrt must be approved by SGS Taiwan Electronic & Communication Laboratory in writing.

Signed for on the behalf of SGS

Supervisor

Ricky Huang

Ricky Huang

Date: Aug. 03, 2012

Supervisor

Kelly Tsai

Kelly Tsai

Date: Aug. 03, 2012

Version

Report Number	Revision	Date	Memo
ES/2012/40010	00	2012/08/03	Initial creation of test report.

This test report contains a reference to the previous version test report that it replaces.

Contents

1. General Information

1.1 Testing Laboratory

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1.2 Details of Applicant

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1.3 Description of EUT

EUT Name	Juno T41/5			
Marketing Name	RH41G			
Brand Name	Trimble			
Model No.	JUNO/T41/5-BWC			
IMEI Code	359998040010276			
FCC ID	S9E-JNOBWC			
Mode of Operation	☒GSM ☒GPRS ☒EDGE ☒WCDMA ☒HSDPA ☒HSUPA ☒WLAN802.11 b/g/n (H20) band			
Duty Cycle	GSM	1/8.3		
	GPRS	1/2		
	EDGE	1/2		
	WCDMA	1		
	WLAN802.11 b/g/n(H20)	1		
TX Frequency Range (MHz)	GSM850	824.2	—	848.8
	GSM1900	1850.2	—	1909.8
	WCDMA Band II	1852.4	—	1907.6
	WCDMA Band V	826.4	—	846.6
	WLAN802.11 b/g/n(H20)	2412	—	2462
Channel Number (ARFCN)	GSM850	128	—	251
	GSM1900	512	—	810
	WCDMA Band II	9262	—	9538
	WCDMA Band V	4132	—	4233
	WLAN802.11 b/g/n(H20)	1	—	11

Max. SAR Measured(1 g) (Unit: W/Kg)	Head	GSM 850	0.577	☐Left ☒Right ☒Cheek ☐Tilt 251 Channel
		GSM 1900	0.417	☐Left ☒Right ☒Cheek ☐Tilt 661 Channel
		WCDMA Band II	0.792	☐Left ☒Right ☒Cheek ☐Tilt 9400 Channel -with memory card
		WCDMA Band V	0.639	☐Left ☒Right ☒Cheek ☐Tilt 4183 Channel
	Body-worn	GSM 850	0.458	☐Left ☒Front ☐Right ☐Back ☐Bottom 128 Channel
		GSM 1900	0.159	☐Left ☒Front ☐Right ☐Back ☐Bottom 512 Channel
		WCDMA Band II	0.337	☐Left ☒Front ☐Right ☐Back ☐Bottom 9538 Channel
		WCDMA Band V	0.56	☐Left ☒Front ☐Right ☐Back ☐Bottom 4183 Channel
		WLAN802.11 b	0.119	☐Left ☐Front ☐Right ☒Back ☐Bottom 11 Channel -with memory card

#. GSM / GPRS / EDGE conducted power table:

EUT mode	Frequency (MHz)	CH	Burst average power Avg.(dBm)	Source-based time average power Avg.(dBm)
GSM 850	824.2	128	32.90	23.87
	836.6	190	32.60	23.57
	848.8	251	32.70	23.67
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	
			-9.03	

Burst average power						
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)
GPRS 850	824.2	128	32.90	30.00	27.80	26.60
	836.6	190	32.70	29.90	27.70	26.30
	848.8	251	32.80	29.80	27.70	26.10
Source-based time average power						
GPRS 850	824.2	128	23.87	23.98	23.54	23.59
	836.6	190	23.67	23.88	23.44	23.29
	848.8	251	23.77	23.78	23.44	23.09
The division factor compared to the number of TX time slot						
Division factor			1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot
			-9.03	-6.02	-4.26	-3.01

Burst average power						
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)
EDGE 850	824.2	128	26.90	23.90	22.30	21.30
	836.6	190	26.90	23.80	22.10	21.20
	848.8	251	26.80	23.80	22.10	21.10
Source-based time average power						
EDGE 850	824.2	128	17.87	17.88	18.04	18.29
	836.6	190	17.87	17.78	17.84	18.19
	848.8	251	17.77	17.78	17.84	18.09
The division factor compared to the number of TX time slot						
Division factor			1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot
			-9.03	-6.02	-4.26	-3.01

EUT mode	Frequency (MHz)	CH	Burst average power	Source-based time average power
			Avg.(dBm)	Avg.(dBm)
GSM 1900	1850.2	512	30.50	21.47
	1880	661	30.50	21.47
	1909.8	810	30.40	21.37
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	
			-9.03	

Burst average power						
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)
GPRS 1900	1850.2	512	30.50	26.90	24.70	23.60
	1880	661	30.50	27.10	24.80	23.50
	1909.8	810	30.40	27.10	25.00	23.70
Source-based time average power						
GPRS 1900	1850.2	512	21.47	20.88	20.44	20.59
	1880	661	21.47	21.08	20.54	20.49
	1909.8	810	21.37	21.08	20.74	20.69
The division factor compared to the number of TX time slot						
Division factor			1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot
			-9.03	-6.02	-4.26	-3.01

Burst average power						
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)
EDGE 1900	1850.2	512	26.60	22.60	21.20	19.70
	1880	661	26.80	22.80	21.20	20.00
	1909.8	810	26.70	22.80	21.30	19.90
Source-based time average power						
EDGE 1900	1850.2	512	17.57	16.58	16.94	16.69
	1880	661	17.77	16.78	16.94	16.99
	1909.8	810	17.67	16.78	17.04	16.89
The division factor compared to the number of TX time slot						
Division factor			1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot
			-9.03	-6.02	-4.26	-3.01

#. WCDMA Band II / Band V / HSDPA / HSUPA conducted power table:

Band	CH	Rel99 AV(dBm)	HSDPA mode AV(dBm)				HSUPA mode AV(dBm)				
			SUB-1	SUB-2	SUB-3	SUB-4	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5
WCDMA Band II	9262	24.16	24.33	24.04	23.85	23.92	24.08	22.13	23.14	22.26	23.97
	9400	23.72	23.61	23.58	23.16	23.17	23.70	21.77	22.72	21.82	23.56
	9538	23.89	23.75	23.74	23.22	23.34	23.83	21.87	22.91	21.91	23.74
WCDMA Band V	4132	24.25	24.04	24.18	23.58	23.63	24.21	22.27	23.25	22.32	24.07
	4183	24.25	24.11	24.14	23.63	23.67	24.18	22.26	23.24	22.32	24.01
	4233	24.15	24.27	24.02	23.78	23.84	24.07	22.11	23.15	22.19	23.96

#. WLAN802.11 b/g/n (H20) conducted power table:

802.11b		Average Power Output(dBm)			
CH	Frequency (MHz)	Data Rate			
		1	2	5.5	11
1	2412	15.31	15.29	15.26	15.28
6	2437	15.14	15.12	15.08	15.09
11	2462	14.46	14.43	14.41	14.42

802.11g		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate							
		6	9	12	18	24	36	48	54
1	2412	12.85	12.82	12.83	12.80	12.81	12.78	12.80	12.73
6	2437	13.08	13.01	13.05	13.04	13.06	12.98	13.01	13.02
11	2462	12.99	12.85	12.89	12.86	12.88	12.82	12.80	12.83

802.11n (H20)		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate							
		6.5	13	19.5	26	39	52	58.5	65
1	2412	12.84	12.80	12.81	12.78	12.80	12.82	12.79	12.76
6	2437	13.07	13.02	13.05	12.98	12.96	12.99	13.01	13.03
11	2462	12.81	12.78	12.76	12.75	12.77	12.80	12.78	12.75

#. Bluetooth conducted power table:

Frequency (MHz)	Peak Power (dBm)	
	BDR	EDR
2402	1.84	1.8
2441	2.63	2.57
2480	2.75	2.56

1.4 Test Environment

Ambient Temperature: 22±2° C
Tissue Simulating Liquid: 22±2° C

1.5 Operation Description

General:

1. The EUT is controlled by using a Radio Communication Tester (R&S CMU200), and the communication between the EUT and the tester is established by air link.
2. Measurements are performed respectively on the lowest, middle and highest channels of the operating band(s). The EUT is set to maximum power level during all tests, and at the beginning of each test the battery is fully charged.
3. During the SAR testing, the DASY4 system checks power drift by comparing the e-field strength of one specific location measured at the beginning with that measured at the end of the SAR testing.
4. Testing Head SAR at lowest, middle and highest channel for all bands with LET/LEC/RET/REC conditions.

SAR evaluation considerations for handsets with multiple transmitters:

5. When the maximum transmitter and antenna output power are ≦ 60/f(GHz) (mW) SAR evaluation is typically not required for FCC or TCB approval
   (Bluetooth peak power= 2.75dBm)
6. According to **KDB248227**-SAR is not required for 802.11 g/HT20/HT40 channels when the maximum average output power is higher than that measured on the corresponding 802.11b channels but increase less than 1/4 dB.
7. Using **KDB941225 D01** to exclude SAR test requirements for HSPA modes due to the maximum average output power of HSPA active is higher than that measured without HSPA using 12.2kbps RMC but increase less than 1/4 dB.

8. For Body, The highest 1-g SAR for WLAN is 0.119 W/kg and the highest 1-g SAR for WWAN is 0.56W/kg. The sum of 1-g for simultaneous transmitting WLAN and WWAN antenna pair is 0.119+0.56 = 0.679 W/kg. According to KDB648474/ KDB447498 /KDB248227 Simultaneous SAR evaluation is not required.
9. WLAN / WWAN – Antenna separation is > 5cm, Sum of SAR is less than 1.6W/kg, hence no simultaneous SAR is needed.

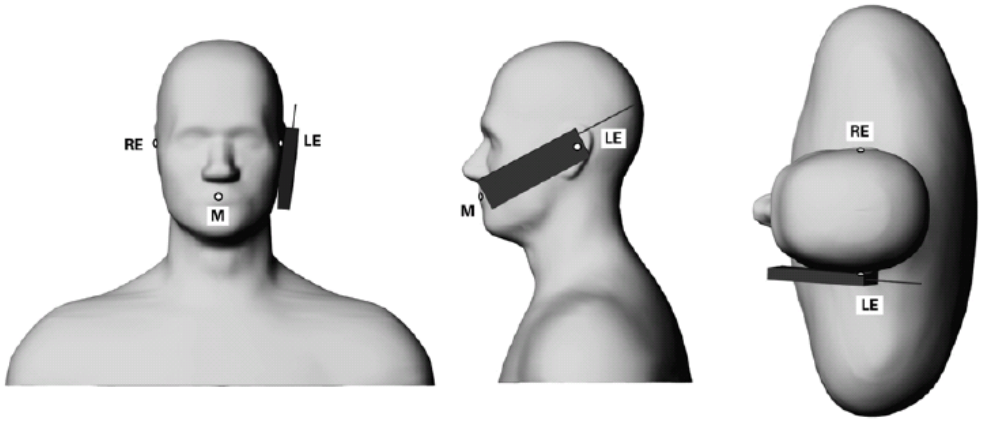
Additional configuration (Head):

10. For highest SAR configuration in this band repeated with external Memory card inside.

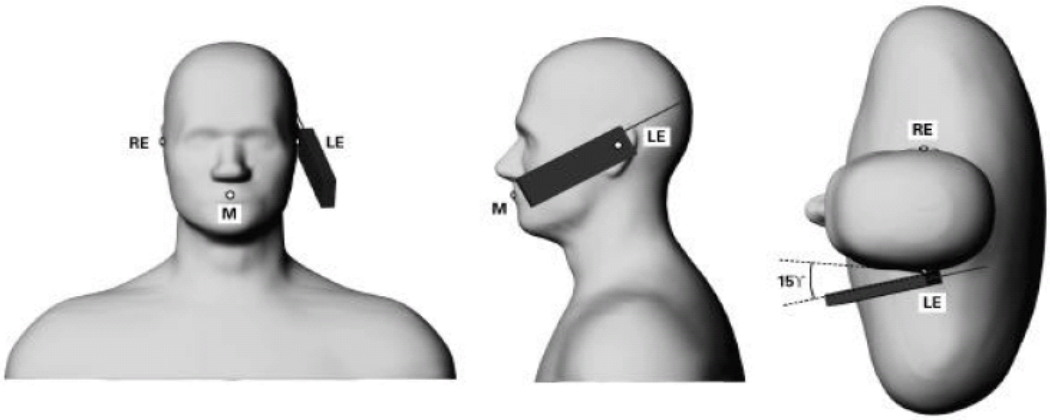
Additional configuration (Body):

11. For highest SAR configuration in this band repeated with external Memory card inside.

1.6 Positioning Procedure



Phone position 1, “cheek” or “touch” position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning.



Phone position 2, “tilted position.” The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning.

Cheek/Touch Position:
The handset was brought toward the mouth of the head phantom by pivoting against the ear reference point until any point of the mouthpiece or keypad touched the phantom.
Ear/Tilt Position:
With the phone aligned in the Cheek/Touch position, the handset was tilted away from the mouth with respect to the test device reference point by 15 degrees.

1.7 The SAR Measurement System

A block diagram of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY4 professional system). A Model ES3DV3 field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ ($|Ei|^2$)/ ρ where σ and ρ are the conductivity and mass density of the tissue-simulant.

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

- A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage intissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

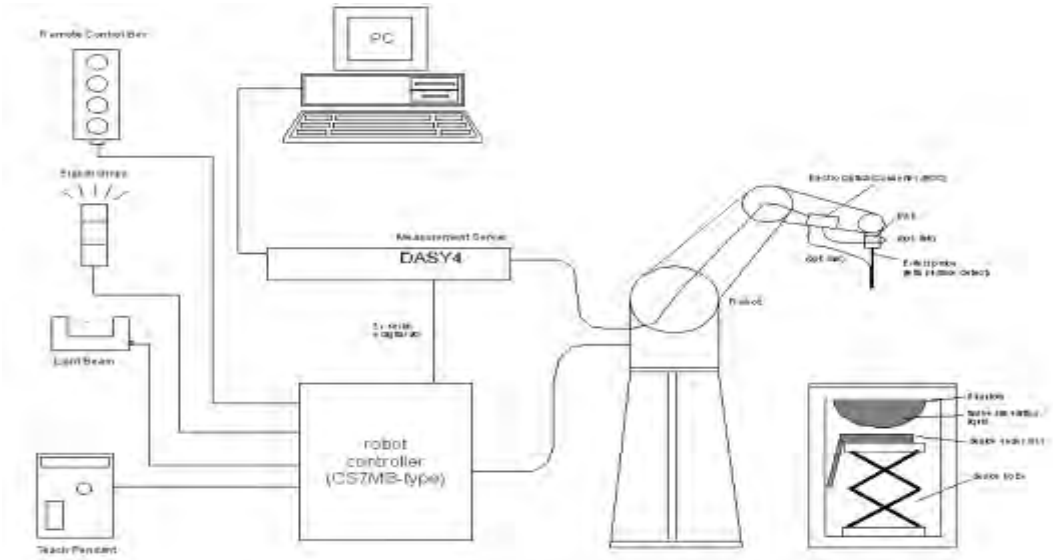


Fig. a A block diagram of the SAR measurement System

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

1.8 System Components

ES3DV3E-Field Probe

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 835/1900/2450 MHz Additional CF for other liquids and frequencies upon request	
Frequency	10 MHz to > 4 GHz, Linearity: ± 0.6 dB (30 MHz to 4 GHz)	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.6 dB (noise: typically < 1 µW/g)	
Dimensions	Tip diameter: 4 mm (Body: 10 mm)	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

SAM PHANTOM V4.0C

Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.	
Shell Thickness	2 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Height: 810 mm; Length: 1000 mm; Width: 500 mm	

DEVICE HOLDER

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

1.9 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 5% from the target SAR values. These tests were done at 835/1900/2450 MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1 (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was 21.7°C, the relative humidity was 62% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

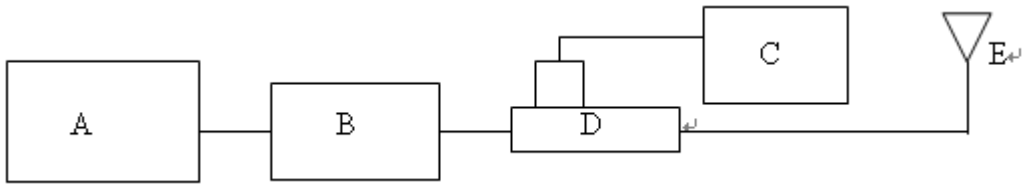


Fig. b The block diagram of system verification

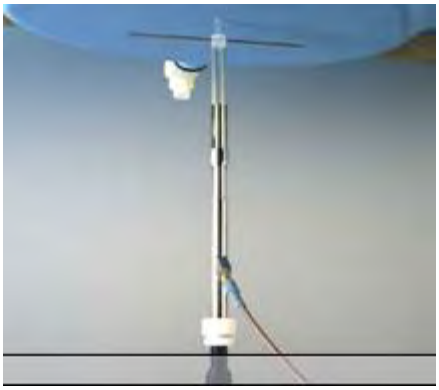
A. Signal Generator

B. Amplifier

C. Power Sensor

D. Dual Directional Coupling

E. Reference Dipole Antenna



Photograph of the Dipole Antenna

Validation Kit	S/N	Frequency (MHz)		Target SAR (1g) (Pin=250mW) (mW/g)	Measured SAR (1g)(mW/g)	Measured Date
D835V2	4d063	835	Head	2.36	2.29	Jun. 10, 2012
			Body	2.46	2.38	Jun. 13, 2012
D1900V2	5d027	1900	Head	9.43	9.48	Jun. 10, 2012
			Body	10	9.51	Jun. 13, 2012
D2450V2	727	2450	Body	12.7	13.3	Jul. 28, 2012

Table 1. Results of system validation

1.10 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this body-simulant fluid were measured by using the Agilent Model 85070D Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with Network Analyzer (30 KHz-6000 MHz).

All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The depth of the tissue simulant in the flat section of the phantom was 15cm±5mm during all tests. (Fig. 2)

Frequency (MHz)	Tissue Type	Dielectric Parameters		Recommended Limits	Measured	Measurement Date
835	Head	Verification	ρ	38.57-42.63	40.8	Jun. 10, 2012
			σ (S/m)	0.85-0.93	0.922	
		Test CH (L)_GSM	ρ	38.57-42.63	40.9	
			σ (S/m)	0.85-0.93	0.915	
		Test CH (M)_GSM	ρ	38.57-42.63	40.7	
			σ (S/m)	0.85-0.93	0.923	
		Test CH (H)_GSM	ρ	38.57-42.63	40.6	
			σ (S/m)	0.85-0.93	0.927	
		Test CH (L)_WCDMA	ρ	38.57-42.63	41	
			σ (S/m)	0.85-0.93	0.919	
		Test CH (M)_WCDMA	ρ	38.57-42.63	40.7	
			σ (S/m)	0.85-0.93	0.923	
		Test CH (H)_WCDMA	ρ	38.57-42.63	40.5	
			σ (S/m)	0.85-0.93	0.927	
		Simulated Tissue Temp.(°C)		20-24	21.7	

Frequency (MHz)	Tissue Type	Dielectric Parameters		Recommended Limits	Measured	Measurement Date
835	Body	Verification	ρ	51.59-57.02	52.4	Jun. 13, 2012
			σ (S/m)	0.95-1.05	0.979	
		Test CH (L)_GPRS	ρ	51.59-57.02	52.5	
			σ (S/m)	0.95-1.05	0.965	
		Test CH (M)_ GPRS	ρ	51.59-57.02	52.4	
			σ (S/m)	0.95-1.05	0.989	
		Test CH (H)_ GPRS	ρ	51.59-57.02	52.3	
			σ (S/m)	0.95-1.05	0.99	
		Test CH (L)_WCDMA	ρ	51.59-57.02	52.6	
			σ (S/m)	0.95-1.05	0.975	
		Test CH (M)_ WCDMA	ρ	51.59-57.02	52.4	
			σ (S/m)	0.95-1.05	0.989	
		Test CH (H)_ WCDMA	ρ	51.59-57.02	52.2	
			σ (S/m)	0.95-1.05	0.991	
		Simulated Tissue Temp.(°C)		20-24	21.7	
1900	Head	Verification	ρ	38.76-42.84	39.6	Jun. 10, 2012
			σ (S/m)	1.30-1.44	1.41	
		Test CH (L)_GSM	ρ	38.76-42.84	39.8	
			σ (S/m)	1.30-1.44	1.37	
		Test CH (M)_GSM	ρ	38.76-42.84	39.7	
			σ (S/m)	1.30-1.44	1.4	
		Test CH (H)_GSM	ρ	38.76-42.84	39.5	
			σ (S/m)	1.30-1.44	1.42	
		Test CH (L)_WCDMA	ρ	38.76-42.84	39.8	
			σ (S/m)	1.30-1.44	1.37	
		Test CH (M)_ WCDMA	ρ	38.76-42.84	39.7	
			σ (S/m)	1.30-1.44	1.4	
		Test CH (H)_ WCDMA	ρ	38.76-42.84	39.4	
			σ (S/m)	1.30-1.44	1.43	
		Simulated Tissue Temp.(°C)		20-24	21.7	

Frequency (MHz)	Tissue Type	Dielectric Parameters		Recommended Limits	Measured	Measurement Date
1900	Body	Verification	ρ	50.64-55.97	51.5	Jun. 13, 2012
			σ (S/m)	1.43-1.59	1.55	
		Test CH (L)_GSM	ρ	50.64-55.97	51.7	
			σ (S/m)	1.43-1.59	1.49	
		Test CH (M)_GSM	ρ	50.64-55.97	51.5	
			σ (S/m)	1.43-1.59	1.53	
		Test CH (H)_GSM	ρ	50.64-55.97	51.4	
			σ (S/m)	1.43-1.59	1.56	
		Test CH (l)_WCDMA	ρ	50.64-55.97	51.6	
			σ (S/m)	1.43-1.59	1.5	
		Test CH (m)_WCDMA	ρ	50.64-55.97	51.5	
			σ (S/m)	1.43-1.59	1.53	
		Test CH (H)_WCDMA	ρ	50.64-55.97	51.4	
			σ (S/m)	1.43-1.59	1.55	
		Simulated Tissue Temp.(°C)		20-24	21.7	
2450	Body	Verification	P	49.78-55.02	51.3	Jul. 28, 2012
			σ (S/m)	1.88-2.08	2.05	
		Test CH (L)_WLAN	P	49.78-55.02	51.7	
			σ (S/m)	1.88-2.08	2	
		Test CH (M)_WLAN	P	49.78-55.02	51.5	
			σ (S/m)	1.88-2.08	2.03	
		Test CH (H)_WLAN	P	49.78-55.02	51.3	
			σ (S/m)	1.88-2.08	2.06	
		Simulated Tissue Temp.(°C)		20-24	21.7	

Table 2. Dielectric Parameters of Tissue Simulant Fluid

The composition of the brain tissue simulating liquid:

Frequency (MHz)	Mode	Ingredient						Total amount
		DGMBE	Water	Salt	Preventol D-7	Cellulose	Sugar	
850	Head	—	532.98 g	18.3 g	2.4 g	3.2 g	766 g	1.0L(Kg)
	Body	—	631.68 g	11.72 g	1.2 g	—	600 g	1.0L(Kg)
1900	Head	444.52 g	552.42 g	3.06 g	—	—	—	1.0L(Kg)
	Body	300.67 g	716.56 g	4 g	—	—	—	1.0L(Kg)
2450	Body	301.7ml	698.3ml	—	—	—	—	1.0L(Kg)

Table 3. Recipes for Tissue Simulating Liquid

1.11 Evaluation Procedures

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

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

The probe is calibrated at the center of the dipole sensors that 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. The angle between the probe axis and the surface normal line is less than 30 degree.

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

The maximum search is automatically performed after each area scan measurement. It

is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 7x7x7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements.

The measured volume of 30x30x30mm contains about 30g of tissue.

The first procedure is an extrapolation (incl. Boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume. In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

1.12 Probe Calibration Procedures

For the calibration of E-field probes in lossy liquids, an electric field with an accurately known field strength must be produced within the measured liquid. For standardization purposes it would be desirable if all measurements which are necessary to assess the correct field strength would be traceable to standardized measurement procedures. In the following two different calibration techniques are summarized:

1.12.1 Transfer Calibration with Temperature Probes

In lossy liquids the specific absorption rate (SAR) is related both to the electric field (E) and the temperature gradient ($\delta T / \delta t$) in the liquid.

$$SAR = \frac{\sigma}{\rho}|E|^2 = c\frac{\delta T}{\delta t}$$

whereby σ is the conductivity, ρ the density and c the heat capacity of the liquid.

Hence, the electric field in lossy liquid can be measured indirectly by measuring the temperature gradient in the liquid. Non-disturbing temperature probes (optical probes or thermistor probes with resistive lines) with high spatial resolution (<1-2 mm) and fast reaction time (<1 s) are available and can be easily calibrated with high precision [1]. The setup and the exciting source have no influence on the calibration; only the relative positioning uncertainties of the standard temperature probe and the E-field probe to be calibrated must be considered. However, several problems limit the available accuracy of probe calibrations with temperature probes:

- The temperature gradient is not directly measurable but must be evaluated from temperature measurements at different time steps. Special precaution is necessary to avoid measurement errors caused by temperature gradients due to energy equalizing effects or convection currents in the liquid. Such effects cannot be completely avoided, as the measured field itself destroys the thermal equilibrium in the liquid. With a careful setup these errors can be kept small.
- The measured volume around the temperature probe is not well defined. It is difficult

to calculate the energy transfer from a surrounding gradient temperature field into the probe. These effects must be considered, since temperature probes are calibrated in liquid with homogeneous temperatures. There is no traceable standard for temperature rise measurements.

- The calibration depends on the assessment of the specific density, the heat capacity and the conductivity of the medium. While the specific density and heat capacity can be measured accurately with standardized procedures (~ 2% for c; much better for ρ) , there is no standard for the measurement of the conductivity. Depending on the method and liquid, the error can well exceed ±5%.
- Temperature rise measurements are not very sensitive and therefore are often performed at a higher power level than the E-field measurements. The nonlinearities in the system (e.g., power measurements, different components, etc.) must be considered.

Considering these problems, the possible accuracy of the calibration of E-field probes with temperature gradient measurements in a carefully designed setup is about ±10% (RSS) [2]. Recently, a setup which is a combination of the waveguide techniques and the thermal measurements was presented in [3]. The estimated uncertainty of the setup is ±5% (RSS) when the same liquid is used for the calibration and for actual measurements and ±7-9% (RSS) when not, which is in good agreement with the estimates given in [2].

1.12.2 Calibration with Analytical Fields

In this method a technical setup is used in which the field can be calculated analytically from measurements of other physical magnitudes (e.g., input power). This corresponds to the standard field method for probe calibration in air; however, there is no standard defined for fields in lossy liquids.

When using calculated fields in lossy liquids for probe calibration, several points must be considered in the assessment of the uncertainty:

- The setup must enable accurate determination of the incident power.
- The accuracy of the calculated field strength will depend on the assessment of the dielectric parameters of the liquid.
- Due to the small wavelength in liquids with high permittivity, even small setups might be above the resonant cutoff frequencies. The field distribution in the setup must be carefully checked for conformity with the theoretical field distribution.

References

[1] N. Kuster, Q. Balzano, and J.C. Lin, Eds., *Mobile Communications Safety*, Chapman & Hall, London, 1997.

[2] K. Meier, M. Burkhardt, T. Schmid, and N. Kuster, \Broadband calibration of E-field probes in lossy media", *IEEE Transactions on Microwave Theory and Techniques*, vol. 44, no. 10, pp. 1954{1962, Oct. 1996.

[3] K. Jokela, P. Hyysalo, and L. Puranen, \Calibration of specific absorption rate (SAR) probes in waveguide at 900 MHz", *IEEE Transactions on Instrumentation and Measurements*, vol. 47, no. 2, pp. 432{438, Apr. 1998.

1.13 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (“SAR”) in Section 4.2 of “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,” ANSI/IEEE C95.1–1992, Copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in “Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields,” NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube).

(2) Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

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

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

Table 4. RF exposure limits

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

2. Summary of Results

GSM 850

Band	Mode	EUT Position	Test Configuration	Averaged SAR over 1g(W/kg)			SAR Limit 1g (W/kg)
				CH 128	CH 190	CH 251	
				824.2	836.6	848.8	
				MHz	MHz	MHz	
GSM 850	GSM	Right	Cheek	0.467	0.491	0.577	1.6
			Tilt	—	0.26	—	1.6
		Left	Cheek	—	0.456	—	1.6
			Tilt	—	0.229	—	1.6
	GPRS Multi-class 10	Body worn	Front	0.458	0.417	0.379	1.6

Using KDB941225 D03 and KDB941225 D04 to exclude SAR test requirements for EDGE modes due to the source-based time-averaged output power for EDGE mode is lower than that in the GPRS mode.

According to KDB447498 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.

GSM 1900

Band	Mode	EUT Position	Test Configuration	Averaged SAR over 1g(W/kg)			SAR Limit 1g (W/kg)
				CH 512	CH 661	CH 810	
				1850.2	1880	1909.8	
				MHz	MHz	MHz	
GSM 1900	GSM	Right	Cheek	0.382	0.417	0.412	1.6
			Tilt	—	0.118	—	1.6
		Left	Cheek	—	0.229	—	1.6
			Tilt	—	0.138	—	1.6
	GPRS Multi-class 8	Body worn	Front	0.159	0.125	0.155	1.6

Using KDB941225 D03 and KDB941225 D04 to exclude SAR test requirements for EDGE modes due to the source-based time-averaged output power for EDGE mode is lower than that in the GPRS mode.

According to KDB447498 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.

WCDMA Band II

Band	Mode	EUT Position	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
				CH 9262	CH 9400	CH 9538	
				1852.40 MHz	1880.00 MHz	1907.60 MHz	
WCDMA Band Ⅱ	R99	Right	Cheek	0.76	0.786	0.785	1.6
			- with memory card	—	0.792	—	1.6
			Tilt	—	0.217	—	1.6
		Left	Cheek	—	0.456	—	1.6
			Tilt	—	0.259	—	1.6
	Body worn		Front	0.321	0.316	0.337	1.6

Using KDB941225 D01 to exclude SAR test requirements for HSPA modes due to the maximum average output power of HSPA active is higher than that measured without HSPA using 12.2kbps RMC but increase less than 1/4 dB.

According to KDB447498 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.

WCDMA Band V

Band	Mode	EUT Position	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
				CH 4132	CH 4183	CH 4233	
				826.40 MHz	836.60 MHz	846.60 MHz	
WCDMA Band V	R99	Right	Cheek	0.614	0.639	0.531	1.6
			Tilt	—	0.424	—	1.6
		Left	Cheek	—	0.587	—	1.6
			Tilt	—	0.323	—	1.6
	Body worn		Front	0.516	0.56	0.466	1.6
			- with memory card	—	0.513	—	1.6
			Back	—	0.523	—	1.6

Using KDB941225 D01 to exclude SAR test requirements for HSPA modes due to the maximum average output power of HSPA active is higher than that measured without HSPA using 12.2kbps RMC but increase less than 1/4 dB.

According to KDB447498 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.

WLAN802.11 b

Band	EUT Position	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
			CH 1	CH 6	CH 11	
			2412	2437	2462	
			MHz	MHz	MHz	
WLAN 802.11 b	Body worn	Front	—	—	0.02	1.6
		Back	0.085	0.101	0.112	1.6
		- with Bluetooth	—	—	0.111	1.6
		- with memory card	—	—	0.119	1.6

Using KDB248227-SAR is not required for 802.11 g/HT20 channels when the maximum average output power is higher than that measured on the corresponding 802.11b channels but increase less than 1/4 dB.

According to KDB447498 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is ≤ 100 MHz, testing for the other channels is not required.

3. Instruments List

Manufacturer	Device	Type	Serial number	Date of last calibration	Date of next calibration
Schmid & Partner Engineering AG	Dosimetric E-Field Probe	ES3DV3	3172	Aug.23,2011	Aug.22,2012
Schmid & Partner Engineering AG	835/1900/2450 MHz System Validation Dipole	D835V2 D1900V2 D2450V2	4d063 5d027 727	May25,2012 Apr.26,2012 Apr.25,2012	May24,2013 Apr.25,2013 Apr.24,2013
Schmid & Partner Engineering AG	Data acquisition Electronics	DAE4	547 1260	Jun.01.2012 Aug.22,2011	May 31.2013 Aug.21,2012
Schmid & Partner Engineering AG	Software	DASY 4 V4.7	N/A	Calibration not required	Calibration not required
Schmid & Partner Engineering AG	Phantom	SAM	N/A	Calibration not required	Calibration not required
HP	Network Analyzer	8753D	3410A05547	Mar.15,2012	Mar.14,2013
Agilent	Dielectric Probe Kit	85070D	US01440168	Calibration not required	Calibration not required
Agilent	Dual-directional coupler	777D 778D	50114 50313	Aug.18,2011 Aug.19,2011	Aug.17,2012 Aug.18,2012
Agilent	RF Signal Generator	8648D	3847M00432	Jun.04,2012	Jun.03,2013
Agilent	Power Sensor	U2001B	MY48100169	May12,2012	May11,2013
R&S	Radio Communication Test	CMU200	113505	May 11,2012	May10,2013

4. Measurements

Date: 2012/6/10

Re Cheek_CH128

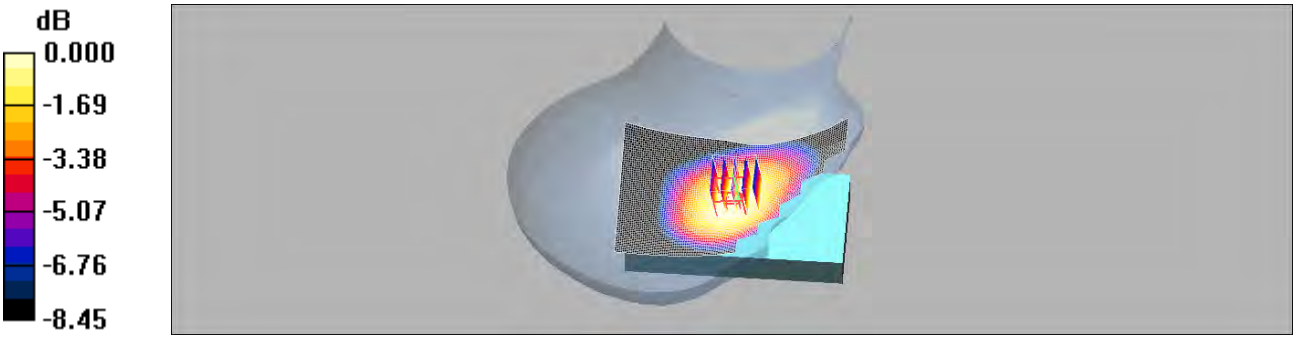
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: Head 850 MHz Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.915 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.496 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.49 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 0.580 W/kg
SAR(1 g) = 0.467 mW/g; SAR(10 g) = 0.358 mW/g
Maximum value of SAR (measured) = 0.498 mW/g



0 dB = 0.498mW/g

Date: 2012/6/10

Re Cheek_CH190

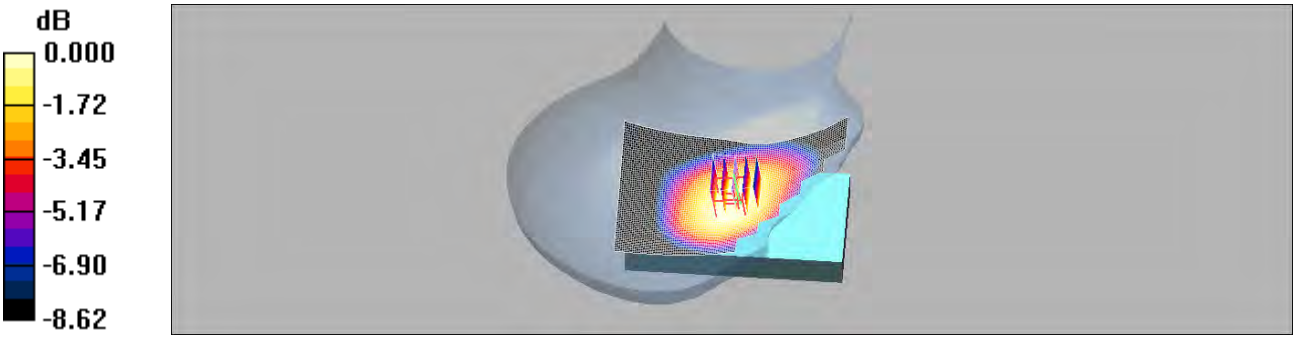
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: Head 850 MHz Medium parameters used: f = 837 MHz; σ = 0.923 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.528 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.77 V/m; Power Drift = -0.108 dB
Peak SAR (extrapolated) = 0.616 W/kg
SAR(1 g) = 0.491 mW/g; SAR(10 g) = 0.375 mW/g
Maximum value of SAR (measured) = 0.522 mW/g



0 dB = 0.522mW/g

Date: 2012/6/10

Re Cheek_CH251

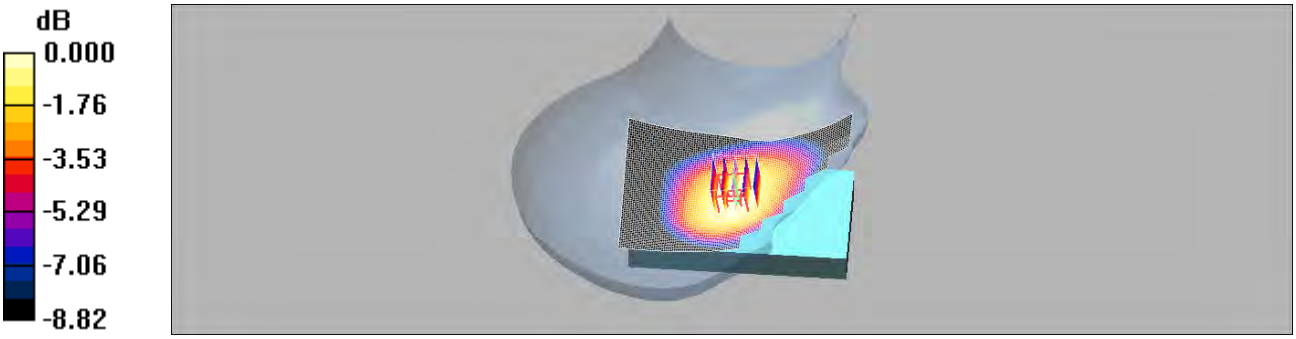
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium: Head 850 MHz Medium parameters used: f = 849 MHz; σ = 0.927 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.611 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.48 V/m; Power Drift = 0.121 dB
Peak SAR (extrapolated) = 0.719 W/kg
SAR(1 g) = 0.577 mW/g; SAR(10 g) = 0.441 mW/g
Maximum value of SAR (measured) = 0.623 mW/g



0 dB = 0.623mW/g

Date: 2012/6/10

Re Tilt_CH190

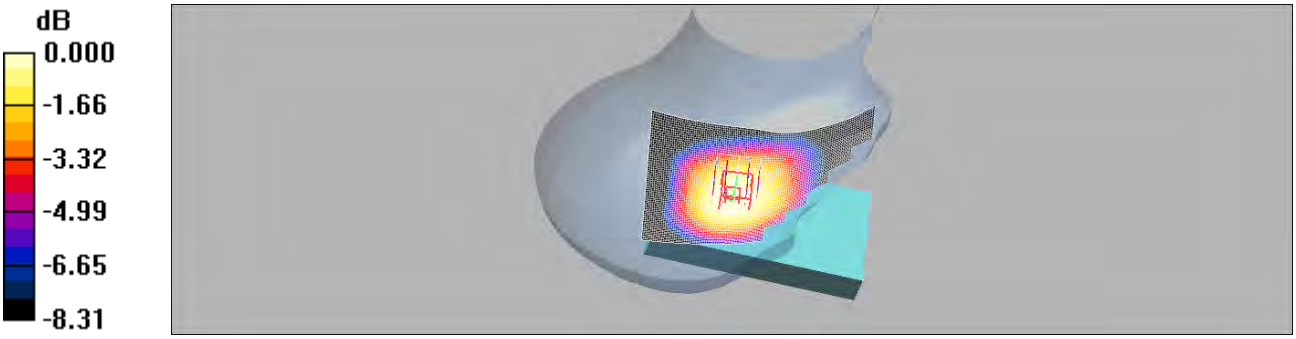
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: Head 850 MHz Medium parameters used: f = 837 MHz; σ = 0.923 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.286 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.5 V/m; Power Drift = -0.079 dB
Peak SAR (extrapolated) = 0.320 W/kg
SAR(1 g) = 0.260 mW/g; SAR(10 g) = 0.200 mW/g
Maximum value of SAR (measured) = 0.279 mW/g



0 dB = 0.279mW/g

Date: 2012/6/10

Le Cheek_CH190

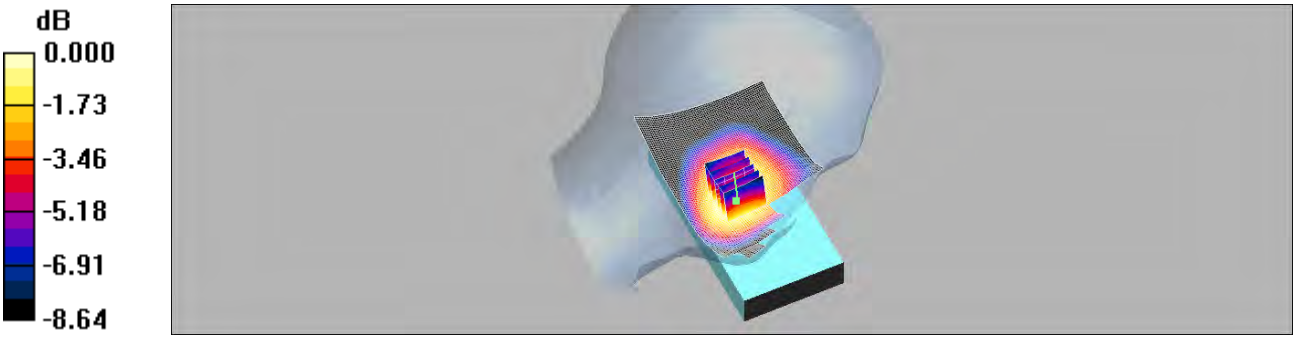
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: Head 850 MHz Medium parameters used: f = 837 MHz; σ = 0.923 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.488 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.49 V/m; Power Drift = -0.090 dB
Peak SAR (extrapolated) = 0.574 W/kg
SAR(1 g) = 0.456 mW/g; SAR(10 g) = 0.344 mW/g
Maximum value of SAR (measured) = 0.492 mW/g



0 dB = 0.492mW/g

Date: 2012/6/10

Le Tilt_CH190

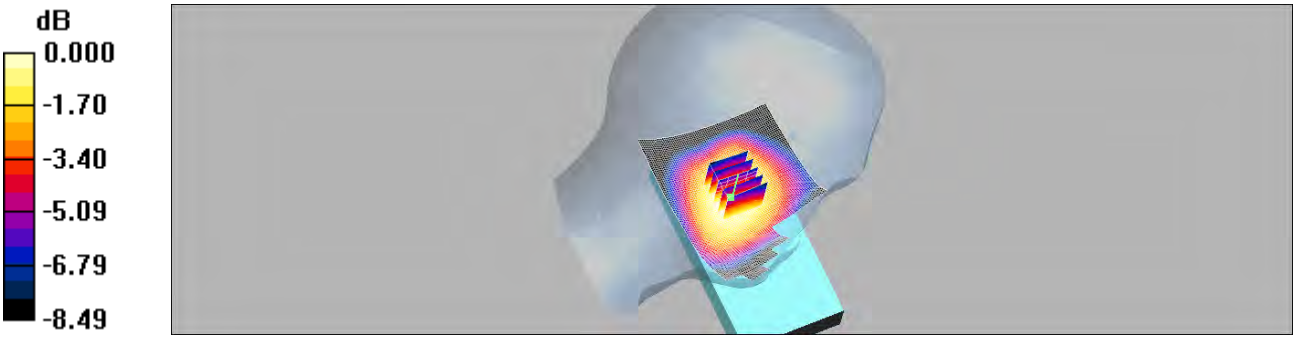
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium: Head 850 MHz Medium parameters used: f = 837 MHz; σ = 0.923 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.252 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.2 V/m; Power Drift = -0.015 dB
Peak SAR (extrapolated) = 0.289 W/kg
SAR(1 g) = 0.229 mW/g; SAR(10 g) = 0.173 mW/g
Maximum value of SAR (measured) = 0.247 mW/g



0 dB = 0.247mW/g

Date: 2012/6/13

Body_GRPS 850_CH128

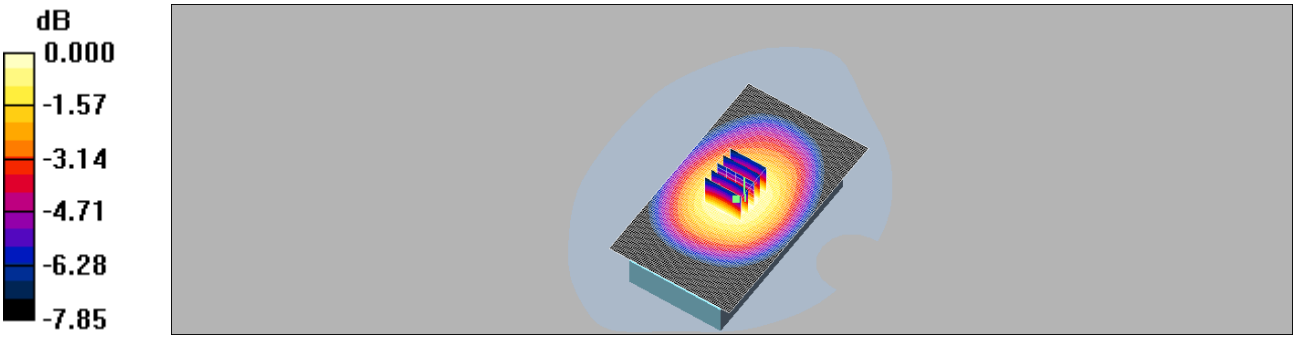
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:4.1
Medium: Muscle 900 MHz Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.965 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.475 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.6 V/m; Power Drift = 0.175 dB
Peak SAR (extrapolated) = 0.587 W/kg
SAR(1 g) = 0.458 mW/g; SAR(10 g) = 0.349 mW/g
Maximum value of SAR (measured) = 0.493 mW/g



0 dB = 0.493mW/g

Date: 2012/6/13

Body_GRPS 850_CH190

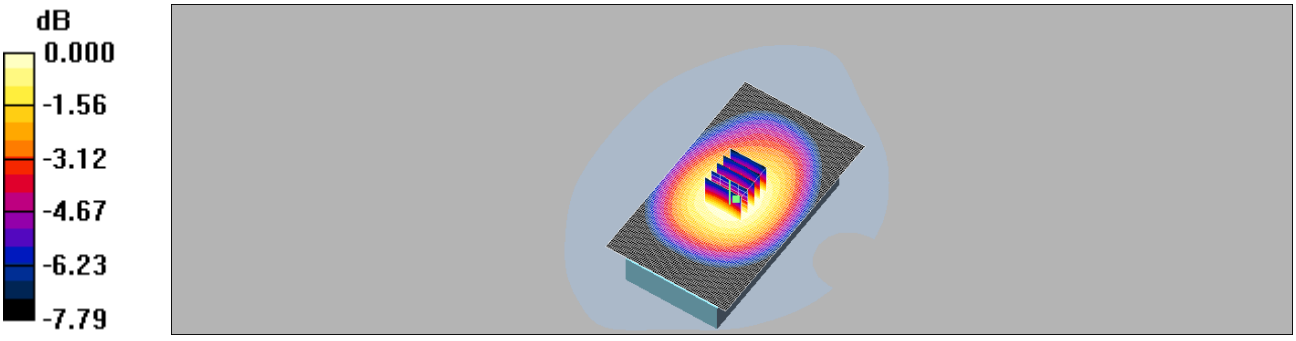
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.1
Medium: Muscle 900 MHz Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.461 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.9 V/m; Power Drift = -0.115 dB
Peak SAR (extrapolated) = 0.533 W/kg
SAR(1 g) = 0.417 mW/g; SAR(10 g) = 0.317 mW/g
Maximum value of SAR (measured) = 0.447 mW/g



0 dB = 0.447mW/g

Date: 2012/6/13

Body_GRPS 850 _CH251

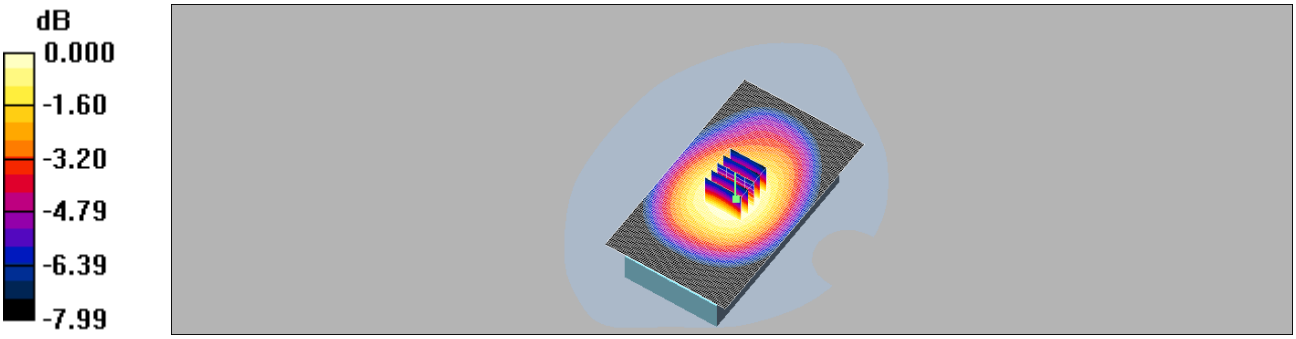
Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:4.1
Medium: Muscle 900 MHz Medium parameters used: f = 849 MHz; σ = 0.99 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.413 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.7 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 0.489 W/kg
SAR(1 g) = 0.379 mW/g; SAR(10 g) = 0.286 mW/g
Maximum value of SAR (measured) = 0.408 mW/g



0 dB = 0.408mW/g

Date: 2012/6/10

Re Cheek_CH512

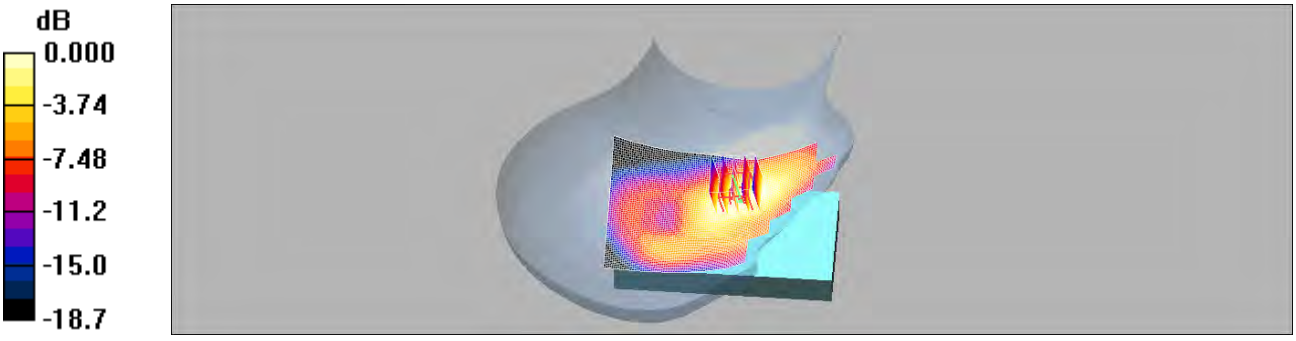
Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: Head 1900 MHz Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.37 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.462 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.56 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 0.588 W/kg
SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.238 mW/g
Maximum value of SAR (measured) = 0.433 mW/g



0 dB = 0.433mW/g

Date: 2012/6/10

Re Cheek_CH661

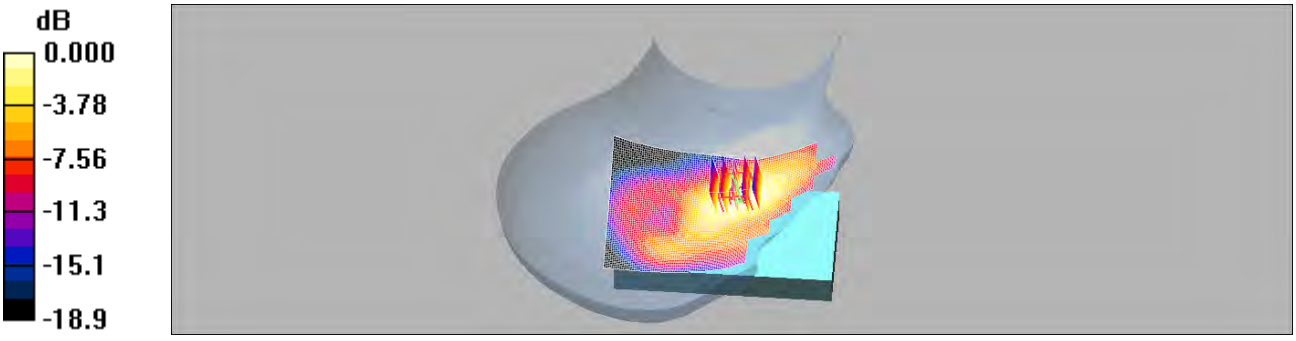
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Head 1900 MHz Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.502 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.04 V/m; Power Drift = 0.169 dB
Peak SAR (extrapolated) = 0.651 W/kg
SAR(1 g) = 0.417 mW/g; SAR(10 g) = 0.256 mW/g
Maximum value of SAR (measured) = 0.479 mW/g



0 dB = 0.479mW/g

Date: 2012/6/10

Re Cheek_CH810

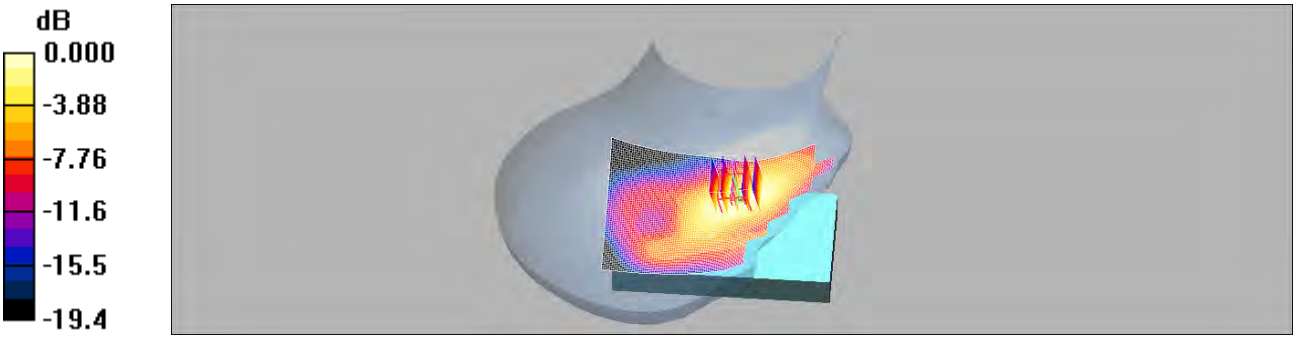
Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: Head 1900 MHz Medium parameters used: f = 1910 MHz; σ = 1.42 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.495 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.29 V/m; Power Drift = -0.071 dB
Peak SAR (extrapolated) = 0.654 W/kg
SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.249 mW/g
Maximum value of SAR (measured) = 0.478 mW/g



0 dB = 0.478mW/g

Date: 2012/6/10

Re Tilt_CH661

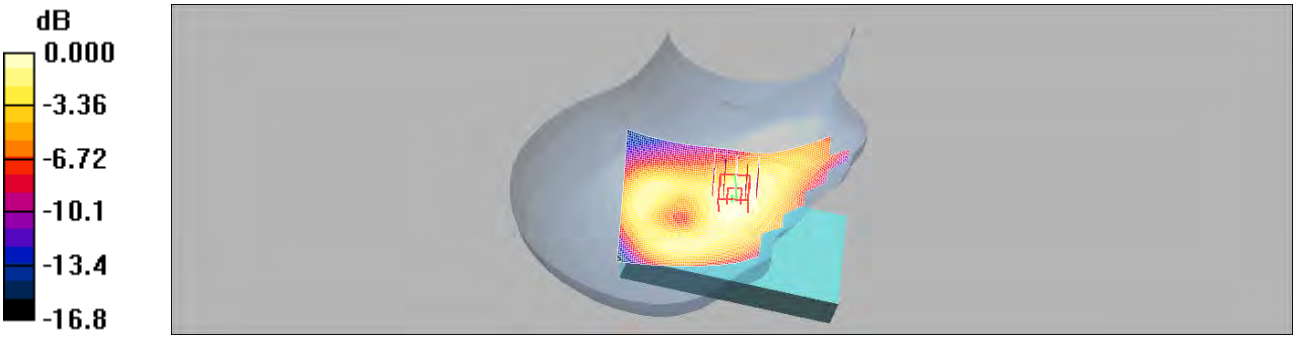
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Head 1900 MHz Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.136 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.53 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 0.171 W/kg
SAR(1 g) = 0.118 mW/g; SAR(10 g) = 0.078 mW/g
Maximum value of SAR (measured) = 0.132 mW/g



0 dB = 0.132mW/g

Date: 2012/6/10

Le Cheek_CH661

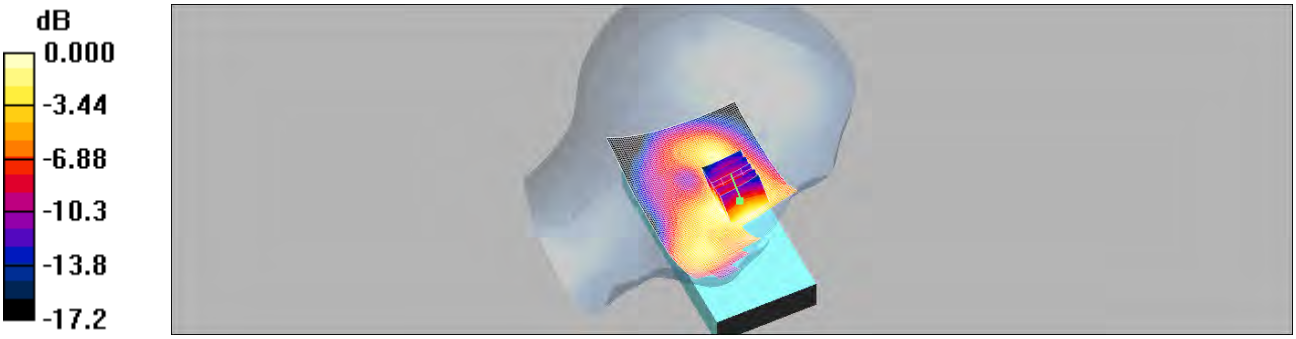
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Head 1900 MHz Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.270 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.17 V/m; Power Drift = -0.065 dB
Peak SAR (extrapolated) = 0.346 W/kg
SAR(1 g) = 0.229 mW/g; SAR(10 g) = 0.145 mW/g
Maximum value of SAR (measured) = 0.260 mW/g



0 dB = 0.260mW/g

Date: 2012/6/10

Le Tilt_CH661

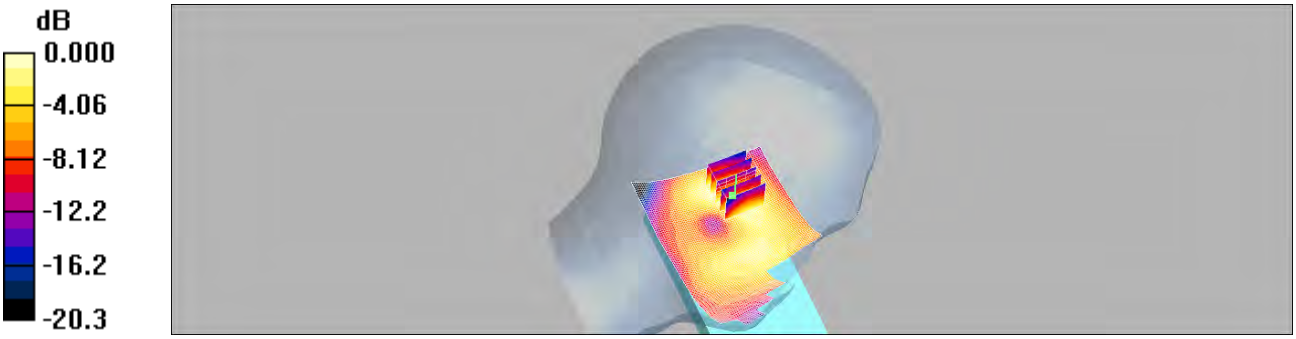
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: Head 1900 MHz Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.163 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.09 V/m; Power Drift = -0.041 dB
Peak SAR (extrapolated) = 0.225 W/kg
SAR(1 g) = 0.138 mW/g; SAR(10 g) = 0.080 mW/g
Maximum value of SAR (measured) = 0.159 mW/g



0 dB = 0.159mW/g

Date: 2012/6/13

Body_GRPS 1900 _CH512

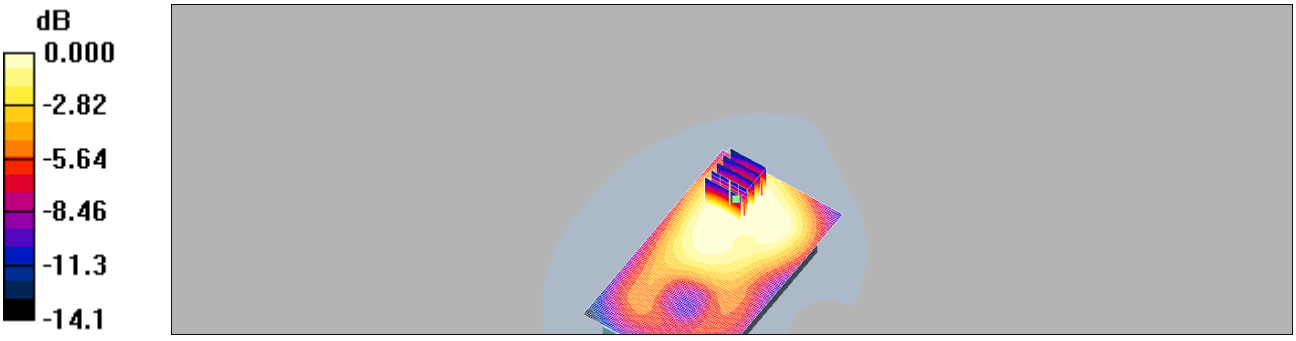
Communication System: GSM1900; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: M1800 & 1900 Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.49 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.38, 4.38, 4.38); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.185 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.44 V/m; Power Drift = -0.115 dB
Peak SAR (extrapolated) = 0.241 W/kg
SAR(1 g) = 0.159 mW/g; SAR(10 g) = 0.104 mW/g
Maximum value of SAR (measured) = 0.178 mW/g



0 dB = 0.178mW/g

Date: 2012/6/13

Body_GRPS 1900 _CH661

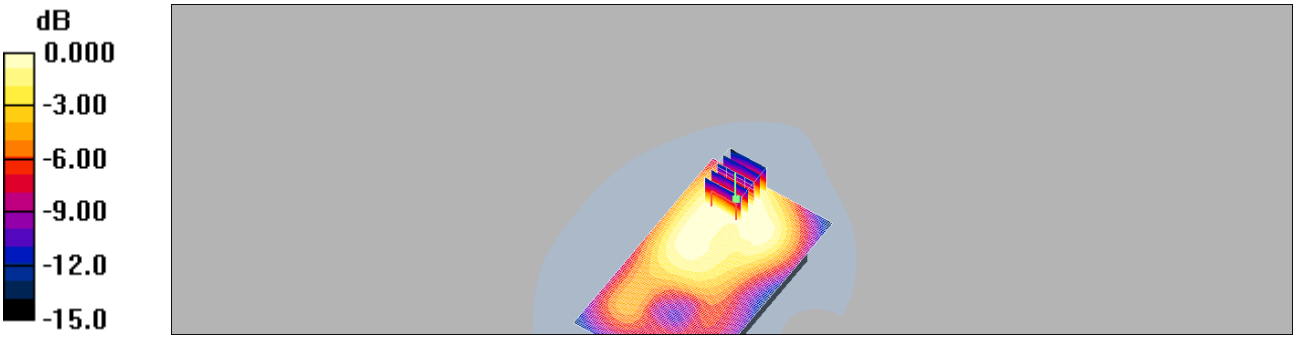
Communication System: GSM1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium: M1800 & 1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.38, 4.38, 4.38); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.143 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.26 V/m; Power Drift = -0.127 dB
Peak SAR (extrapolated) = 0.188 W/kg
SAR(1 g) = 0.125 mW/g; SAR(10 g) = 0.080 mW/g
Maximum value of SAR (measured) = 0.140 mW/g



0 dB = 0.140mW/g

Date: 2012/6/13

Body_GRPS 1900_CH810

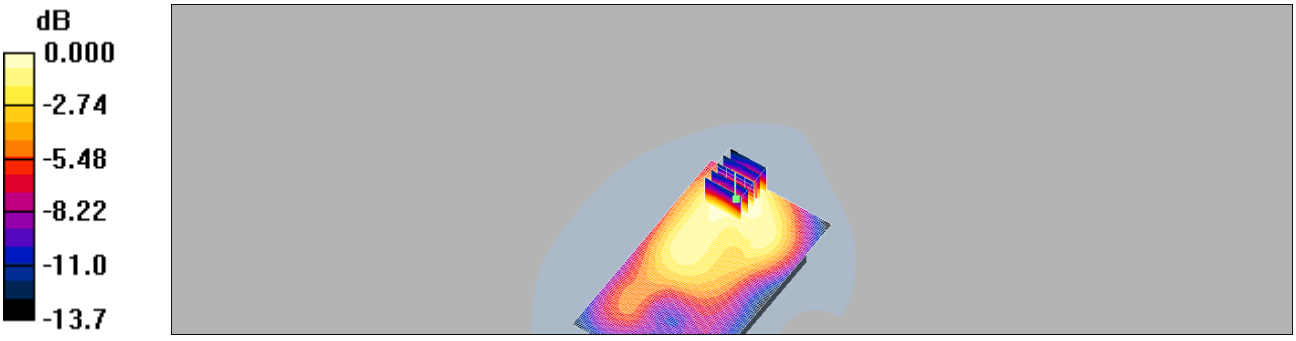
Communication System: GSM1900; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3
Medium: M1800 & 1900 Medium parameters used: f = 1910 MHz; σ = 1.56 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.38, 4.38, 4.38); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.179 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.81 V/m; Power Drift = -0.180 dB
Peak SAR (extrapolated) = 0.234 W/kg
SAR(1 g) = 0.155 mW/g; SAR(10 g) = 0.099 mW/g
Maximum value of SAR (measured) = 0.177 mW/g



0 dB = 0.177mW/g

Date: 2012/6/10

Re Cheek_CH9262

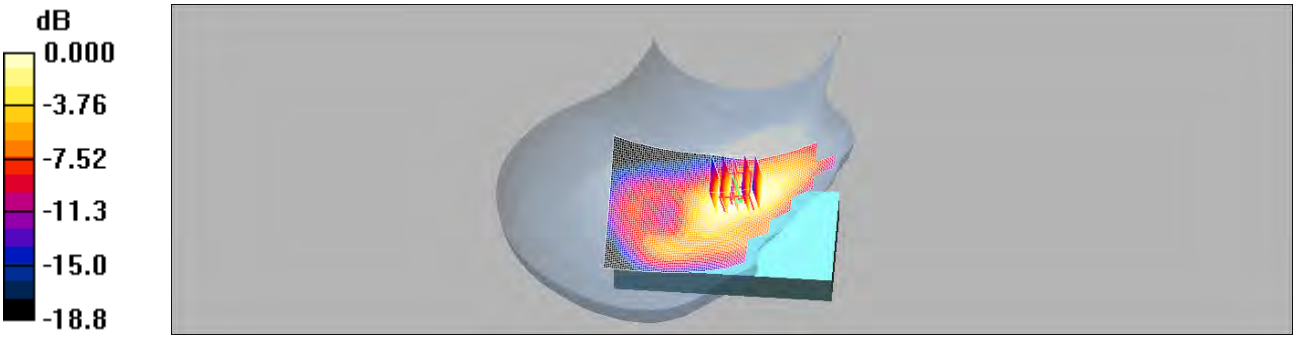
Communication System: WCDMA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: Head 1900 MHz Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.37 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.924 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.02 V/m; Power Drift = -0.114 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.760 mW/g; SAR(10 g) = 0.473 mW/g
Maximum value of SAR (measured) = 0.867 mW/g



0 dB = 0.867mW/g

Date: 2012/6/10

Re Cheek_CH9400

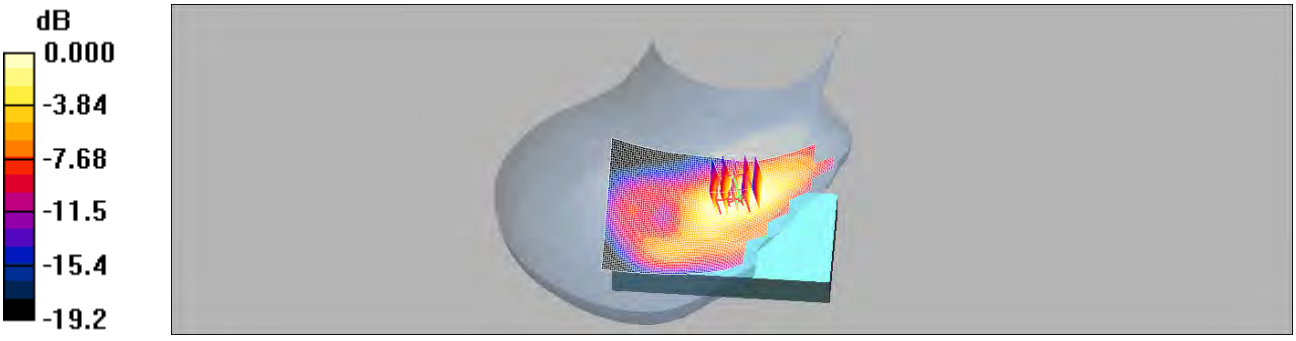
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Head 1900 MHz Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.943 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.56 V/m; Power Drift = -0.159 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.786 mW/g; SAR(10 g) = 0.481 mW/g
Maximum value of SAR (measured) = 0.905 mW/g



0 dB = 0.905mW/g

Date: 2012/6/10

Re Cheek_CH9538

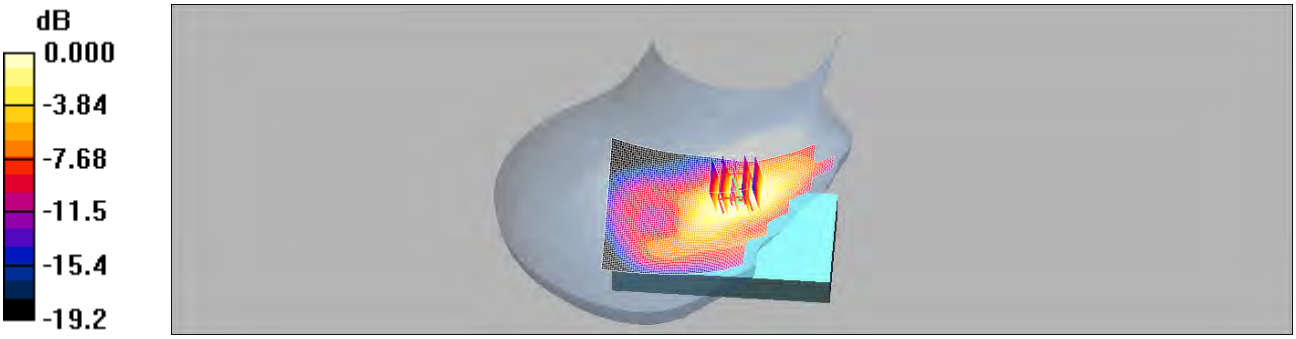
Communication System: WCDMA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: Head 1900 MHz Medium parameters used: f = 1908 MHz; σ = 1.43 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.937 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.56 V/m; Power Drift = -0.171 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.785 mW/g; SAR(10 g) = 0.474 mW/g
Maximum value of SAR (measured) = 0.912 mW/g



0 dB = 0.912mW/g

Re Cheek_CH9400_repeated with memory card

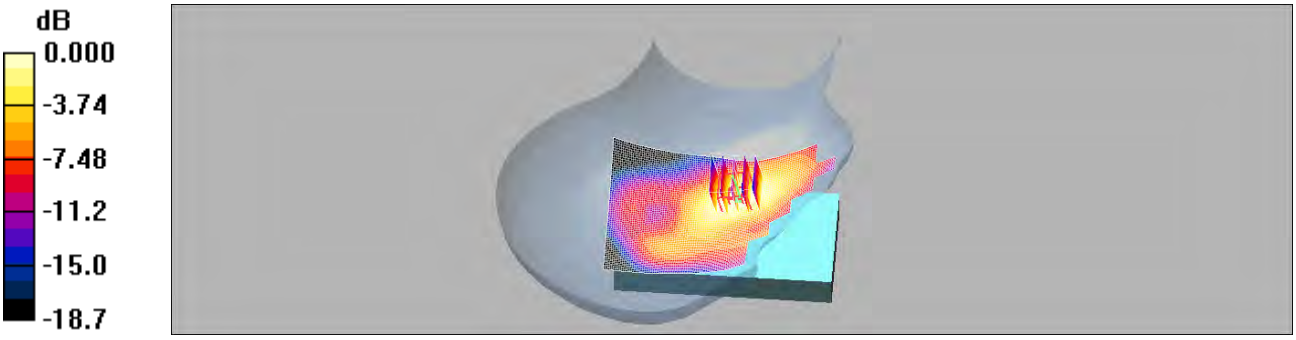
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Head 1900 MHz Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.937 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.88 V/m; Power Drift = 0.111 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.792 mW/g; SAR(10 g) = 0.483 mW/g
Maximum value of SAR (measured) = 0.897 mW/g



0 dB = 0.897mW/g

Re Tilt_CH9400

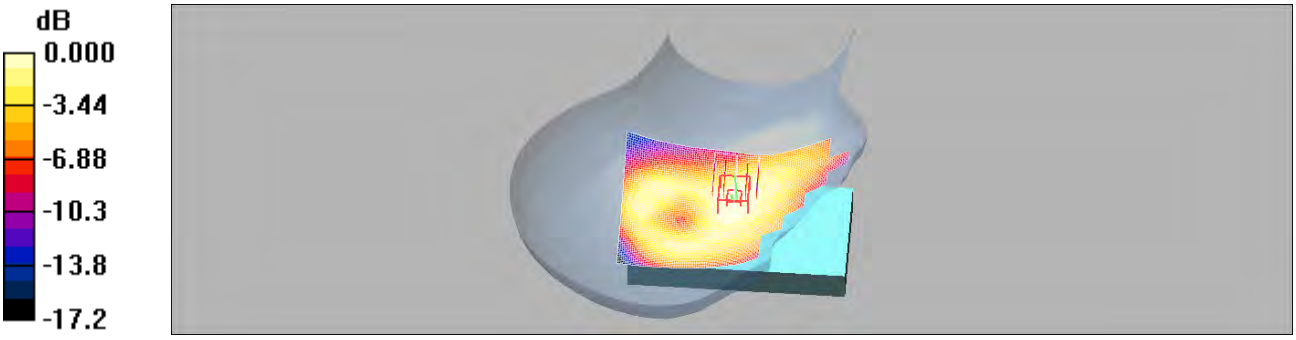
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Head 1900 MHz Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.250 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.94 V/m; Power Drift = 0.037 dB
Peak SAR (extrapolated) = 0.315 W/kg
SAR(1 g) = 0.217 mW/g; SAR(10 g) = 0.143 mW/g
Maximum value of SAR (measured) = 0.241 mW/g



0 dB = 0.241mW/g

Date: 2012/6/10

Le Cheek_CH9400

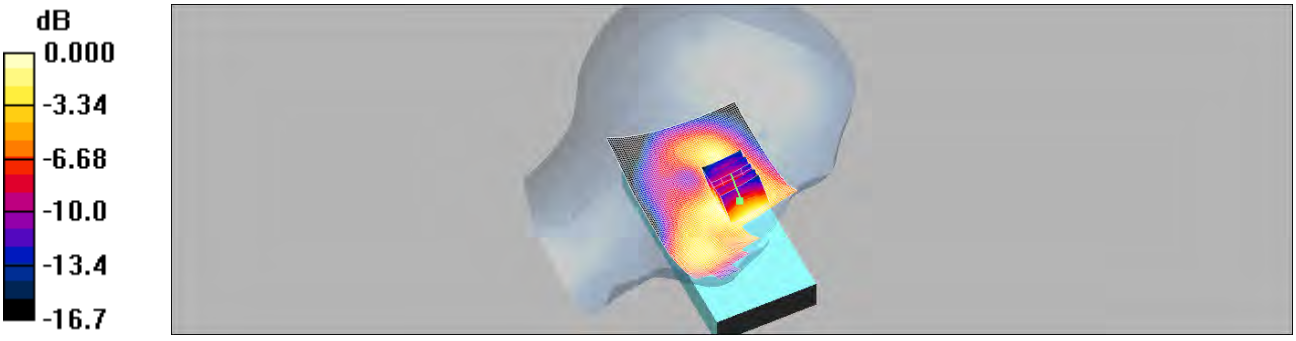
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Head 1900 MHz Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.531 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = -0.100 dB
Peak SAR (extrapolated) = 0.688 W/kg
SAR(1 g) = 0.456 mW/g; SAR(10 g) = 0.290 mW/g
Maximum value of SAR (measured) = 0.516 mW/g



0 dB = 0.516mW/g

Date: 2012/6/10

Le Tilt_CH9400

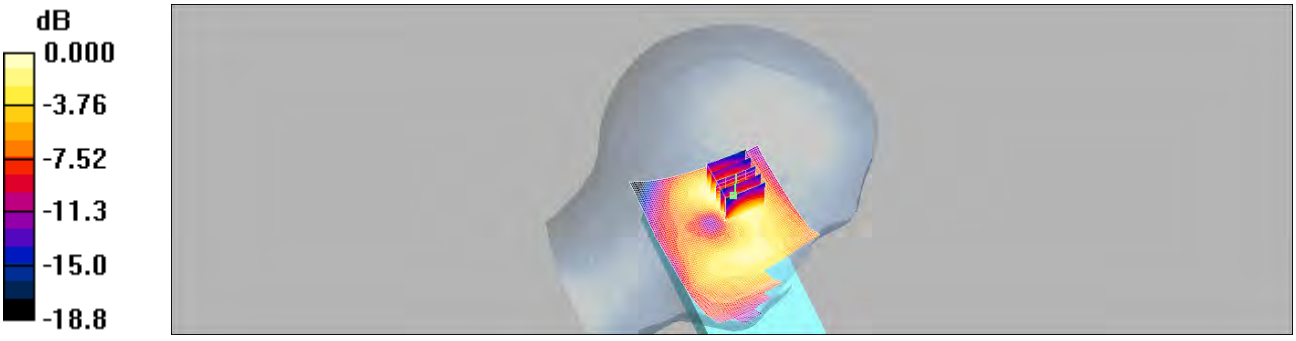
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: Head 1900 MHz Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.309 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.0 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 0.417 W/kg
SAR(1 g) = 0.259 mW/g; SAR(10 g) = 0.151 mW/g
Maximum value of SAR (measured) = 0.298 mW/g



0 dB = 0.298mW/g

Date: 2012/6/13

Body_WCDMA Band II_CH9262

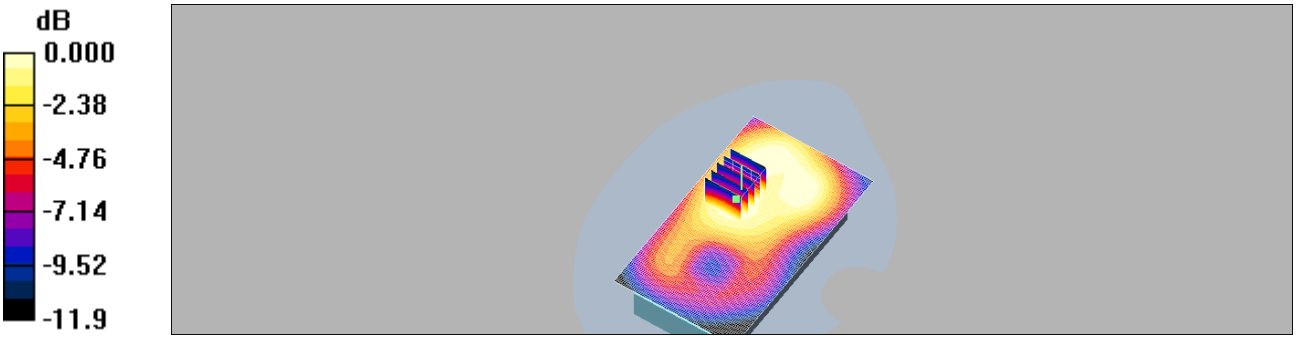
Communication System: WCDMA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: M1800 & 1900 Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.5 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.38, 4.38, 4.38); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.365 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.7 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 0.466 W/kg
SAR(1 g) = 0.321 mW/g; SAR(10 g) = 0.217 mW/g
Maximum value of SAR (measured) = 0.355 mW/g



0 dB = 0.355mW/g

Date: 2012/6/13

Body_WCDMA Band II_CH9400

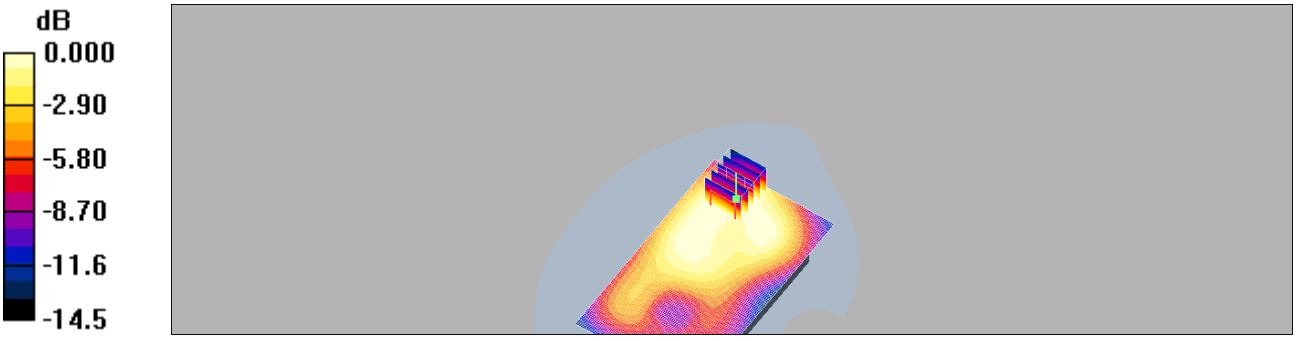
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: M1800 & 1900 Medium parameters used: f = 1880 MHz; σ = 1.53 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.38, 4.38, 4.38); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.358 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.1 V/m; Power Drift = 0.132 dB
Peak SAR (extrapolated) = 0.474 W/kg
SAR(1 g) = 0.316 mW/g; SAR(10 g) = 0.206 mW/g
Maximum value of SAR (measured) = 0.354 mW/g



0 dB = 0.354mW/g

Date: 2012/6/13

Body_WCDMA Band II_CH9538

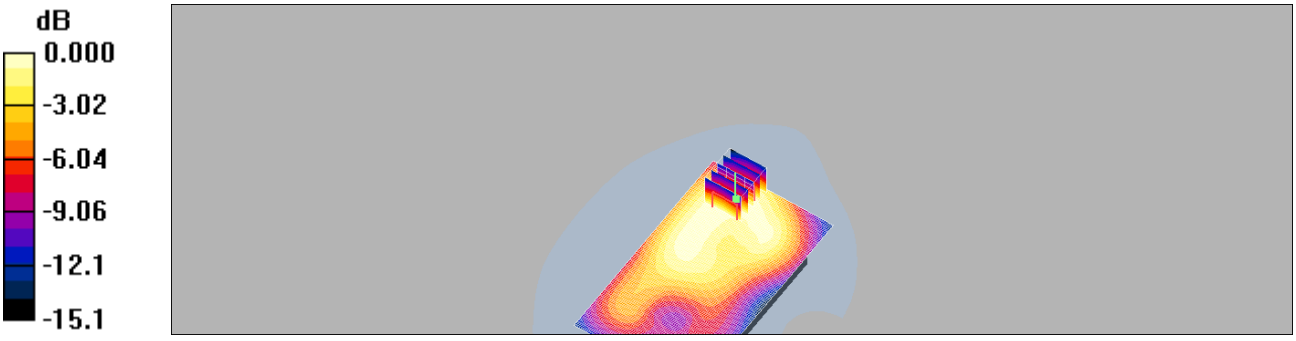
Communication System: WCDMA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: M1800 & 1900 Medium parameters used: f = 1908 MHz; σ = 1.55 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.38, 4.38, 4.38); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.387 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.5 V/m; Power Drift = -0.126 dB
Peak SAR (extrapolated) = 0.512 W/kg
SAR(1 g) = 0.337 mW/g; SAR(10 g) = 0.216 mW/g
Maximum value of SAR (measured) = 0.384 mW/g



0 dB = 0.384mW/g

Date: 2012/6/10

Re Cheek_CH4132

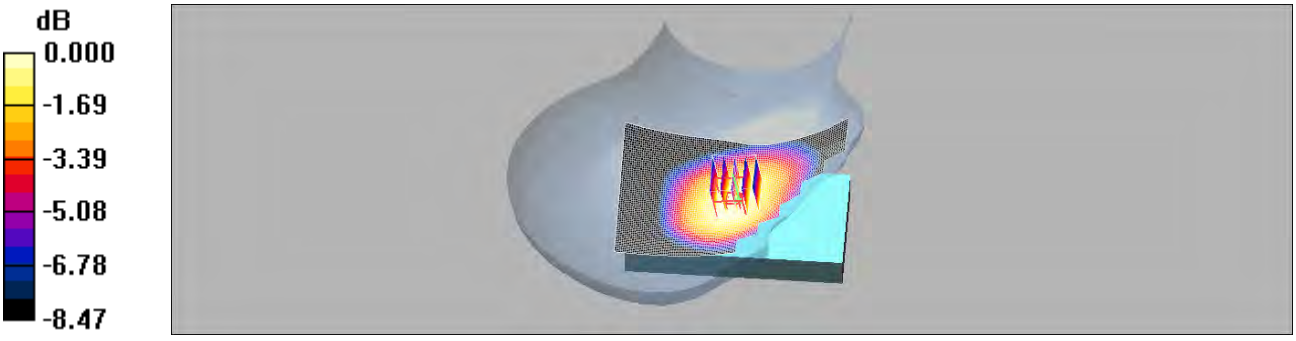
Communication System:WCDMA Band V; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: Head 850 MHz Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.919 mho/m; ε_r = 41; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.659 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.52 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 0.765 W/kg
SAR(1 g) = 0.614 mW/g; SAR(10 g) = 0.470 mW/g
Maximum value of SAR (measured) = 0.656 mW/g



0 dB = 0.656mW/g

Date: 2012/6/10

Re Cheek_CH4183

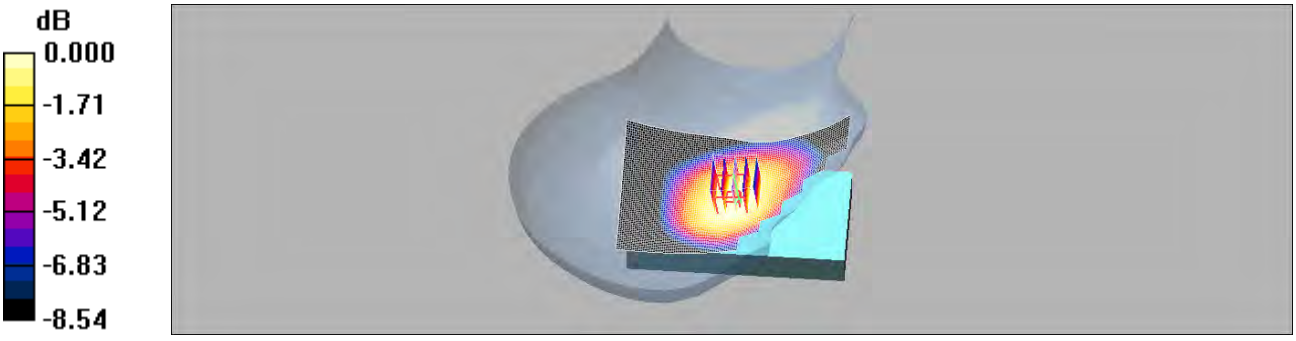
Communication System:WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Head 850 MHz Medium parameters used: f = 837 MHz; σ = 0.923 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.690 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = -0.188 dB
Peak SAR (extrapolated) = 0.793 W/kg
SAR(1 g) = 0.639 mW/g; SAR(10 g) = 0.488 mW/g
Maximum value of SAR (measured) = 0.682 mW/g



0 dB = 0.682mW/g

Date: 2012/6/10

Re Cheek_CH4233

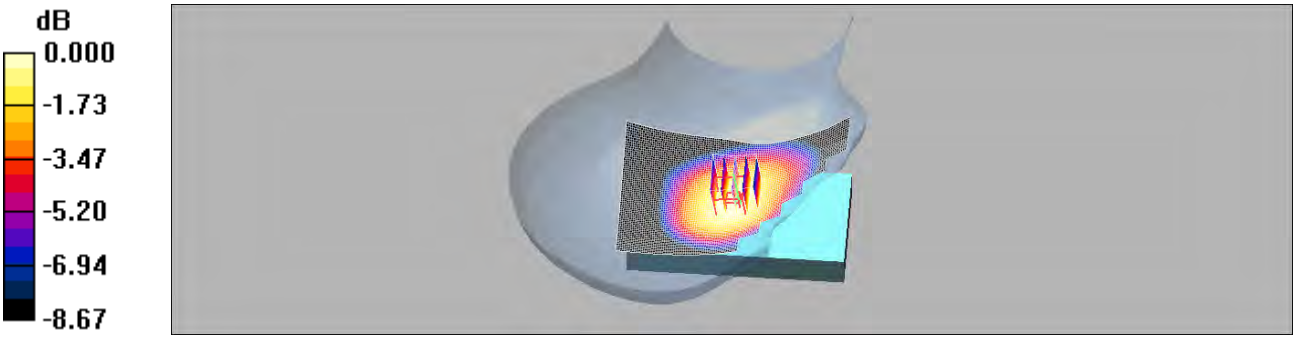
Communication System:WCDMA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: Head 850 MHz Medium parameters used: f = 847 MHz; σ = 0.927 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.556 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.08 V/m; Power Drift = 0.126 dB
Peak SAR (extrapolated) = 0.666 W/kg
SAR(1 g) = 0.531 mW/g; SAR(10 g) = 0.407 mW/g
Maximum value of SAR (measured) = 0.575 mW/g



0 dB = 0.575mW/g

Date: 2012/6/10

Re Tilt_CH4183

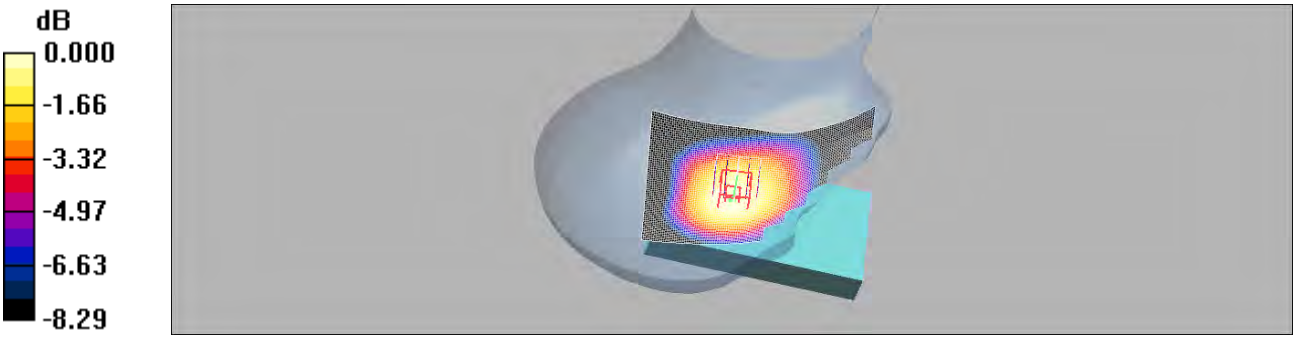
Communication System:WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Head 850 MHz Medium parameters used: f = 837 MHz; σ = 0.923 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.452 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.2 V/m; Power Drift = 0.155 dB
Peak SAR (extrapolated) = 0.527 W/kg
SAR(1 g) = 0.424 mW/g; SAR(10 g) = 0.325 mW/g
Maximum value of SAR (measured) = 0.456 mW/g



0 dB = 0.456mW/g

Date: 2012/6/10

Le Cheek_CH4183

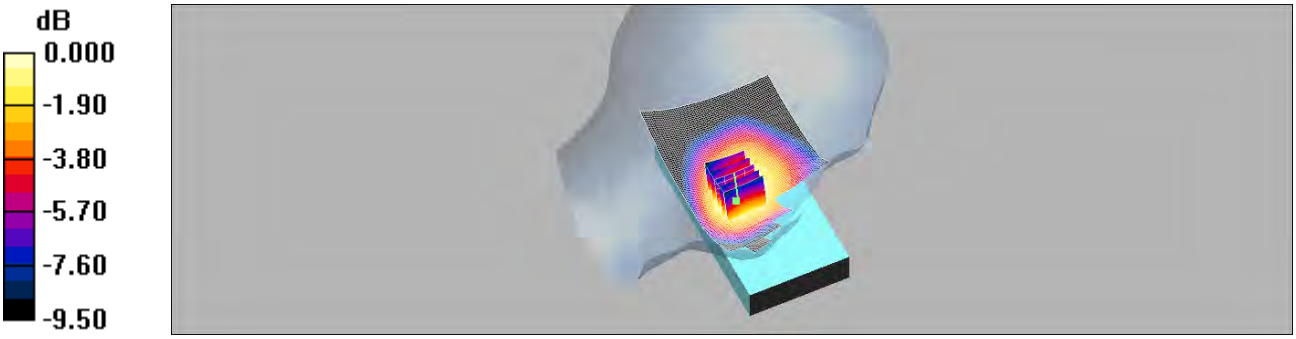
Communication System:WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Head 850 MHz Medium parameters used: f = 837 MHz; σ = 0.923 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.628 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = -0.086 dB
Peak SAR (extrapolated) = 0.754 W/kg
SAR(1 g) = 0.587 mW/g; SAR(10 g) = 0.442 mW/g
Maximum value of SAR (measured) = 0.628 mW/g



0 dB = 0.628mW/g

Date: 2012/6/10

Le Tilt_CH4183

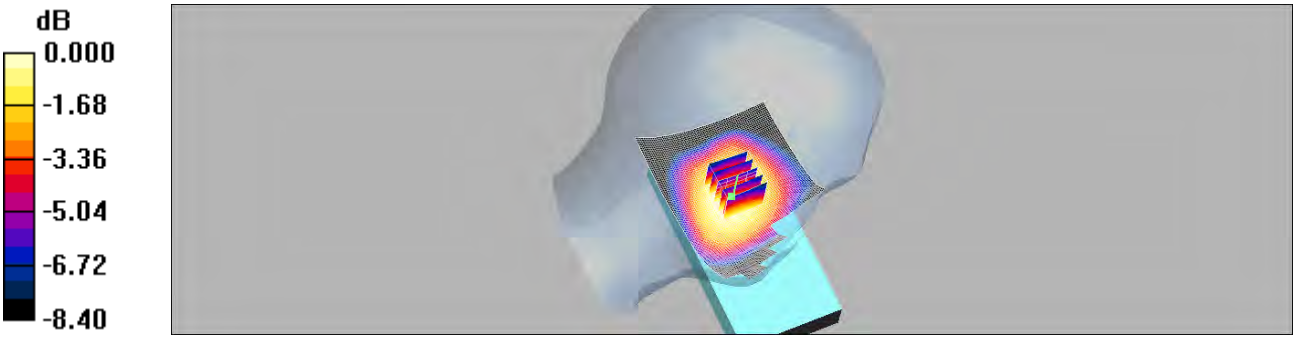
Communication System:WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Head 850 MHz Medium parameters used: f = 837 MHz; σ = 0.923 mho/m; ε_r = 40.7; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Head/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.351 mW/g

Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.7 V/m; Power Drift = 0.032 dB
Peak SAR (extrapolated) = 0.406 W/kg
SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.246 mW/g
Maximum value of SAR (measured) = 0.345 mW/g



0 dB = 0.345mW/g

Date: 2012/6/13

Body_WCDMA Band V_CH4132

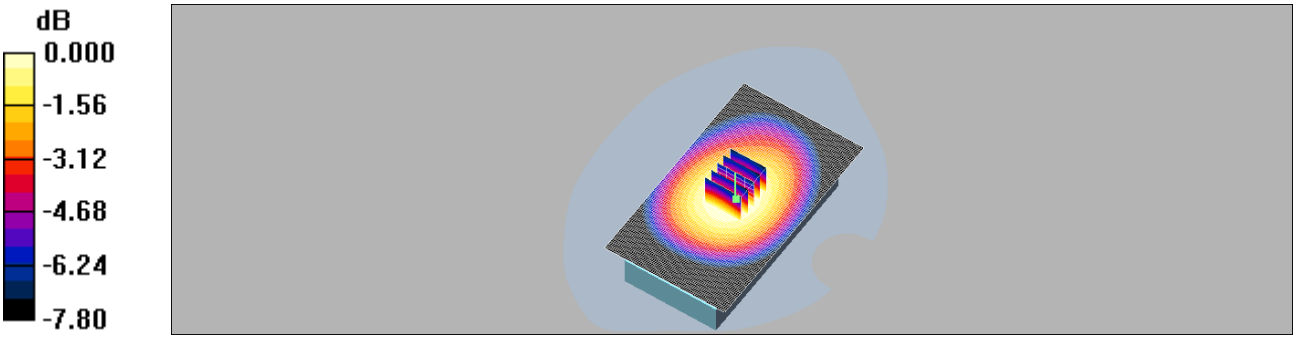
Communication System:WCDMA Band V; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.975 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.588 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.1 V/m; Power Drift = -0.144 dB
Peak SAR (extrapolated) = 0.661 W/kg
SAR(1 g) = 0.516 mW/g; SAR(10 g) = 0.395 mW/g
Maximum value of SAR (measured) = 0.558 mW/g



0 dB = 0.558mW/g

Date: 2012/6/13

Body_WCDMA Band V_CH4183

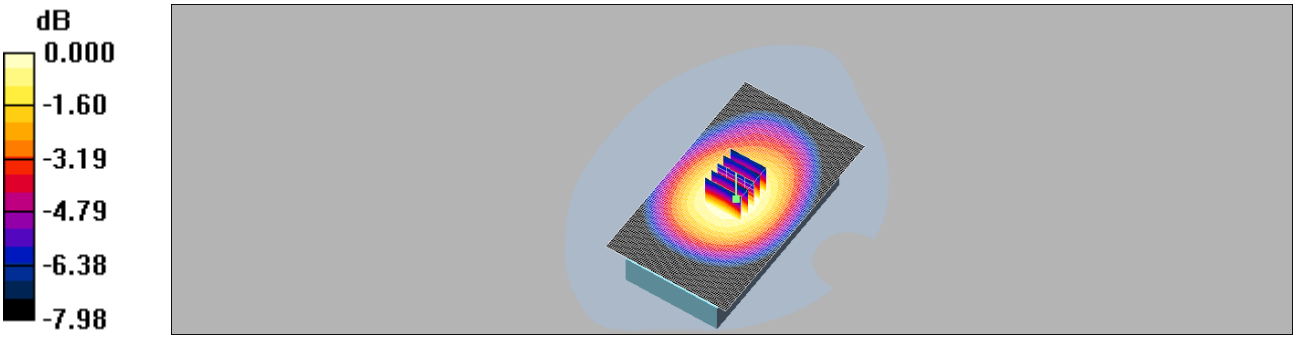
Communication System:WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.617 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.1 V/m; Power Drift = -0.073 dB
Peak SAR (extrapolated) = 0.724 W/kg
SAR(1 g) = 0.560 mW/g; SAR(10 g) = 0.423 mW/g
Maximum value of SAR (measured) = 0.608 mW/g



0 dB = 0.608mW/g

Date: 2012/6/13

Body_WCDMA Band V_CH4233

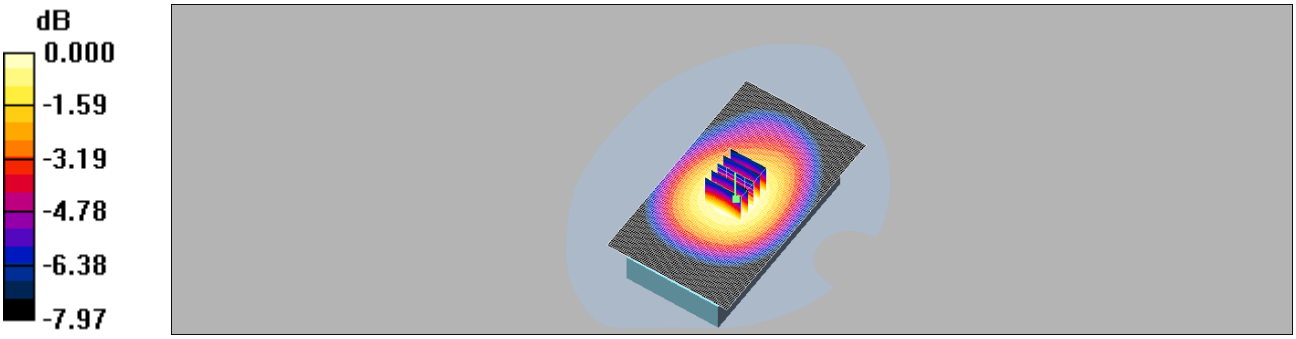
Communication System:WCDMA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 847 MHz; σ = 0.991 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.498 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.7 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 0.602 W/kg
SAR(1 g) = 0.466 mW/g; SAR(10 g) = 0.351 mW/g
Maximum value of SAR (measured) = 0.505 mW/g



0 dB = 0.505mW/g

Date: 2012/6/13

Body_WCDMA Band V_CH4183_repeated with memory card

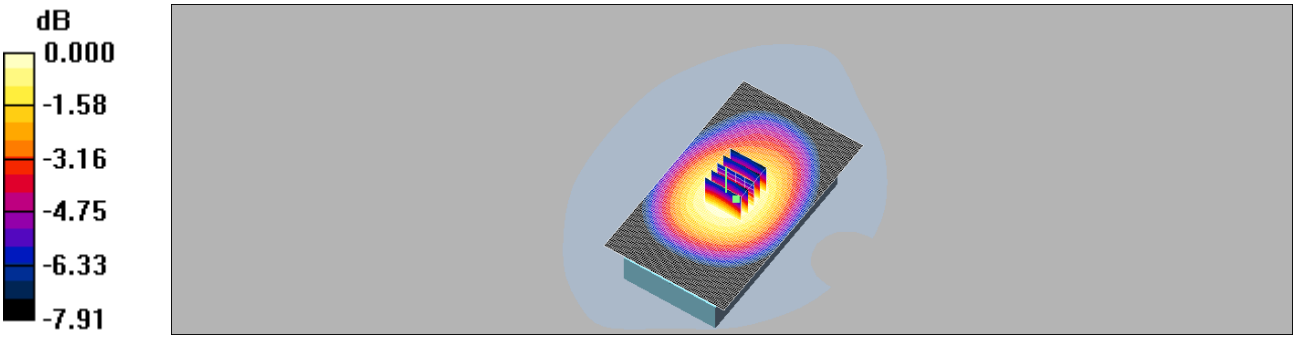
Communication System:WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.560 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.0 V/m; Power Drift = -0.048 dB
Peak SAR (extrapolated) = 0.666 W/kg
SAR(1 g) = 0.513 mW/g; SAR(10 g) = 0.389 mW/g
Maximum value of SAR (measured) = 0.555 mW/g



0 dB = 0.555mW/g

Date: 2012/6/13

Body_WCDMA Band V_CH4183_repeated for EUT back to phantom

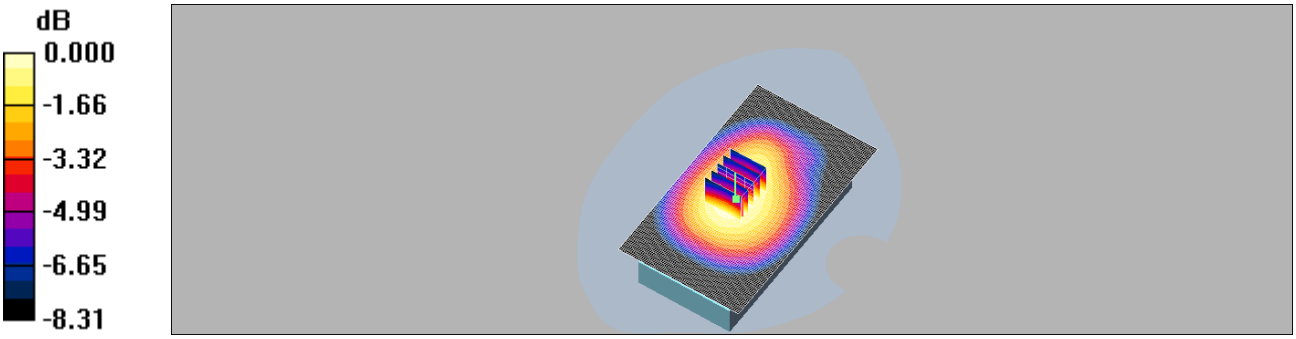
Communication System:WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 837 MHz; σ = 0.989 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.563 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.4 V/m; Power Drift = 0.190 dB
Peak SAR (extrapolated) = 0.671 W/kg
SAR(1 g) = 0.523 mW/g; SAR(10 g) = 0.393 mW/g
Maximum value of SAR (measured) = 0.564 mW/g



0 dB = 0.564mW/g

Date: 2012/7/28

Body_WLAN 802.11 b _CH 11_repeated for EUT front to phantom

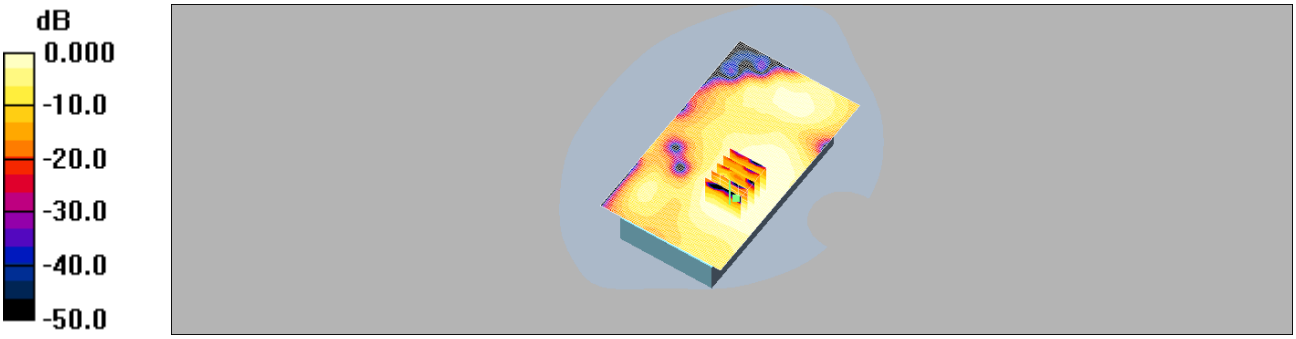
Communication System: WiFi b_FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2462 MHz; σ = 2.06 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(3.99, 3.99, 3.99); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2012/6/1
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.023 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.08 V/m; Power Drift = 0.075 dB
Peak SAR (extrapolated) = 0.039 W/kg
SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.012 mW/g
Maximum value of SAR (measured) = 0.024 mW/g



0 dB = 0.024mW/g

Date: 2012/7/28

Body_WLAN 802.11 b _CH1

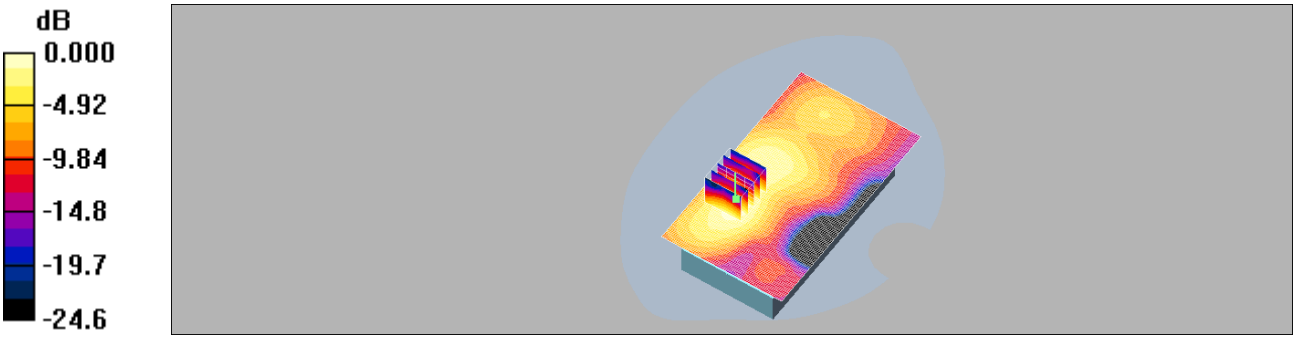
Communication System: WiFi b_FCC; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2412 MHz; σ = 2 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(3.99, 3.99, 3.99); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2012/6/1
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.095 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.29 V/m; Power Drift = -0.027 dB
Peak SAR (extrapolated) = 0.158 W/kg
SAR(1 g) = 0.085 mW/g; SAR(10 g) = 0.046 mW/g
Maximum value of SAR (measured) = 0.098 mW/g



0 dB = 0.098mW/g

Date: 2012/7/28

Body_WLAN 802.11 b _CH 6

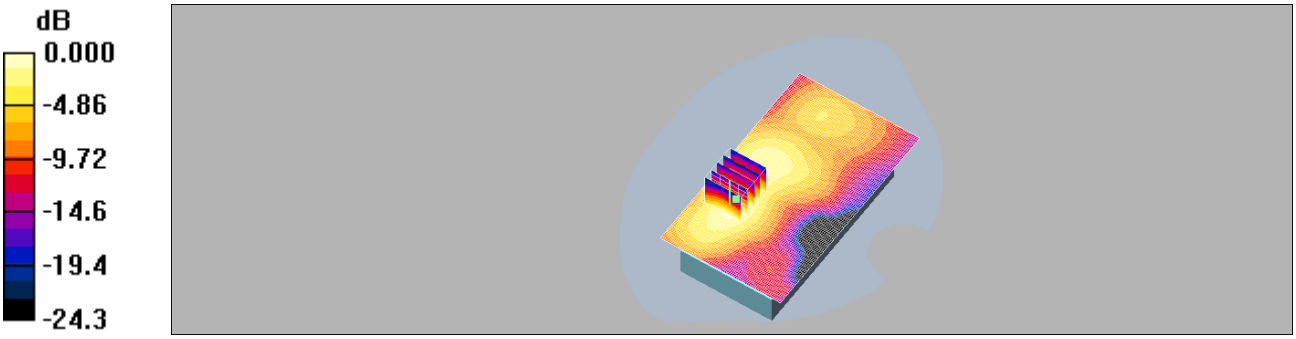
Communication System: WiFi b_FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2437 MHz; σ = 2.03 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(3.99, 3.99, 3.99); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2012/6/1
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.114 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.47 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 0.189 W/kg
SAR(1 g) = 0.101 mW/g; SAR(10 g) = 0.055 mW/g
Maximum value of SAR (measured) = 0.116 mW/g



0 dB = 0.116mW/g

Date: 2012/7/28

Body_WLAN 802.11 b _CH 11

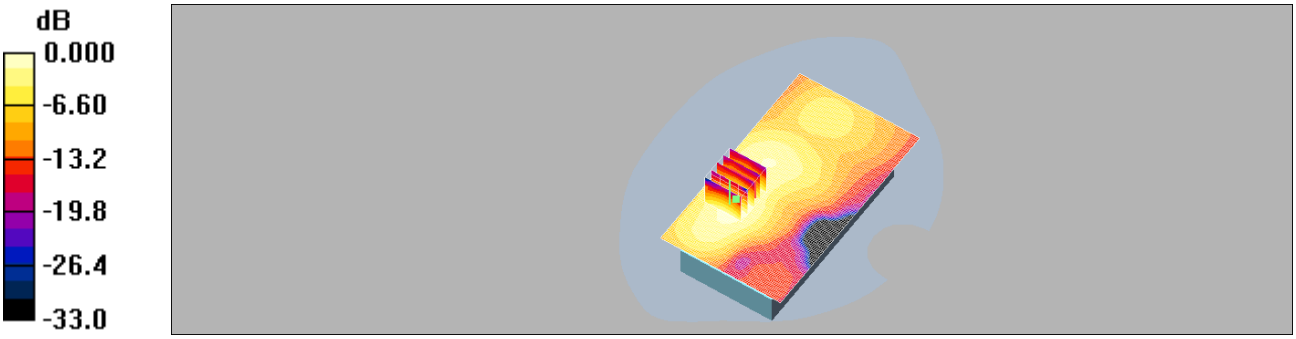
Communication System: WiFi b_FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2462 MHz; σ = 2.06 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(3.99, 3.99, 3.99); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2012/6/1
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.127 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.51 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 0.209 W/kg
SAR(1 g) = 0.112 mW/g; SAR(10 g) = 0.061 mW/g
Maximum value of SAR (measured) = 0.129 mW/g



0 dB = 0.129mW/g

Date: 2012/7/28

Body_WLAN 802.11 b_CH11_repeated with Bluetooth active

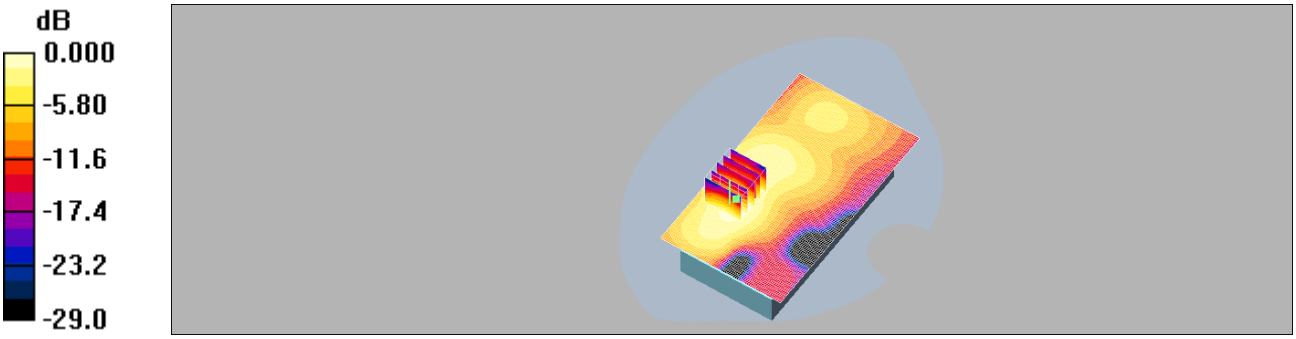
Communication System: WiFi b_FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2462 MHz; σ = 2.06 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(3.99, 3.99, 3.99); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2012/6/1
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.126 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.45 V/m; Power Drift = 0.197 dB
Peak SAR (extrapolated) = 0.208 W/kg
SAR(1 g) = 0.111 mW/g; SAR(10 g) = 0.060 mW/g
Maximum value of SAR (measured) = 0.128 mW/g



0 dB = 0.128mW/g

Body_WLAN 802.11 b_CH11_repeated with memory card

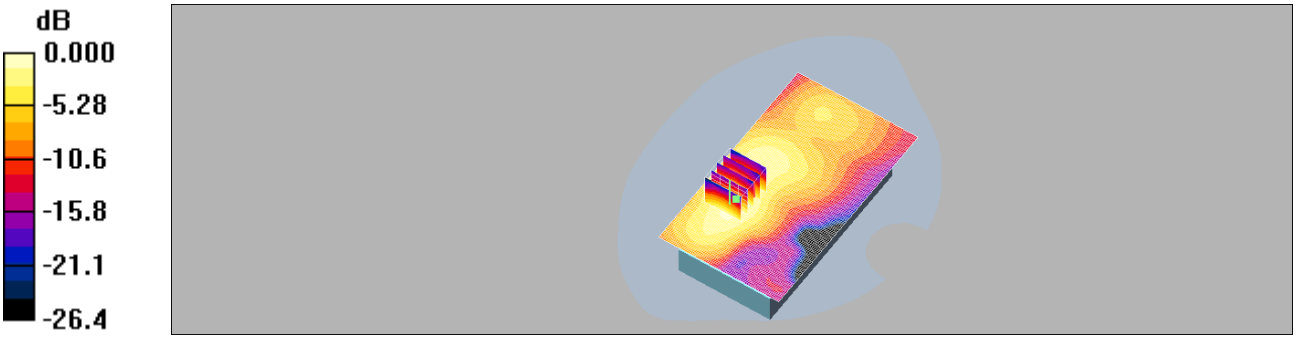
Communication System: WiFi b_FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2462 MHz; σ = 2.06 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(3.99, 3.99, 3.99); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2012/6/1
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body/Area Scan (71x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.134 mW/g

Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.62 V/m; Power Drift = -0.037 dB
Peak SAR (extrapolated) = 0.223 W/kg
SAR(1 g) = 0.119 mW/g; SAR(10 g) = 0.064 mW/g
Maximum value of SAR (measured) = 0.137 mW/g



0 dB = 0.137mW/g

5. SAR System Performance Verification

Date: 2012/6/10

DUT: Dipole 835 MHz (Head)

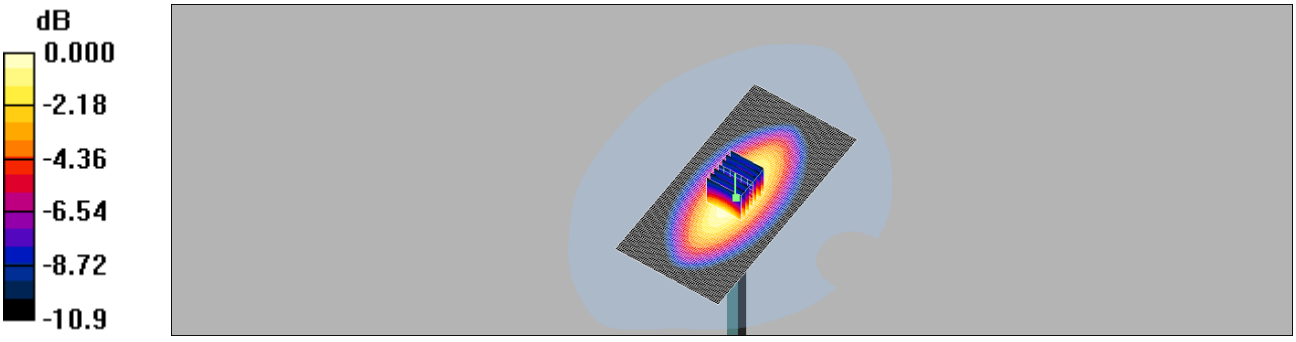
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Head 850 MHz Medium parameters used: f = 835 MHz; σ = 0.922 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1270
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.61 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.7 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 3.54 W/kg
SAR(1 g) = 2.29 mW/g; SAR(10 g) = 1.48 mW/g
Maximum value of SAR (measured) = 2.61 mW/g



0 dB = 2.61mW/g

Date: 2012/6/13

DUT: Dipole 835 MHz (Body)

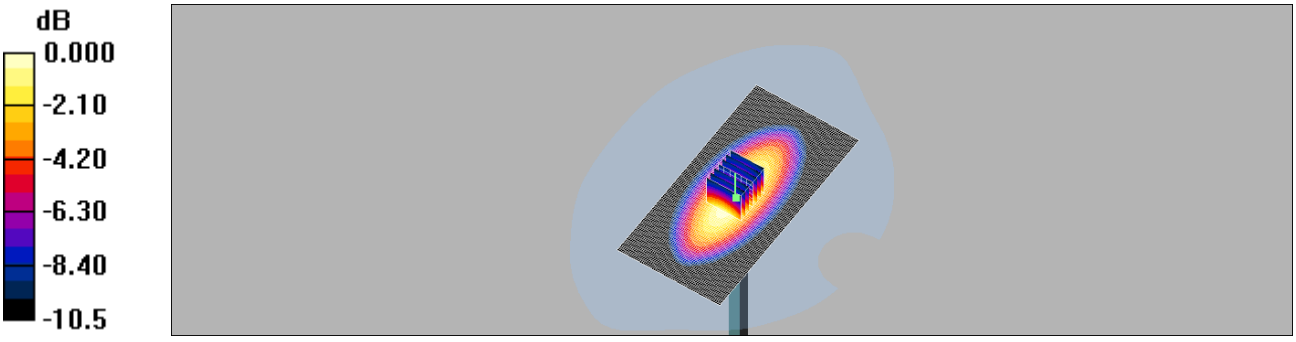
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 835 MHz; σ = 0.979 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(5.83, 5.83, 5.83); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Pin=250mW/Area Scan (61x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.69 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.3 V/m; Power Drift = 0.004 dB
Peak SAR (extrapolated) = 3.56 W/kg
SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.56 mW/g
Maximum value of SAR (measured) = 2.68 mW/g



0 dB = 2.68mW/g

Date: 2012/6/10

DUT: Dipole 1900 MHz (Head)

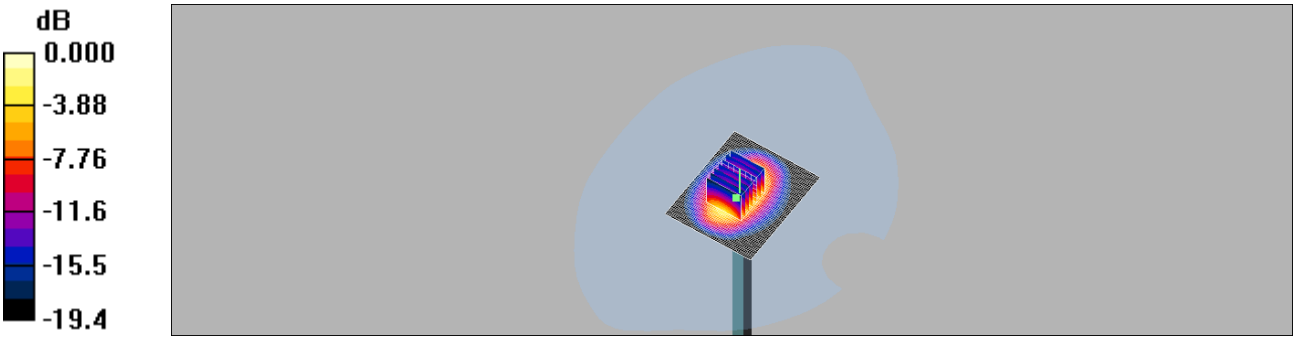
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: Head 1900 MHz Medium parameters used: f = 1900 MHz; σ = 1.41 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.78, 4.78, 4.78); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Pin=250mw/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.4 mW/g

Pin=250mw/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86.8 V/m; Power Drift = 0.029 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 9.48 mW/g; SAR(10 g) = 4.78 mW/g
Maximum value of SAR (measured) = 11.6 mW/g



0 dB = 11.6mW/g

Date: 2012/6/13

DUT: Dipole 1900 MHz (Body)

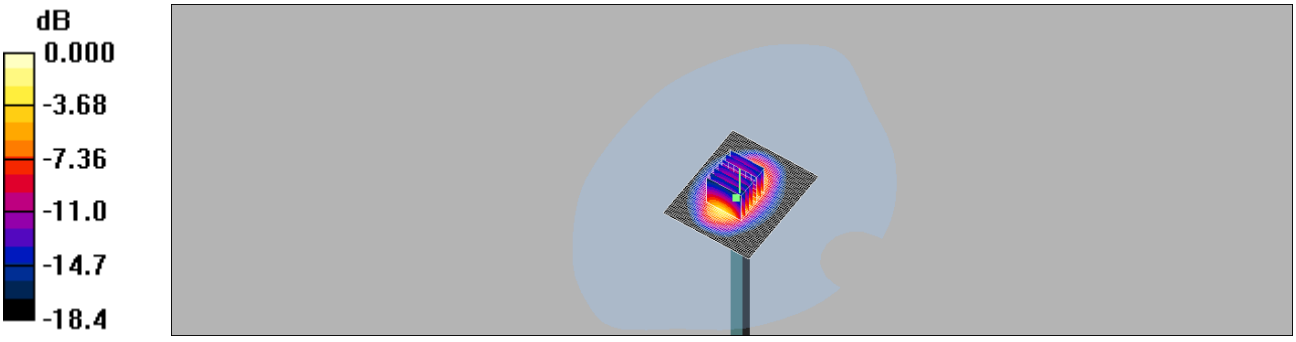
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: M1800 & 1900 Medium parameters used: f = 1900 MHz; σ = 1.55 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(4.38, 4.38, 4.38); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Pin=250mW/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.4 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 90.2 V/m; Power Drift = 0.037 dB
Peak SAR (extrapolated) = 17.1 W/kg
SAR(1 g) = 9.51 mW/g; SAR(10 g) = 4.94 mW/g
Maximum value of SAR (measured) = 11.4 mW/g



0 dB = 11.4mW/g

Date: 2012/7/28

DUT: Dipole 2450 MHz (Body)

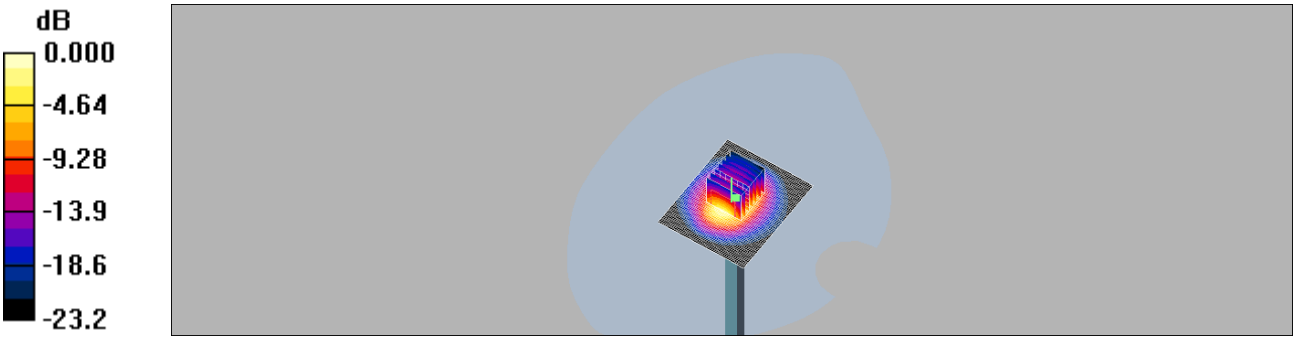
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2450 MHz; σ = 2.05 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3172; ConvF(3.99, 3.99, 3.99); Calibrated: 2011/8/23
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2012/6/1
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Pin=250mW/Area Scan (51x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 17.9 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.6 V/m; Power Drift = 0.087 dB
Peak SAR (extrapolated) = 28.0 W/kg
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.1 mW/g
Maximum value of SAR (measured) = 16.6 mW/g



0 dB = 16.6mW/g

6. DAE & Probe Calibration Certificate

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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 SGS-TW (Auden) **Certificate No: DAE4-547_Jun12**

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 547
Calibration procedure(s)	QA CAL-06.v24 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	June 01, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-11 (No:11450)	Sep-12
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V2.1	SE UWS 053 AA 1001	05-Jan-12 (in house check)	In house check: Jan-13

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

Issued: June 1, 2012

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Accreditation No.: SCS 108

Client SGS (Auden) Certificate No: DAE4-1260_Aug11

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 1260
Calibration procedure(s)	QA CAL-06.v23 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	August 22, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-10 (No:10376)	Sep-11
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	08-Jun-11 (in house check)	In house check: Jun-12

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

Issued: August 22, 2011

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Accreditation No.: SCS 108

Client **SGS-TW (Auden)** Certificate No: **ES3-3172_Aug11**

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3172

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

Calibration date: August 23, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: August 23, 2011

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR*: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z*: *A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters*: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3172

Manufactured: January 23, 2008
Calibrated: August 23, 2011

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3172

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.38	1.15	0.97	± 10.1 %
DCP (mV)[B]	100.5	105.1	95.2	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	117.7	±2.7 %
			Y	0.00	0.00	1.00	110.5	
			Z	0.00	0.00	1.00	93.7	

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

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

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DASY/EASY - Parameters of Probe: ES3DV3 - SN:3172

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.06	6.06	6.06	1.00	1.00	± 12.0 %
835	41.5	0.90	5.83	5.83	5.83	1.00	1.00	± 12.0 %
900	41.5	0.97	5.77	5.77	5.77	1.00	1.00	± 12.0 %
1750	40.1	1.37	4.94	4.94	4.94	0.95	1.09	± 12.0 %
1900	40.0	1.40	4.78	4.78	4.78	0.95	1.12	± 12.0 %
2000	40.0	1.40	4.77	4.77	4.77	0.97	1.08	± 12.0 %
2300	39.5	1.67	4.50	4.50	4.50	0.76	1.24	± 12.0 %
2450	39.2	1.80	4.17	4.17	4.17	0.80	1.19	± 12.0 %
2600	39.0	1.96	4.11	4.11	4.11	0.64	1.46	± 12.0 %

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

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DASY/EASY - Parameters of Probe: ES3DV3- SN:3172

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	5.89	5.89	5.89	1.00	1.00	± 12.0 %
835	55.2	0.97	5.83	5.83	5.83	1.00	1.00	± 12.0 %
900	55.0	1.05	5.72	5.72	5.72	1.00	1.00	± 12.0 %
1750	53.4	1.49	4.60	4.60	4.60	0.88	1.25	± 12.0 %
1900	53.3	1.52	4.38	4.38	4.38	0.78	1.34	± 12.0 %
2000	53.3	1.52	4.46	4.46	4.46	0.77	1.32	± 12.0 %
2300	52.9	1.81	4.18	4.18	4.18	1.00	1.05	± 12.0 %
2450	52.7	1.95	3.99	3.99	3.99	1.00	1.00	± 12.0 %
2600	52.5	2.16	3.90	3.90	3.90	1.00	1.00	± 12.0 %

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

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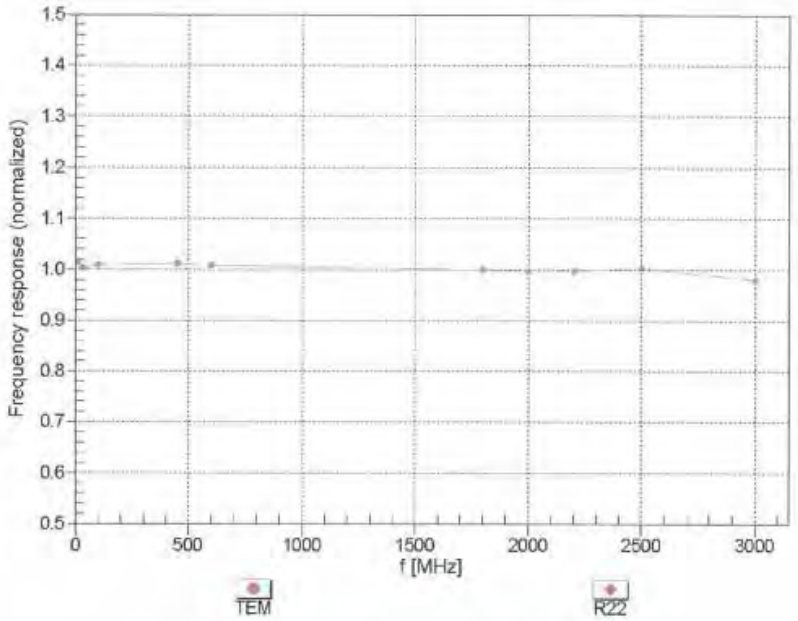
ES3DV3– SN:3172 August 23, 2011

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



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

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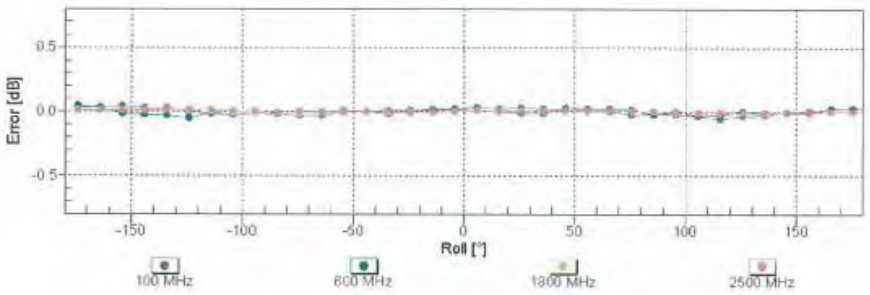
ES3DV3– SN:3172 August 23, 2011

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

f=1800 MHz,R22



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

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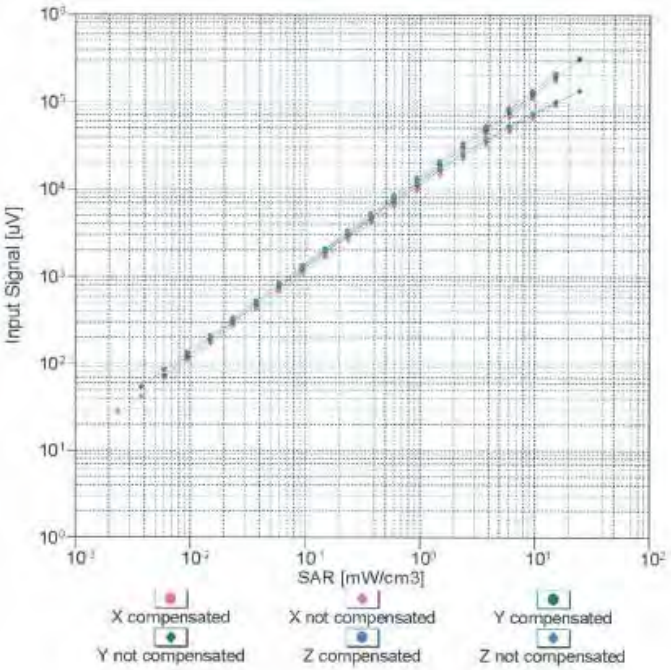
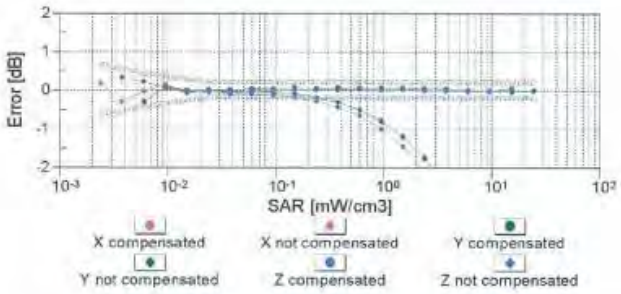
Dynamic Range f(SAR$_{head}$)
(TEM cell , f = 900 MHz)



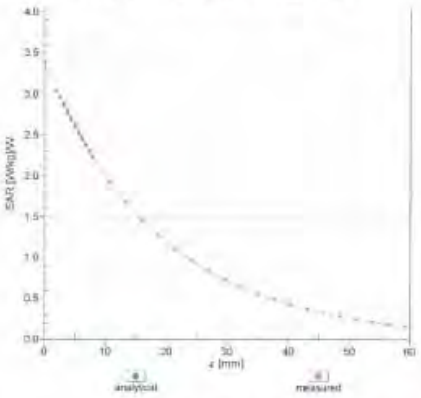


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

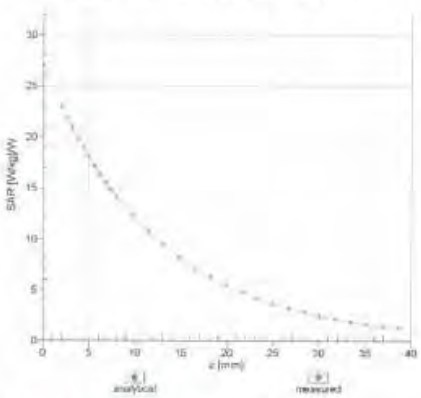
ES3DV3– SN:3172 August 23, 2011

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

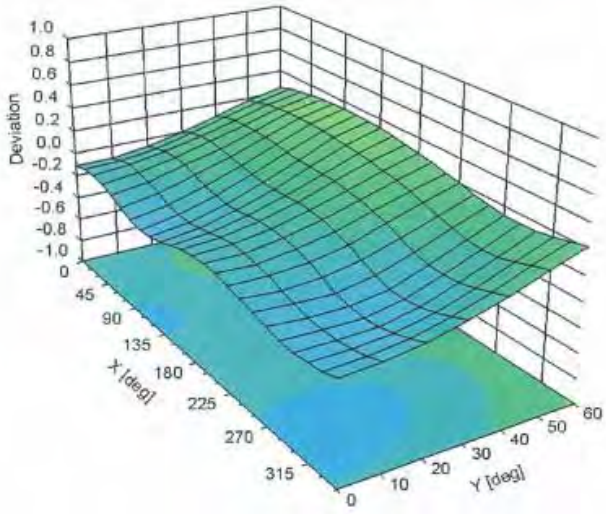


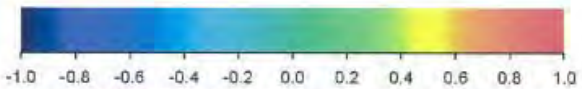
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

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DASY/EASY - Parameters of Probe: ES3DV3 - SN:3172

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

7. Uncertainty Budget

Measurement Uncertainty evaluation template for DUT SAR test
IEEE 1528

A	c	D	e	f	g	h=c * f / e	i=c * g / e	k
Source of Uncertainty	Tolerance/ Uncertainty %	Probability Distributioin	Div	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
Measurement system								
Probe calibration(under 2.6Ghz)	6.00%	N	1	1	1	6.00%	6.00%	∞
Isotropy , Axial	3.50%	R	√3	1	1	2.02%	2.02%	∞
Isotropy, Hemispherical	9.60%	R	√3	1	1	5.54%	5.54%	∞
Boundary Effect	1.00%	R	√3	1	1	0.58%	0.58%	∞
Linearity	4.70%	R	√3	1	1	2.71%	2.71%	∞
Detection Limits	1.00%	R	√3	1	1	0.58%	0.58%	∞
Readout Electronics	0.30%	N	1	1	1	0.30%	0.30%	∞
Response time	0.80%	R	√3	1	1	0.46%	0.46%	∞
Integration Time	2.60%	R	√3	1	1	1.50%	1.50%	∞
Measurement drift (class A evaluation)	1.75%	R	√3	1	1	1.01%	1.01%	∞
RF ambient condition - noise	3.00%	R	√3	1	1	1.73%	1.73%	∞
RF ambient conditions - reflections	3.00%	R	√3	1	1	1.73%	1.73%	∞
Probe positioner Mechanical restrictions	0.40%	R	√3	1	1	0.23%	0.23%	∞
Probe Positioning with respect to phantom shell	2.90%	R	√3	1	1	1.67%	1.67%	∞
Post-processing	1.00%	R	√3	1	1	0.58%	0.58%	∞
Max SAR Eval	1.00%	R	√3	1	1	0.58%	0.58%	∞
Test Sample related								
Test sample positioning	2.90%	N	1	1	1	2.90%	2.90%	M-1
Device Holder Uncertainty	3.60%	N	1	1	1	3.60%	3.60%	M-1
Drift of output power	5.00%	R	√3	1	1	2.89%	2.89%	∞
Phantom and Setup								
Phantom Uncertainty	4.00%	R	√3	1	1	2.31%	2.31%	∞
Liquid conductivity(meas.) Max at 1900 band	4.60%	N	1	0.64	0.43	2.94%	1.98%	M
Liquid permitivity(meas.) Max at 835 band	2.17%	N	1	0.6	0.49	1.30%	1.06%	M
Combined standard uncertainty		RSS				11.72%	11.49%	
Expant uncertainty (95% confidence interval), K=2						23.44%	22.98%	

8. Phantom Description

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Certificate of Conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 C
Series No	TP-1150 and higher
Manufacturer	SPEAG Zeughausstrasse 43 CH-8004 Zürich Switzerland

Tests
The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series items (called samples) or are tested at each item.

Test	Requirement	Details	Units tested
Dimensions	Compliant with the geometry according to the CAD model	IT'IS CAD File (*)	First article, Samples
Material thickness of shell	Compliant with the requirements according to the standards	2mm +/- 0.2mm in flat and specific areas of head section	First article, Samples, TP-1314 ff.
Material thickness at ERP	Compliant with the requirements according to the standards	6mm +/- 0.2mm at ERP	First article, All items
Material parameters	Dielectric parameters for required frequencies	300 MHz – 6 GHz: Relative permittivity < 5, Loss tangent < 0.05	Material samples
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions. Observe technical Note for material compatibility.	DEGMBE based simulating liquids	Pre-series, First article, Material samples
Sagging	Compliant with the requirements according to the standards. Sagging of the flat section when filled with tissue simulating liquid.	< 1% typical < 0.8% if filled with 155mm of HSL900 and without DUT below	Prototypes, Sample testing

Standards
[1] CENELEC EN 50361
[2] IEEE Std 1528-2003
[3] IEC 62209 Part I
[4] FCC OET Bulletin 65, Supplement C, Edition 01-01
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of the other documents.

Conformity
Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standards [1] to [4].

Date 07.07.2005

Signature / Stamp

s p e a g
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9. System Validation from Original Equipment Supplier

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Accreditation No.: **SCS 108**

Client **SGS-TW (Auden)** Certificate No: **D835V2-4d063_May12**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d063
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	May 25, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

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

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

Issued: May 25, 2012

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

Certificate No: D835V2-4d063_May12 Page 1 of 8

DASY5 Validation Report for Head TSL

Date: 25.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d063

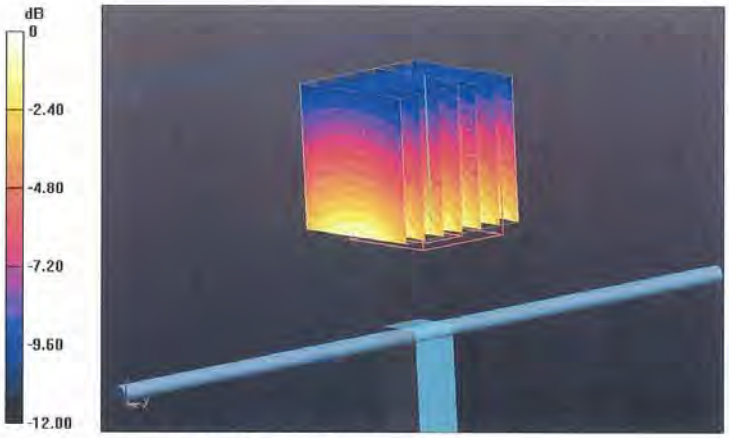
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm 2/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.199 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.481 mW/g
SAR(1 g) = 2.36 mW/g; SAR(10 g) = 1.54 mW/g
Maximum value of SAR (measured) = 2.75 mW/g



0 dB = 2.75 mW/g = 8.79 dB mW/g

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DASY5 Validation Report for Body TSL

Date: 25.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d063

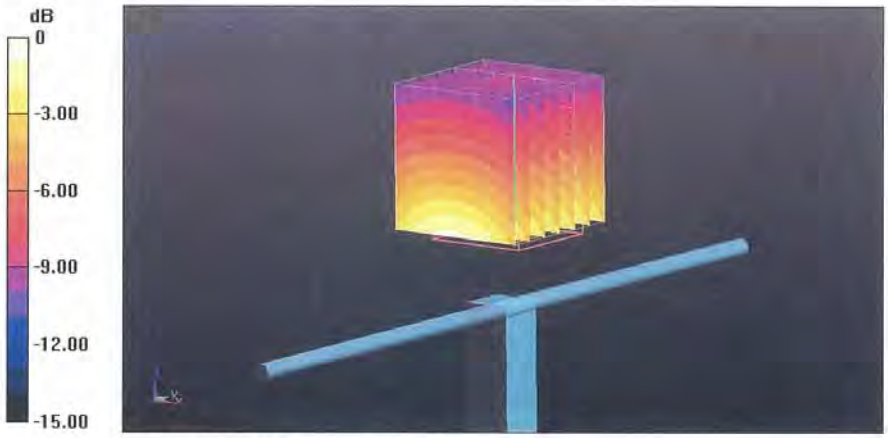
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.303 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.569 mW/g
SAR(1 g) = 2.46 mW/g; SAR(10 g) = 1.62 mW/g
Maximum value of SAR (measured) = 2.87 mW/g



0 dB = 2.87 mW/g = 9.16 dB mW/g

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Accreditation No.: **SCS 108**

Client **SGS-TW (Auden)** Certificate No: **D1900V2-5d027_Apr12**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d027
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	April 26, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

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

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

Issued: April 26, 2012

DASY5 Validation Report for Head TSL

Date: 26.04.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d027

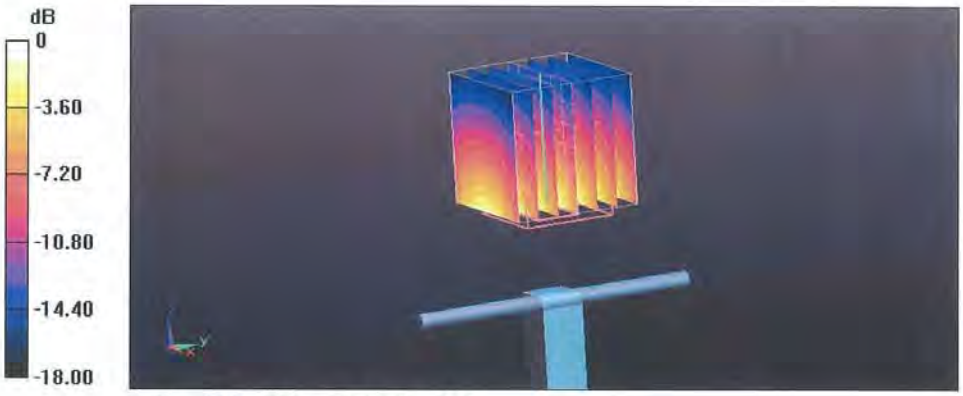
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.37 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.127 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 16.890 mW/g
SAR(1 g) = 9.43 mW/g; SAR(10 g) = 4.96 mW/g
Maximum value of SAR (measured) = 11.8 mW/g



0 dB = 11.8 mW/g = 21.44 dB mW/g

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DASY5 Validation Report for Body TSL

Date: 26.04.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d027

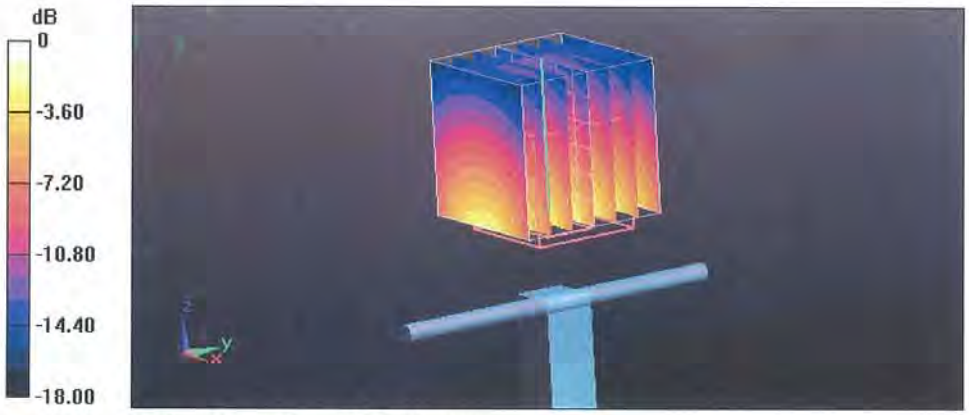
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.51 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.355 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 17.593 mW/g
SAR(1 g) = 10 mW/g; SAR(10 g) = 5.3 mW/g
Maximum value of SAR (measured) = 12.7 mW/g



0 dB = 12.7 mW/g = 22.08 dB mW/g

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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: D2450V2-727_Apr12

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 727
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	April 25, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

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

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

Issued: April 25, 2012

DASY5 Validation Report for Body TSL

Date: 25.04.2012

Test Laboratory: SPEAG, Zurich, Switzerland

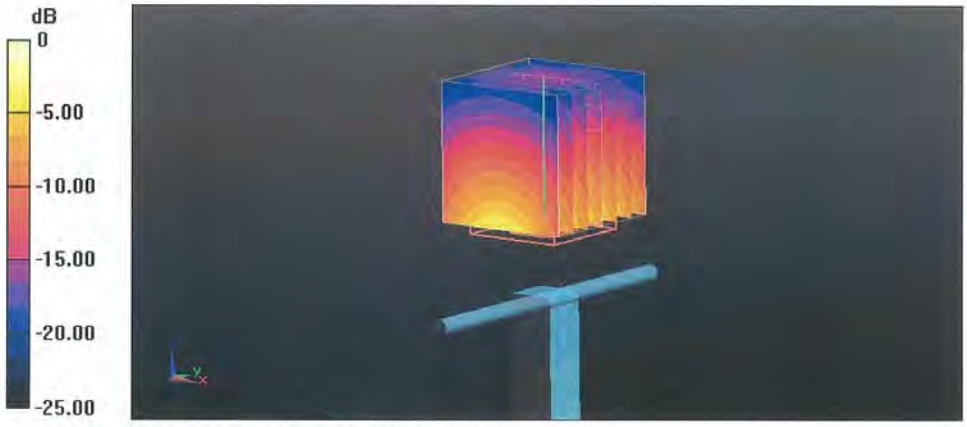
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 727

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.98 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.136 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 25.811 mW/g
SAR(1 g) = 12.7 mW/g; SAR(10 g) = 5.92 mW/g
Maximum value of SAR (measured) = 16.7 mW/g



0 dB = 16.7 mW/g = 24.45 dB mW/g

End of 1st part of report

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