SAR TEST REPORT

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

Equipment Under Test	QD8
Model Name	BF-01D
Brand Name	NTT Docomo
Company Name	Quanta Computer Inc.
Company Address	No.188, Wen Hwa 2nd Road , Kuei Shan Hsiang Tao Yuan Shien, Taiwan
Standards	FCC OET 65 supplement C, IEEE /ANSI C95.1, C95.3, IEEE 1528
FCC ID	HFS-QD8
Date of Receipt	Jan. 8, 2012
Date of Test(s)	Jan. 9, 2012 ~ Jan. 11, 2012
Date of Issue	Jan 19, 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 report must be approved by SGS Taiwan Electronic & Communication Laboratory in writing.

Signed for on the behalf of SGS

Supervisor

Ricky Huang

Ricky Huang

Date: Jan 19, 2012

Supervisor

Nick Hsu

Nick Hsu

Date: Jan 19, 2012

Version

Report Number	Revision	Date	Memo
ES/2011/40008-01	01	2012/01/19	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

Company Name	Quanta Computer Inc.
Company Address	No.188, Wen Hwa 2nd Road , Kuei Shan Hsiang Tao Yuan Shien, Taiwan
Contact Person	03-327-2345 Ext 17577
TEL	03-211-5516
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1.3 Description of EUT

EUT Name	QD8			
Model Name	BF-01D			
Marketing Name	BF-01D			
FCC ID	HFS-QD8			
Mode of Operation	☒WCDMA ☒HSDPA ☒HSUPA ☒WLAN802.11 a/b/g/n (☐H20 ☐H40) band			
Definition	Production unit			
Duty Cycle	WCDMA Band V	1		
	WLAN802.11 b/g/n(20M)	1		
	WLAN802.11 n (40M)	1		
	WLAN802.11 a	1		
	WLAN802.11 n (20M) 5G	1		
	WLAN802.11 n (40M) 5G	1		
TX Frequency Range (MHz)	WCDMA Band V	826.4	—	846.6
	WLAN802.11 b/g/n(20M)	2412	—	2462
	WLAN802.11 n (40M)	2422	—	2452

	WLAN802.11 a	5180	—	5825
	WLAN802.11 n (20M) 5G	5180	—	5825
	WLAN802.11 n (40M) 5G	5190	—	5795
Channel Number (ARFCN)	WCDMA Band V	4132	—	4233
	WLAN802.11 b/g/n(20M)	1	—	11
	WLAN802.11 n (40M)	3	—	9
	WLAN802.11 a	36	—	165
	WLAN802.11 n (20M) 5G	36	—	165
	WLAN802.11 n (40M) 5G	38	—	159
VOIP Function	☐YES ☒NO			
Max. SAR Measured(1 g) (Unit: mW/g)	WCDMA Band V	0.573	☐Top ☐Bottom ☐Left ☒Front ☐Back 4132 Channel	
	WLAN802.11 b	0.054	☐Top ☐Bottom ☒Left ☐Front ☐Back 1 Channel	
	WLAN802.11 n (40M) 5G	0.016	☐Top ☒Bottom ☐Left ☐Front ☐Back 54 Channel	
	WLAN802.11 n (20M) 5G	0.047	☐Top ☒Bottom ☐Left ☐Front ☐Back 52 Channel	
	WLAN802.11 a	0.038	☐Top ☒Bottom ☐Left ☐Front ☐Back 48, 52 Channel	

#. WCDMA HSDPA / HSUPA conducted power table:

Band	Channel	Rel99	HSDPA				HSUPA				
		Rel99	1	2	3	4	1	2	3	4	5
WCDMA Band V	4132	23.07	22.86	23	22.4	22.45	23.03	21.09	22.07	21.14	22.89
	4183	23.03	22.89	22.92	22.41	22.45	22.96	21.04	22.02	21.1	22.79
	4233	22.93	23.05	22.8	22.56	22.62	22.85	20.89	21.93	20.97	22.74

#. WLAN802.11 a/ b/ g/ n(H20/40)/ n 5.2G(H20/40) conducted power table:

	Average power		
Band	Frequency	W-Wifi	L-Wifi
WLAN 802.11 b	2412	12.5	10.46
	2437	12.93	10.44
	2462	12.17	10.77
WLAN 802.11 g	2412	12.28	10.31
	2437	12.92	10.39
	2462	13.15	10.68
WLAN 802.11 n (20M)	2412	12.28	10.29
	2437	12.92	10.36
	2462	13.13	10.61
WLAN 802.11 n (40M)	2422	12.24	10.18
	2437	12.22	10.19
	2452	12.7	10.08
WLAN 802.11 n (20M) 5.2G	5180	12.79	
	5260	13.33	
	5320	12.76	
WLAN 802.11 n (40M) 5.2G	5190	12.73	
	5270	13.2	
	5310	12.95	
WLAN 802.11 a	5180	12.83	
	5220	12.92	
	5240	13.65	
	5260	13.35	
	5280	13.01	
	5230	12.76	

When L-Wifi the maximum transmitter and antenna output power are ≦ 60/f(GHz) (mW)
SAR evaluation is typically not required for FCC or TCB approval

1.4 Test Environment

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

1.5 Operation description

1. The EUT is controlled by using a Radio Communication Tester (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. Use chipset specific software to control the EUT, and makes it transmit in maximum power. 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.
5. Testing body-worn SAR by separating **10mm.**

   #. The SAR testing for portable devices with wireless router capability is refer as test guidance of **KDB 941225 D06** (SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities).

   #. The following procedures are applicable when the overall device length and width are ≥9 cm x 5 cm respectively. A test separation of 10 mm is required. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25 mm from that surface or edge, for the data modes, wireless technologies and frequency bands supporting hotspot mode.

WWAN: Setup configuration referred as appendix of setup photograph
Configuration 1: Top side
Configuration 2: Bottom side
Configuration 3: Left side.
Configuration 4: Right side. (WWAN antenna to user distance >25mm_No SAR)
Configuration 5: Front side.
Configuration 6: Back side.

WLAN : Setup configuration referred as appendix of setup photograph
Configuration 1: Top side. (WLAN antenna to user distance >25mm_No SAR)
Configuration 2: Bottom side
Configuration 3: Left side.
Configuration 4: Right side. (WLAN antenna to user distance >25mm_No SAR)
Configuration 5: Front side.
Configuration 6: Back side.

According to **KDB248227**-SAR is not required for 802.11 g/HT20/HT40 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.
Using **KDB941225 D01** to exclude SAR test requirements for HSPA modes due to the maximum average output power of HSPA active is less than 1/4 dB higher than that measured without HSPA using 12.2kbps RMC
According to **KDB 447498**-When the maximum output power variation across H, M and L channels is ≤ ½ dB, start with the middle channel; otherwise, start with the highest output power channel. When the measured 1-g SAR for the middle or highest output power channel is ≤ 0.8 W/kg, testing of the remaining two channels in that device and exposure configuration is not necessary.
The highest 1-g SAR for WLAN is 0.054 W/kg and the highest 1-g SAR for WWAN is 0.573W/kg. The sum of 1-g for simultaneous transmitting WLAN and WWAN antenna pair is 0.054+0.573 = 0.627 W/kg, **which lower than the limit 1.6W/kg.** According to **KDB648474/KDB447498** Simultaneous SAR evaluation is not required.

1.6 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY 4 professional system). A Model EX3DV4 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 in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

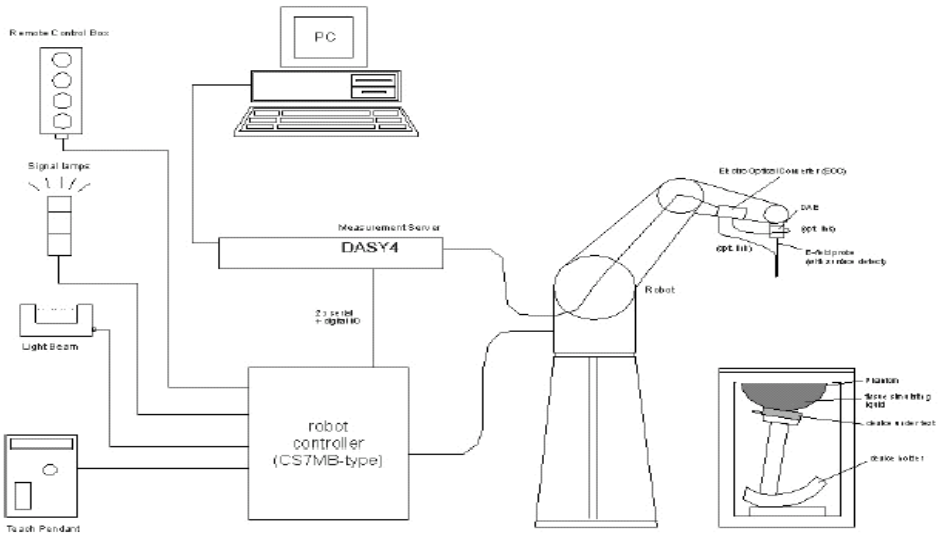


Fig.a The block diagram of SAR system

- 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 2000 or Windows XP.
- DASY4 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing 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.

1.7 System Components

EX3DV4 E-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 HSL835/2450/5200 MHz Additional CF for other liquids and frequencies upon request	
Frequency	10 MHz to > 6 GHz, Linearity: ± 0.2 dB (30 MHz to 6 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: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 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: 251 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

1.8 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 835/2450/5200 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 in the range 22.1°C, the relative humidity was in the range 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.

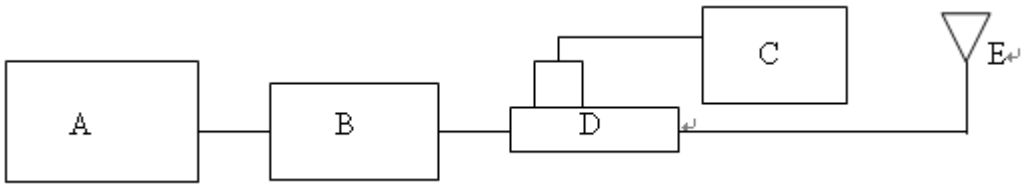
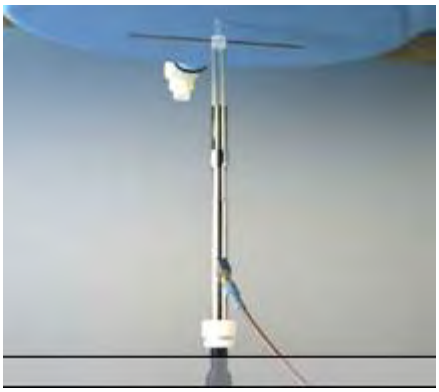


Fig.b The block diagram of system verification

A. Agilent Model 8648D Signal Generator
B. Mini circuits Model ZHL-42 Amplifier
C. Agilent ModelU2001B Power sensor
D. Agilent Model 777D/778D 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	Body	2.43	2.41	Jan. 9, 2012
D2450V2	727	2450	Body	12.7	11.6	Jan. 9, 2012
D5200V2	1040	5200	Body	7.66	7.9	Jan. 11, 2012

Table 2. Results of system validation

1.9 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 HP 8753D 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	Body	ρ	51.21-56.60	54.3	Jan. 9, 2012
		σ (S/m)	0.95-1.05	1	
		Simulated Tissue Temperature(° C)	20-24	21.7	
2450	Body	ρ	48.07-53.13	51.2	Jan. 9, 2012
		σ (S/m)	1.81-2.01	1.97	
		Simulated Tissue Temperature(° C)	20-24	21.7	
5200	Body	ρ	45.13-49.88	49.2	Jan. 11, 2012
		σ (S/m)	5.24-5.80	5.48	
		Simulated Tissue Temperature(° C)	20-24	21.7	

Table 3. 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	Body	—	633.91	11.76	1.20	—	602.12	1.0L(Kg)
2450	Body	313.65	686.35	—	—	—	—	1.0L(Kg)

Table 3. Recipes for tissue simulating liquid

1.10 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.

1.11 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate ("SAR") in Section 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE C95.1–1992, 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

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	Body Worn	Top	—	0.351	—	1.6
			Bottom	—	0.300	—	1.6
			Left	—	0.073	—	1.6
			Front	0.573	0.515	0.505	1.6
			Back	—	0.190	—	1.6

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

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 MHz	2437 MHz	2462 MHz	
WLAN 802.11 b	Body Worn	Bottom	—	0.043	—	1.6
		Left	0.054	0.052	0.050	1.6
		Front	—	0.023	—	1.6
		Back	—	0.018	—	1.6

1. 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.
2. The 1-g SAR for the highest output channel is less than 0.4 W/kg, where the transmission band corresponding to all channels is ≤ 200 MHz, testing for the other channels is not required.

WLAN802.11 n 5.2 G(20M)

Band	EUT Position	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
			CH 36	CH 52	CH 64	
			5180 MHz	5260 MHz	5320 MHz	
WLAN 802.11 n 5.2 G (20M)	Body Worn	Bottom	0.024	0.047	0.028	1.6
		Left	—	0.014	—	1.6
		Front	—	0.021	—	1.6
		Back	—	0.013	—	1.6

1. 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.
2. The 1-g SAR for the highest output channel is less than 0.4 W/kg, where the transmission band corresponding to all channels is ≤ 200 MHz, testing for the other channels is not required.

WLAN802.11 n 5.2 G(40M)

Band	EUT Position	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
			CH 38	CH 54	CH 62	
			5180 MHz	5260 MHz	5320 MHz	
WLAN 802.11 n 5.2 G (40M)	Body Worn	Bottom	0.014	0.016	0.012	1.6
		Left	—	0.00928	—	1.6
		Front	—	0.013	—	1.6
		Back	—	0.00855	—	1.6

1. 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.
2. The 1-g SAR for the highest output channel is less than 0.4 W/kg, where the transmission band corresponding to all channels is ≤ 200 MHz, testing for the other channels is not required.

WLAN802.11 a

Band	EUT Position	Test Configuration	Averaged SAR over 1g (W/kg)				SAR Limit 1g (W/kg)
			CH 36	CH 48	CH 52	CH 64	
			5180 MHz	5240 MHz	5260 MHz	5320 MHz	
WLAN 802.11 a	Body Worn	Bottom	0.027	0.038	0.038	0.029	1.6
		Left	0.021	0.020	0.023	0.020	1.6
		Front	0.019	0.012	0.025	0.026	1.6
		Back	0.018	0.021	0.015	0.016	1.6

1. 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.
2. The 1-g SAR for the highest output channel is less than 0.4 W/kg, where the transmission band corresponding to all channels is ≤ 200 MHz, testing for the other channels is not required.

3. Instruments List

Device	Manufacturer	Type	Serial number	Date of last calibration	Date of next calibration
Dosimetric E-Field Probe	Schmid & Partner Engineering AG	EX3DV4	3578	Jun. 21,2011	Jun. 20,2012
835/2450/5200 MHz System Validation Dipole	Schmid & Partner Engineering AG	D835V2	4d063	May. 25,2011	May. 24,2012
		D2450V2	727	Apr. 19,2011	Apr. 18,2012
		D5GHzV2	1104	Apr. 11,2011	Apr. 10,2012
Data acquisition Electronics	Schmid & Partner Engineering AG	DAE4	547	Aug. 29,2011	Aug. 28,2012
Software	Schmid & Partner Engineering AG	DASY 4 V4.7	N/A	Calibration not required	
Phantom	Schmid & Partner Engineering AG	SAM	N/A	Calibration not required	
Network Analyzer	HP	8753D	3410A05547	Mar.16.2011	Mar.15.2012
Dielectric Probe Kit	Agilent	85070D	US01440168	Calibration not required	
Dual-directional coupler	Agilent	778D	50313	Aug.19.2011	Aug.18.2012
		777D	50114	Aug.18.2011	Aug.17.2012
RF Signal Generator	Agilent	8648D	3847M00432	Jun.01.2011	May.31.2012
Power Sensor	Agilent	U2001B	MY48100169	Apr.28.2011	Apr.27.2012
R&S	Radio Communication Test	CMU200	113505	May.31.2011	May.30.2012

4. Measurements

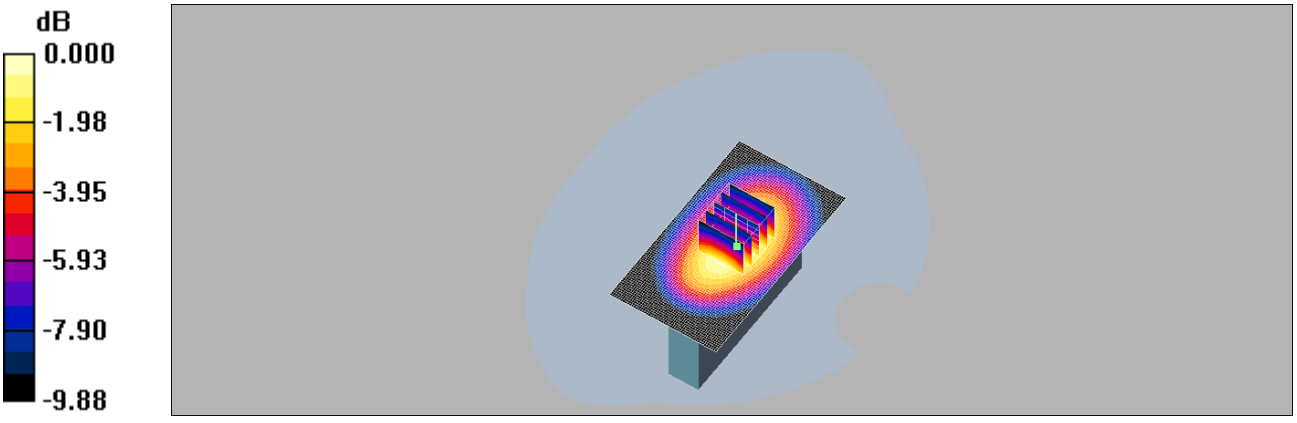
Date: 2012/1/9

WCDMA BAND V_Top side_CH4183

Communication System: WCDMA BAND5; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 837 MHz; σ = 1 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.45, 8.45, 8.45); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.432 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.2 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 0.492 W/kg
SAR(1 g) = 0.351 mW/g; SAR(10 g) = 0.241 mW/g
Maximum value of SAR (measured) = 0.432 mW/g



0 dB = 0.432mW/g

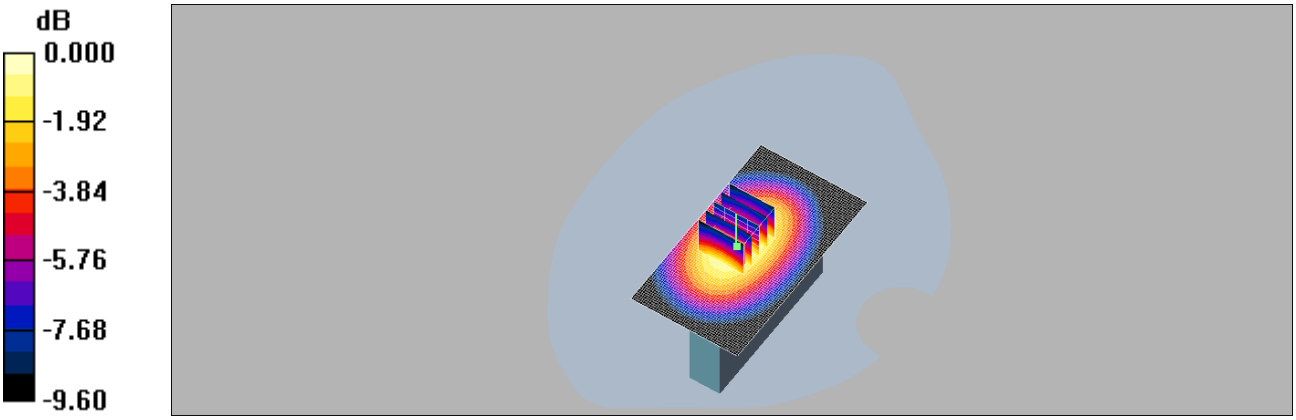
Date: 2012/1/9

WCDMA BAND V_Bottom side_CH4183

Communication System: WCDMA BAND5; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 837 MHz; σ = 1 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.45, 8.45, 8.45); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.367 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.0 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 0.417 W/kg
SAR(1 g) = 0.300 mW/g; SAR(10 g) = 0.208 mW/g
Maximum value of SAR (measured) = 0.365 mW/g



0 dB = 0.365mW/g

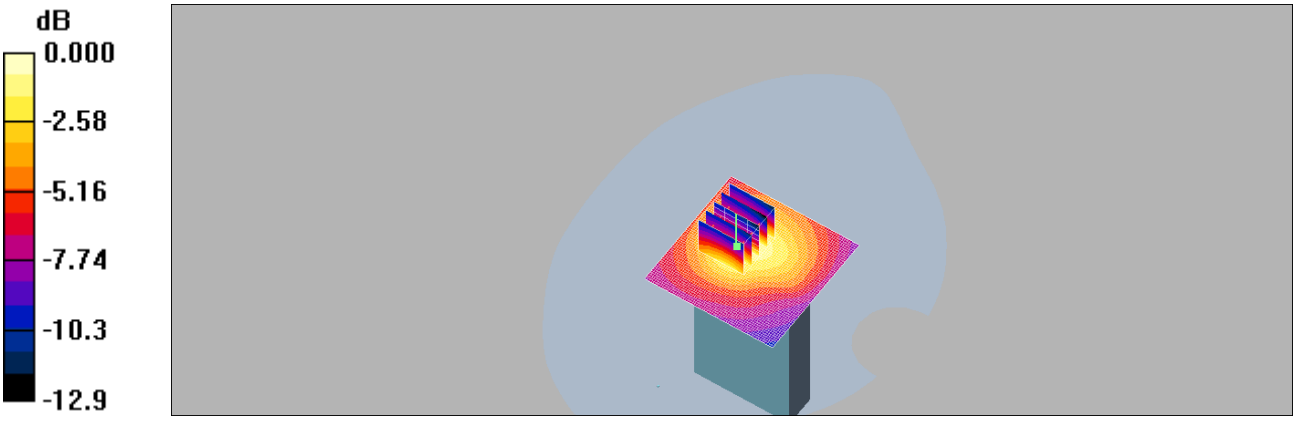
Date: 2012/1/9

WCDMA BAND V_Left side_CH4183

Communication System: WCDMA BAND5; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 837 MHz; σ = 1 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.45, 8.45, 8.45); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.100 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.29 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 0.122 W/kg
SAR(1 g) = 0.073 mW/g; SAR(10 g) = 0.045 mW/g
Maximum value of SAR (measured) = 0.098 mW/g



0 dB = 0.098mW/g

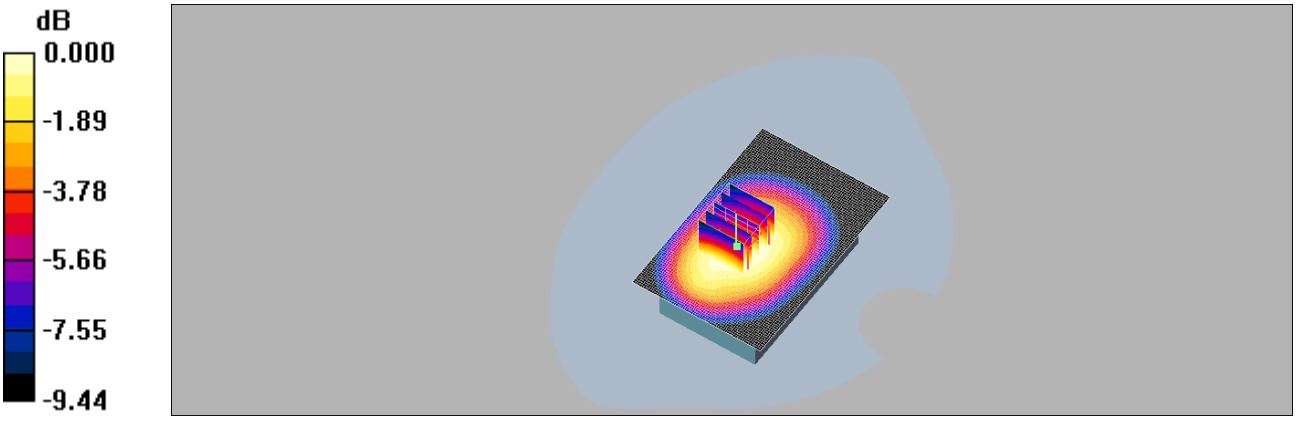
Date: 2012/1/9

WCDMA BAND V_front side_CH4132

Communication System: WCDMA BAND5; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.991 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.45, 8.45, 8.45); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.657 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.2 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 0.720 W/kg
SAR(1 g) = 0.573 mW/g; SAR(10 g) = 0.426 mW/g
Maximum value of SAR (measured) = 0.656 mW/g



0 dB = 0.656mW/g

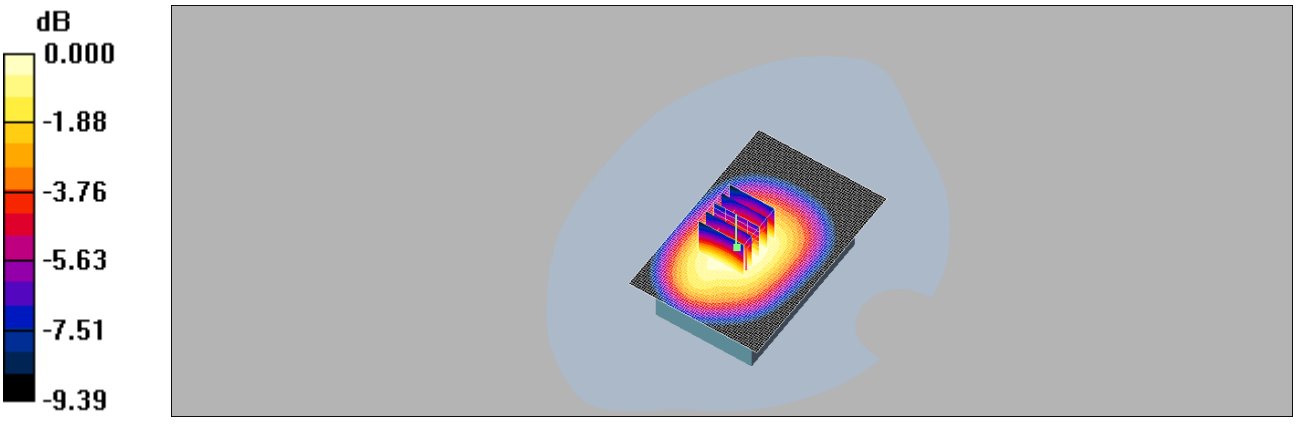
Date: 2012/1/9

WCDMA BAND V_front side_CH4183

Communication System: WCDMA BAND5; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 837 MHz; σ = 1 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.45, 8.45, 8.45); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.598 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.8 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 0.647 W/kg
SAR(1 g) = 0.515 mW/g; SAR(10 g) = 0.383 mW/g
Maximum value of SAR (measured) = 0.591 mW/g



0 dB = 0.591mW/g

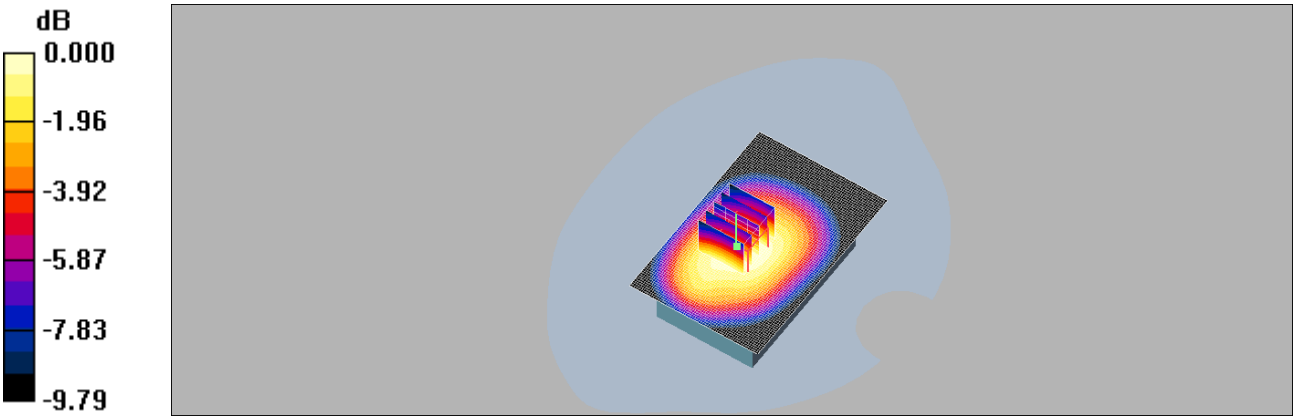
Date: 2012/1/9

WCDMA BAND V_front side_CH4233

Communication System: WCDMA BAND5; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 847 MHz; σ = 1.01 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.45, 8.45, 8.45); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.586 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.8 V/m; Power Drift = -0.106 dB
Peak SAR (extrapolated) = 0.638 W/kg
SAR(1 g) = 0.505 mW/g; SAR(10 g) = 0.374 mW/g
Maximum value of SAR (measured) = 0.577 mW/g



0 dB = 0.577mW/g

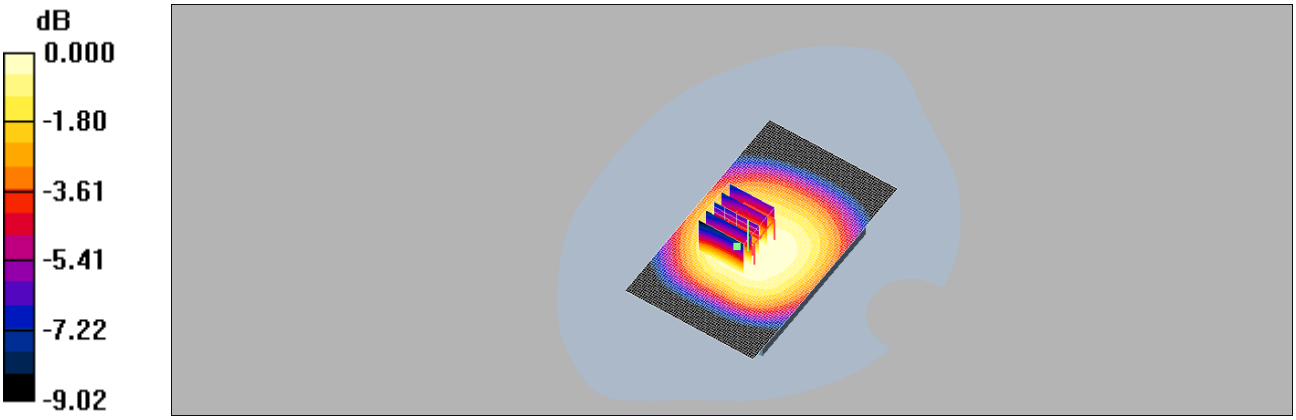
Date: 2012/1/9

WCDMA BAND V_Back side_CH4183

Communication System: WCDMA BAND5; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 837 MHz; σ = 1 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.45, 8.45, 8.45); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.220 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.8 V/m; Power Drift = 0.038 dB
Peak SAR (extrapolated) = 0.239 W/kg
SAR(1 g) = 0.190 mW/g; SAR(10 g) = 0.146 mW/g
Maximum value of SAR (measured) = 0.217 mW/g



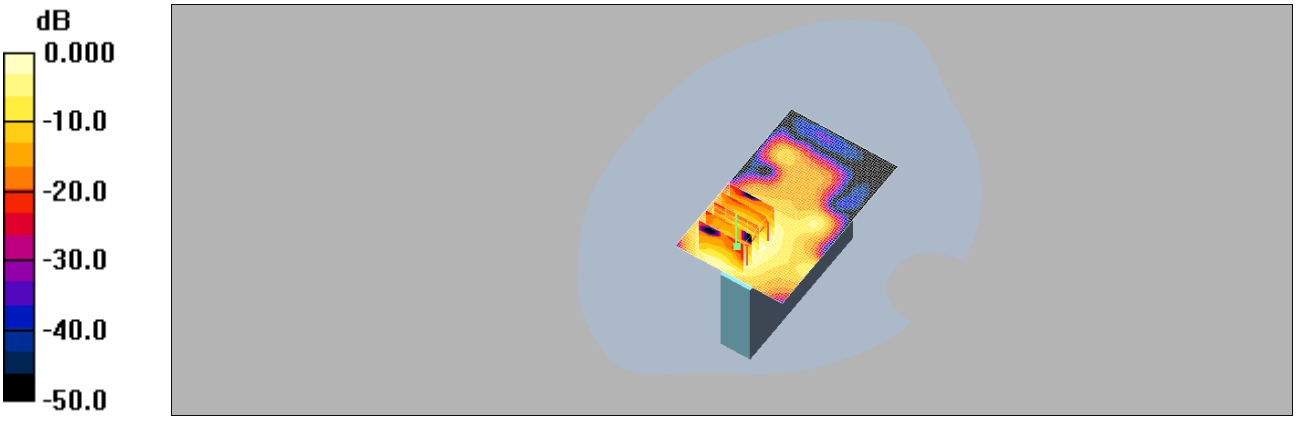
0 dB = 0.217mW/g

WLAN 802.11b_6_Bottom side

Communication System: WiFi b_FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2437 MHz; σ = 1.95 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.18, 6.18, 6.18); Calibrated: 2011/6/21
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.051 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.39 V/m; Power Drift = -0.130 dB
Peak SAR (extrapolated) = 0.092 W/kg
SAR(1 g) = 0.043 mW/g; SAR(10 g) = 0.020 mW/g
Maximum value of SAR (measured) = 0.052 mW/g



0 dB = 0.052mW/g

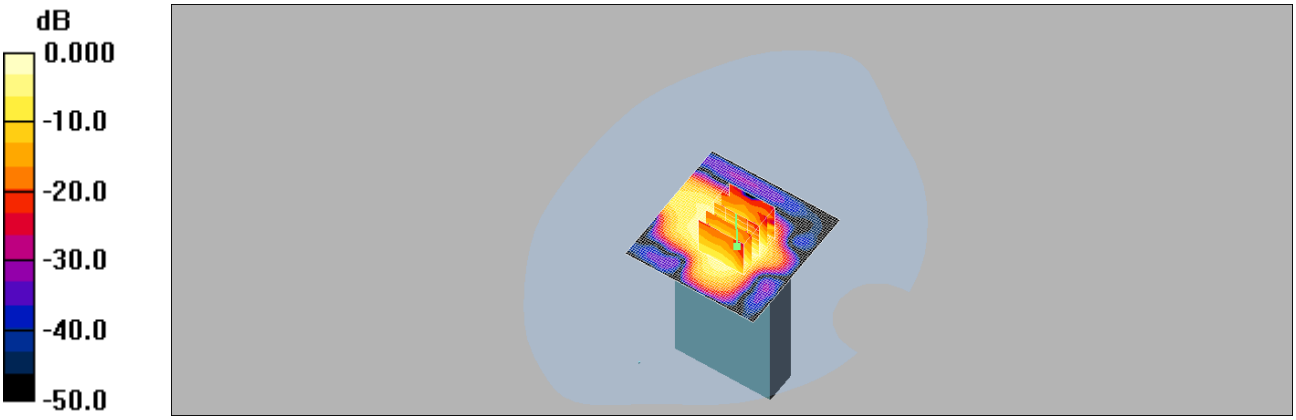
Date: 2012/1/9

WLAN 802.11b_1_Left side

Communication System: WiFi b_FCC; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2412 MHz; σ = 1.93 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.18, 6.18, 6.18); Calibrated: 2011/6/21
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.084 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.55 V/m; Power Drift = 0.128 dB
Peak SAR (extrapolated) = 0.112 W/kg
SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.025 mW/g
Maximum value of SAR (measured) = 0.062 mW/g



0 dB = 0.062mW/g

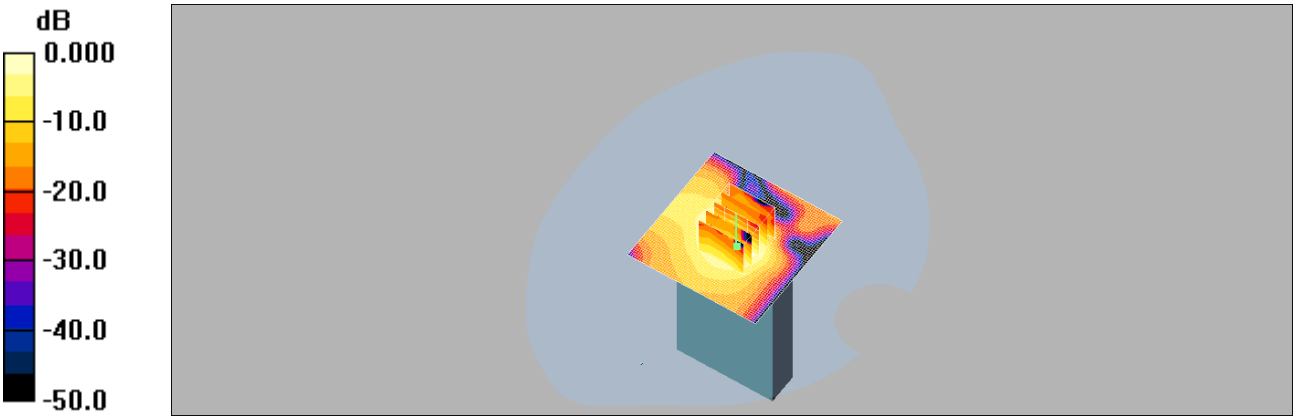
Date: 2012/1/9

WLAN 802.11b_6_Left side

Communication System: WiFi b_FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2437 MHz; σ = 1.95 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.18, 6.18, 6.18); Calibrated: 2011/6/21
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.072 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.27 V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 0.107 W/kg
SAR(1 g) = 0.052 mW/g; SAR(10 g) = 0.024 mW/g
Maximum value of SAR (measured) = 0.063 mW/g



0 dB = 0.063mW/g

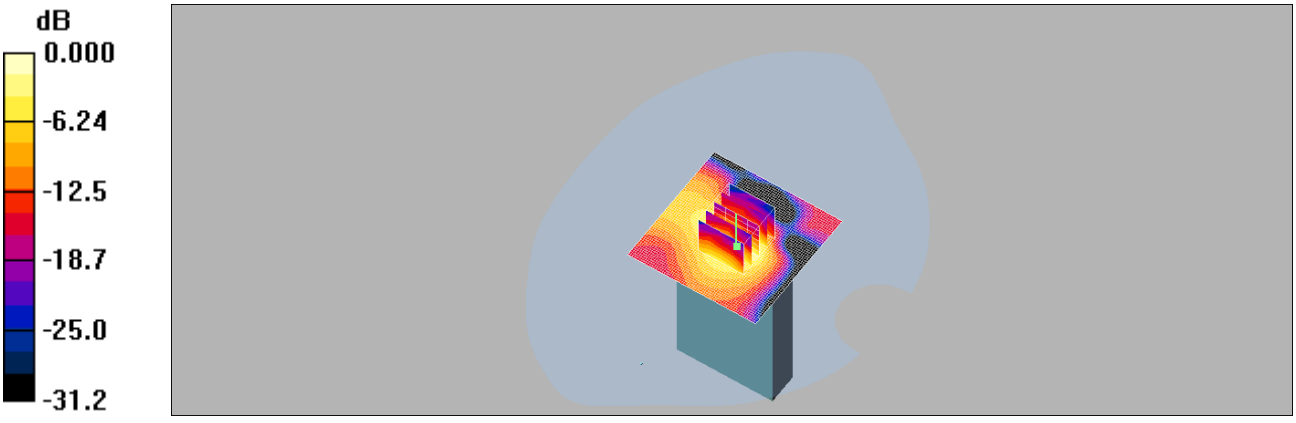
Date: 2012/1/9

WLAN 802.11b_11_Left side

Communication System: WiFi b_FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2462 MHz; σ = 2 mho/m; ε_r = 51.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.18, 6.18, 6.18); Calibrated: 2011/6/21
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.069 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.18 V/m; Power Drift = -0.146 dB
Peak SAR (extrapolated) = 0.105 W/kg
SAR(1 g) = 0.050 mW/g; SAR(10 g) = 0.023 mW/g
Maximum value of SAR (measured) = 0.061 mW/g



0 dB = 0.061mW/g

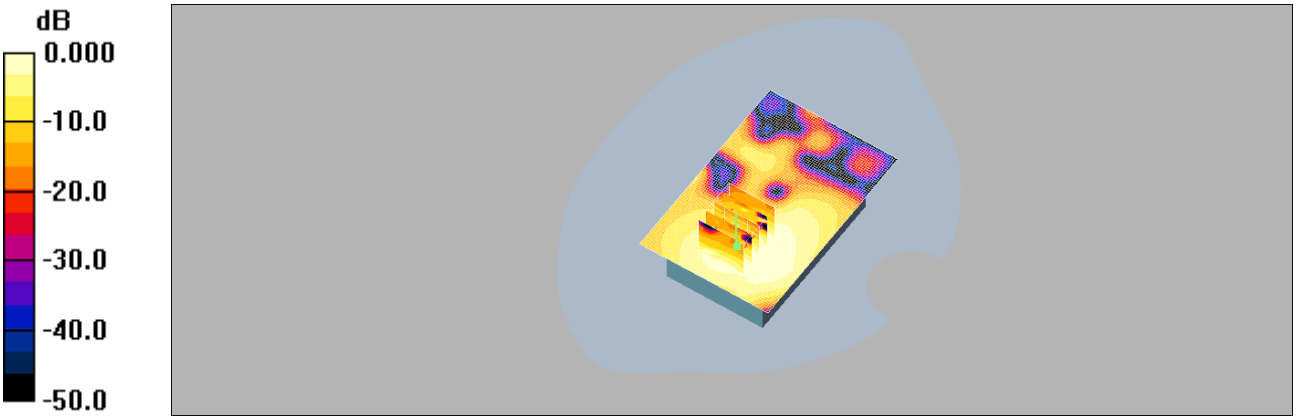
Date: 2012/1/9

WLAN 802.11b_6_Front side

Communication System: WiFi b_FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2437 MHz; σ = 1.95 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.18, 6.18, 6.18); Calibrated: 2011/6/21
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.029 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.70 V/m; Power Drift = -0.150 dB
Peak SAR (extrapolated) = 0.036 W/kg
SAR(1 g) = 0.023 mW/g; SAR(10 g) = 0.012 mW/g
Maximum value of SAR (measured) = 0.027 mW/g



0 dB = 0.027mW/g

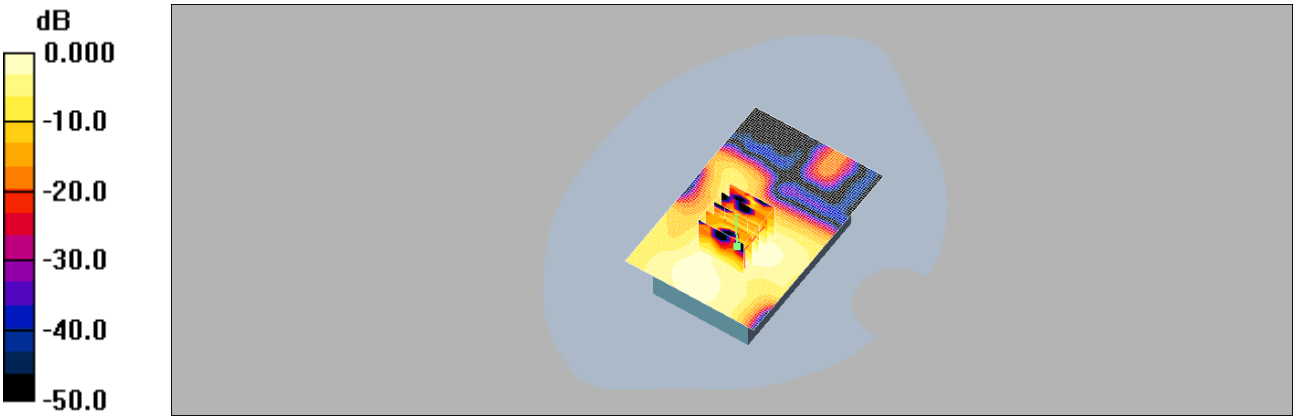
Date: 2012/1/9

WLAN 802.11b_6_Back side

Communication System: WiFi b_FCC; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2437 MHz; σ = 1.95 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.18, 6.18, 6.18); Calibrated: 2011/6/21
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.021 mW/g
Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.22 V/m; Power Drift = 0.157 dB
Peak SAR (extrapolated) = 0.037 W/kg
SAR(1 g) = 0.018 mW/g; SAR(10 g) = 0.00889 mW/g
Maximum value of SAR (measured) = 0.021 mW/g



0 dB = 0.021mW/g

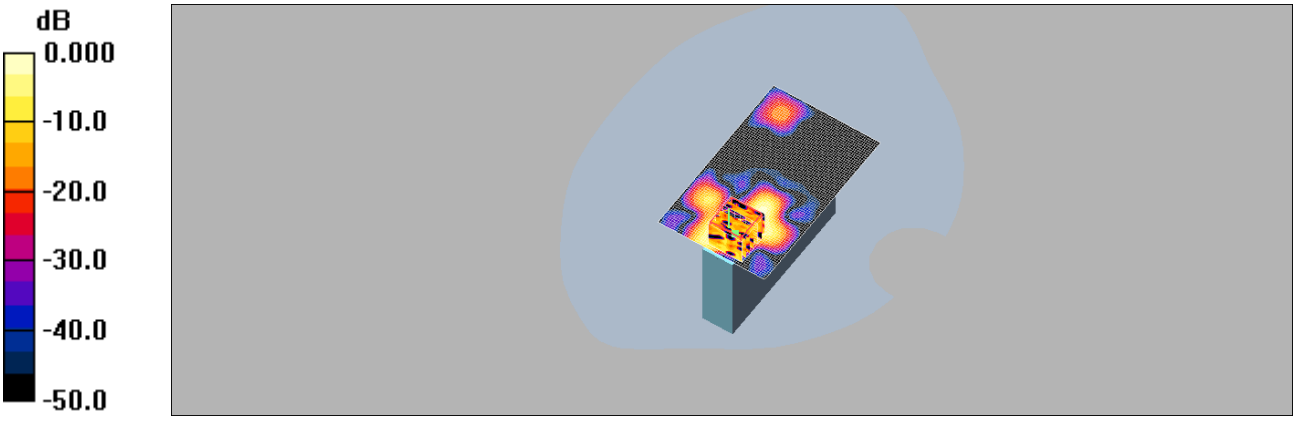
Date: 2012/1/11

WLAN 802.11n(20M)_36_Bottom side

Communication System: WiFi n(20M)_5G_FCC; Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5180 MHz; σ = 5.44 mho/m; ε_r = 49.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.065 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.503 V/m; Power Drift = 0.147 dB
Peak SAR (extrapolated) = 0.085 W/kg
SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.00733 mW/g
Maximum value of SAR (measured) = 0.055 mW/g



0 dB = 0.055mW/g

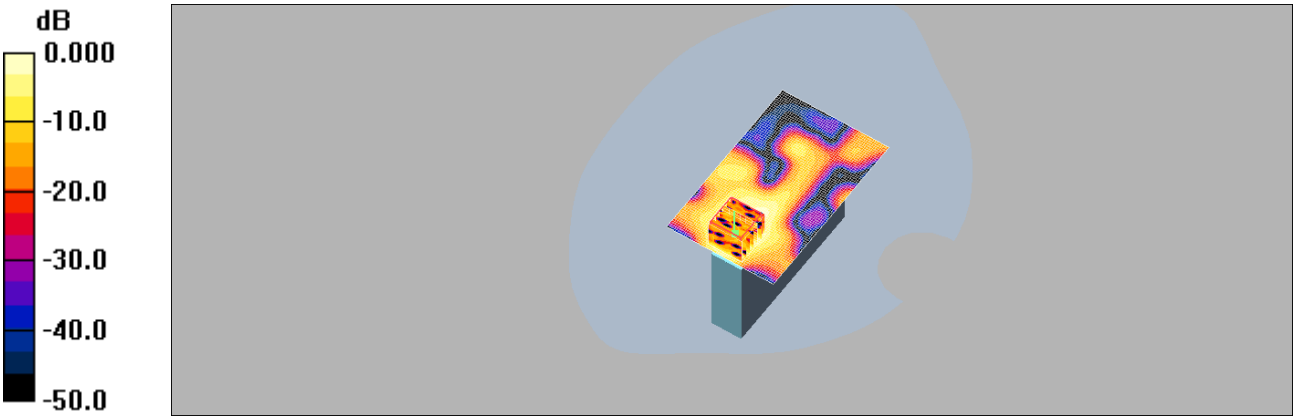
Date: 2012/1/11

WLAN 802.11n(20M)_52_Bottom side

Communication System: WiFi n(20M)_5G_FCC; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5260 MHz; σ = 5.55 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.104 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.44 V/m; Power Drift = -0.133 dB
Peak SAR (extrapolated) = 0.149 W/kg
SAR(1 g) = 0.047 mW/g; SAR(10 g) = 0.014 mW/g
Maximum value of SAR (measured) = 0.099 mW/g



0 dB = 0.099mW/g

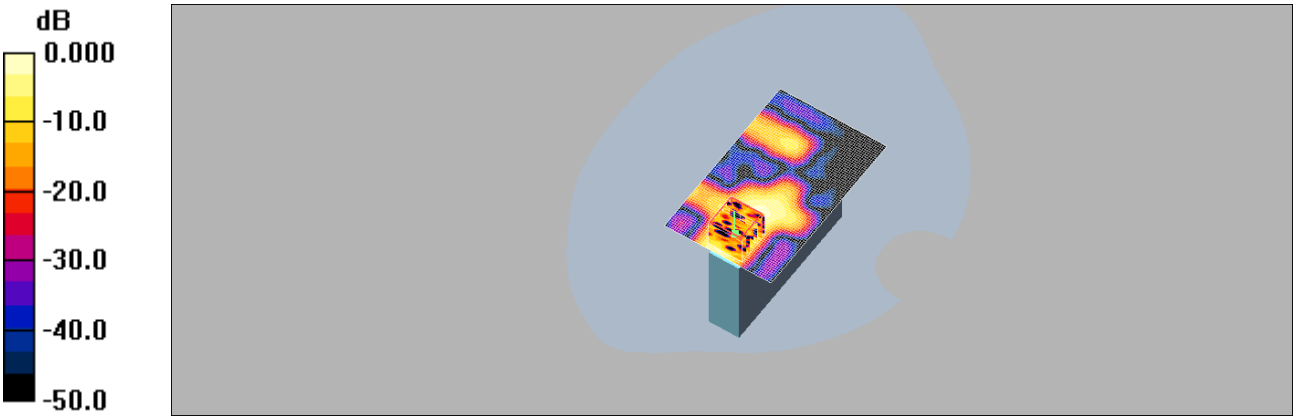
Date: 2012/1/11

WLAN 802.11n(20M)_64_Bottom side

Communication System: WiFi n(20M)_5G_FCC; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5320 MHz; σ = 5.65 mho/m; ε_r = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.108 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.755 V/m; Power Drift = 0.159 dB
Peak SAR (extrapolated) = 0.136 W/kg
SAR(1 g) = 0.028 mW/g; SAR(10 g) = 0.00888 mW/g
Maximum value of SAR (measured) = 0.067 mW/g



0 dB = 0.067mW/g

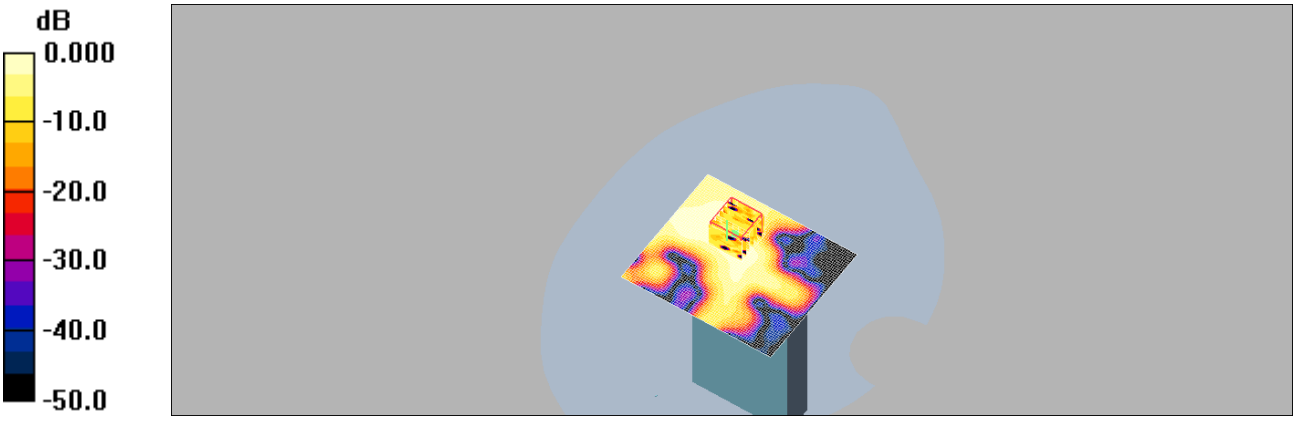
Date: 2012/1/11

WLAN 802.11n(20M)_52_Left side

Communication System: WiFi n(20M)_5G_FCC; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5260 MHz; σ = 5.55 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.031 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.16 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.100 W/kg
SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00636 mW/g
Maximum value of SAR (measured) = 0.028 mW/g



0 dB = 0.028mW/g

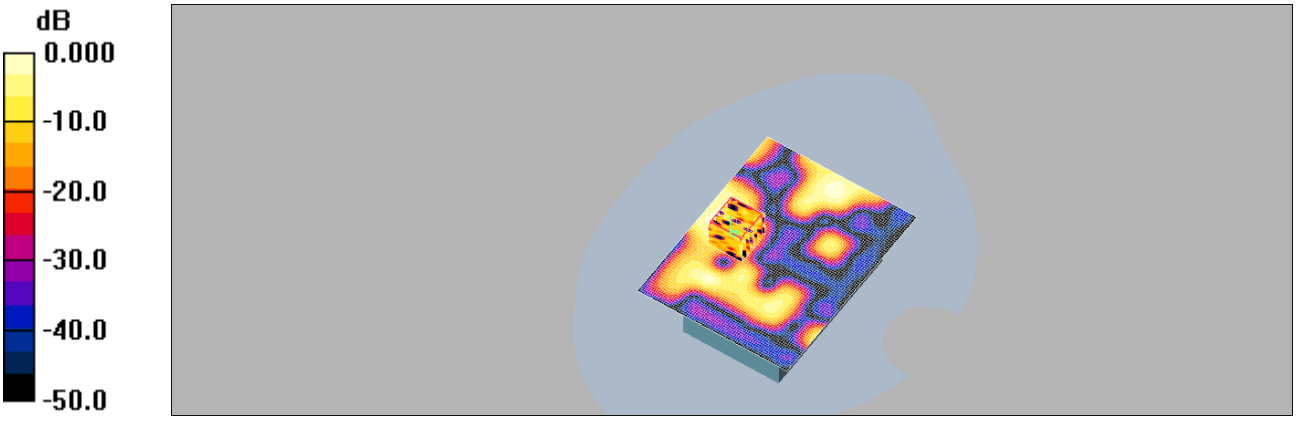
Date: 2012/1/11

WLAN 802.11n(20M)_52_Front side

Communication System: WiFi n(20M)_5G_FCC; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5260 MHz; σ = 5.55 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.063 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.391 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.077 W/kg
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.00571 mW/g
Maximum value of SAR (measured) = 0.046 mW/g



0 dB = 0.046mW/g

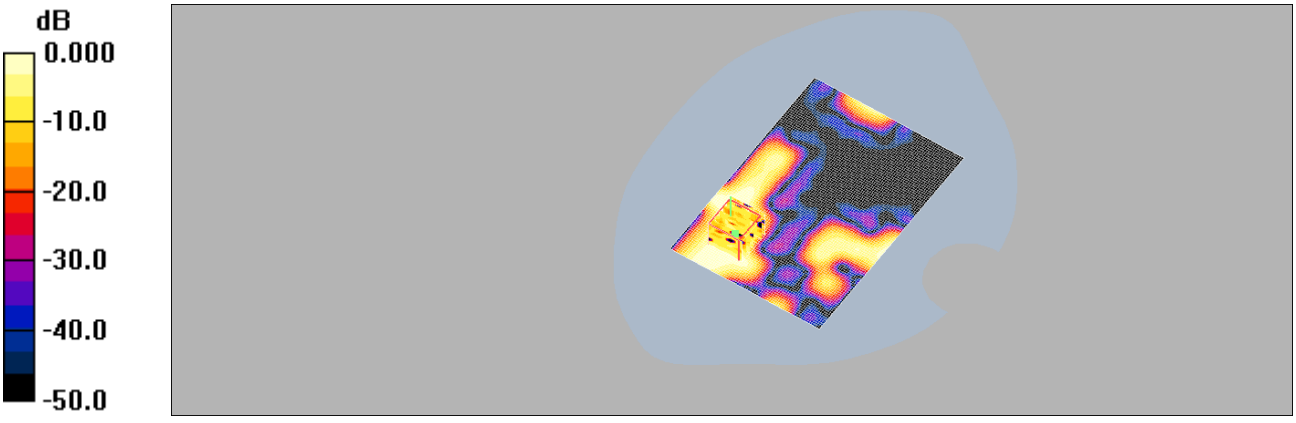
Date: 2012/1/11

WLAN 802.11n(20M)_52_Back side

Communication System: WiFi n(20M)_5G_FCC; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5260 MHz; σ = 5.55 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.036 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.623 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.081 W/kg
SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.00539 mW/g
Maximum value of SAR (measured) = 0.026 mW/g



0 dB = 0.026mW/g

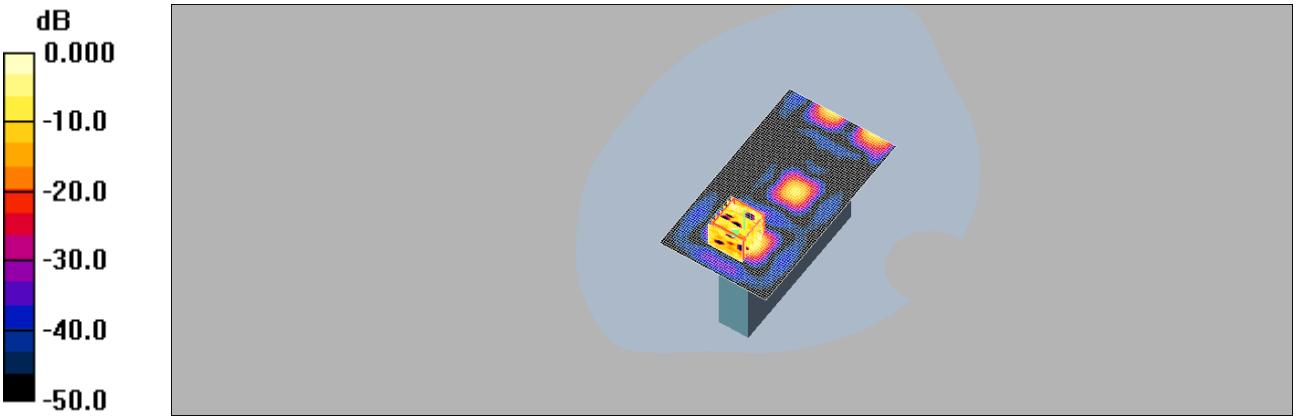
Date: 2012/1/11

WLAN 802.11n(40M)_38_Bottom side

Communication System: WiFi n(40M)_5G_FCC; Frequency: 5190 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5190 MHz; σ = 5.46 mho/m; ε_r = 49.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.017 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.536 V/m; Power Drift = -0.124 dB
Peak SAR (extrapolated) = 0.152 W/kg
SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00313 mW/g
Maximum value of SAR (measured) = 0.025 mW/g



0 dB = 0.025mW/g

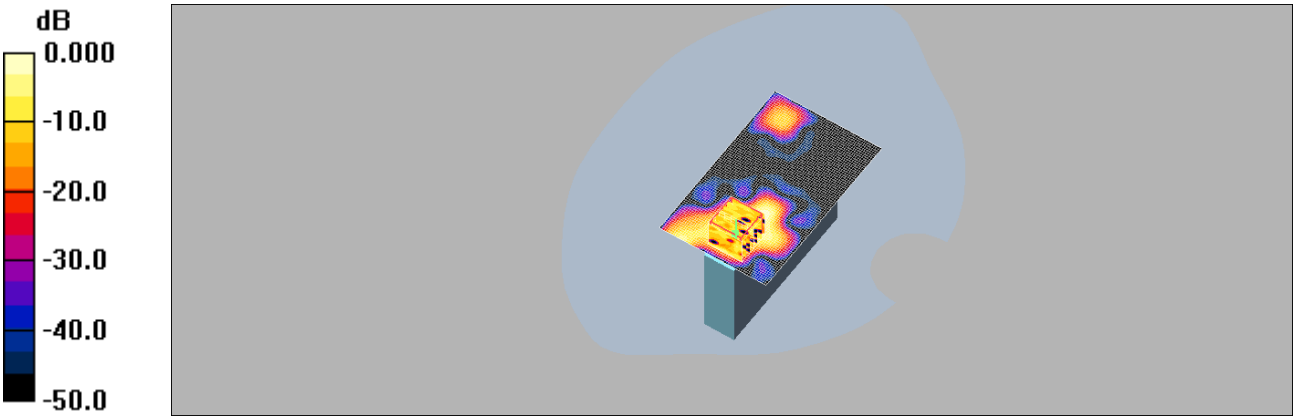
Date: 2012/1/11

WLAN 802.11n(40M)_54_Bottom side

Communication System: WiFi n(40M)_5G_FCC; Frequency: 5270 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5270 MHz; σ = 5.57 mho/m; ε_r = 49; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.070 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.894 V/m; Power Drift = 0.199 dB
Peak SAR (extrapolated) = 0.179 W/kg
SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.0046 mW/g
Maximum value of SAR (measured) = 0.035 mW/g



0 dB = 0.035mW/g

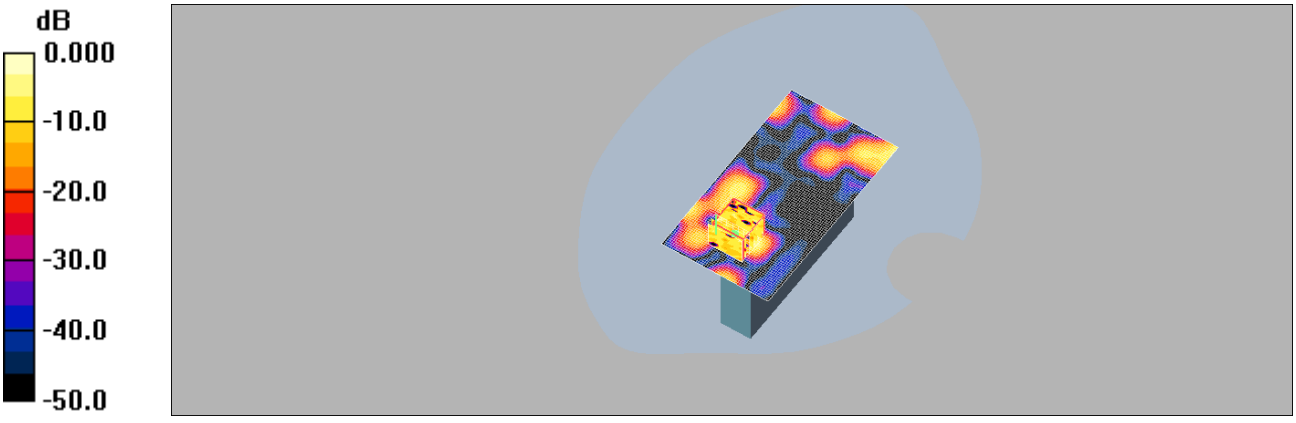
Date: 2012/1/11

WLAN 802.11n(40M)_62_Bottom side

Communication System: WiFi n(40M)_5G_FCC; Frequency: 5310 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5310 MHz; σ = 5.64 mho/m; ε_r = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.019 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.669 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.164 W/kg
SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00163 mW/g
Maximum value of SAR (measured) = 0.030 mW/g



0 dB = 0.030mW/g

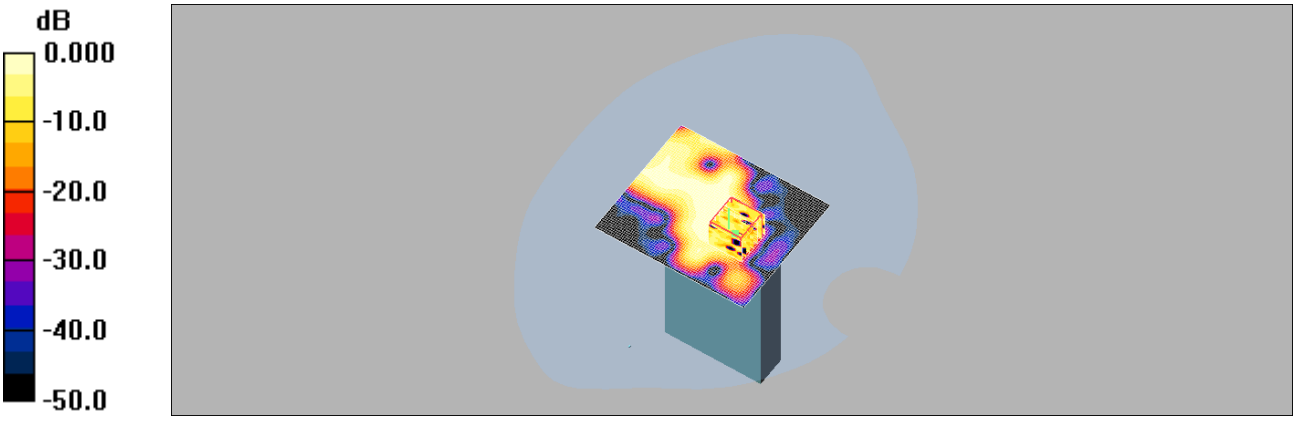
Date: 2012/1/11

WLAN 802.11n(40M)_54_Left side

Communication System: WiFi n(40M)_5G_FCC; Frequency: 5270 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5270 MHz; σ = 5.57 mho/m; ε_r = 49; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.030 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.62 V/m; Power Drift = -0.189 dB
Peak SAR (extrapolated) = 0.052 W/kg
SAR(1 g) = 0.00928 mW/g; SAR(10 g) = 0.00395 mW/g
Maximum value of SAR (measured) = 0.020 mW/g



0 dB = 0.020mW/g

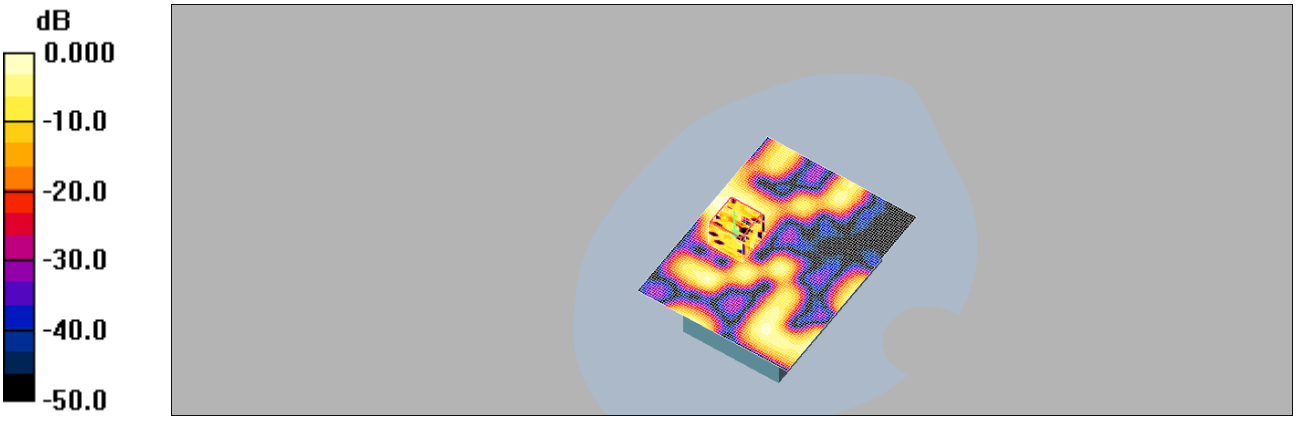
Date: 2012/1/11

WLAN 802.11n(40M)_54_Front side

Communication System: WiFi n(40M)_5G_FCC; Frequency: 5270 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5270 MHz; σ = 5.57 mho/m; ε_r = 49; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.055 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.31 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.075 W/kg
SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.00403 mW/g
Maximum value of SAR (measured) = 0.025 mW/g



0 dB = 0.025mW/g

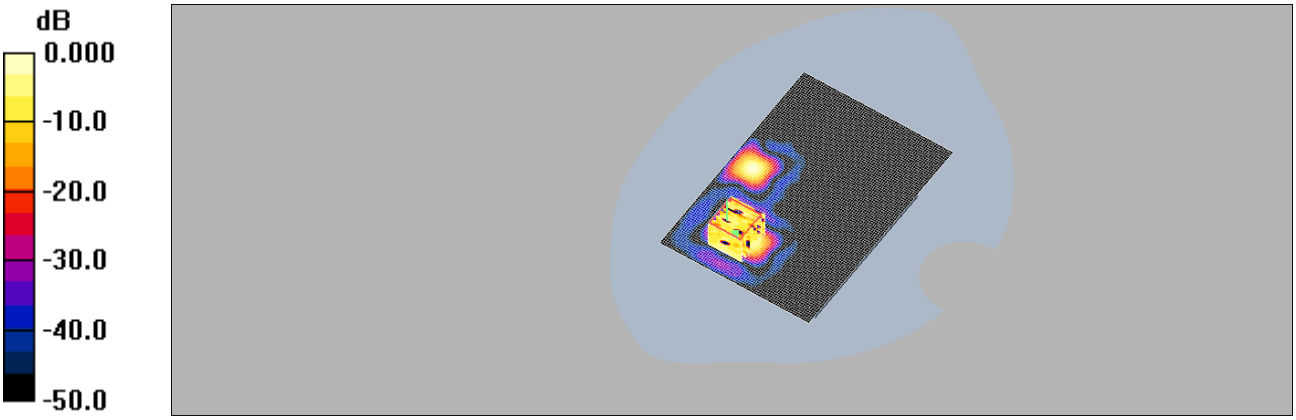
Date: 2012/1/11

WLAN 802.11n(40M)_54_Back side

Communication System: WiFi n(40M)_5G_FCC; Frequency: 5270 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5270 MHz; σ = 5.57 mho/m; ε_r = 49; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.020 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.462 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.043 W/kg
SAR(1 g) = 0.00855 mW/g; SAR(10 g) = 0.00347 mW/g
Maximum value of SAR (measured) = 0.020 mW/g



0 dB = 0.020mW/g

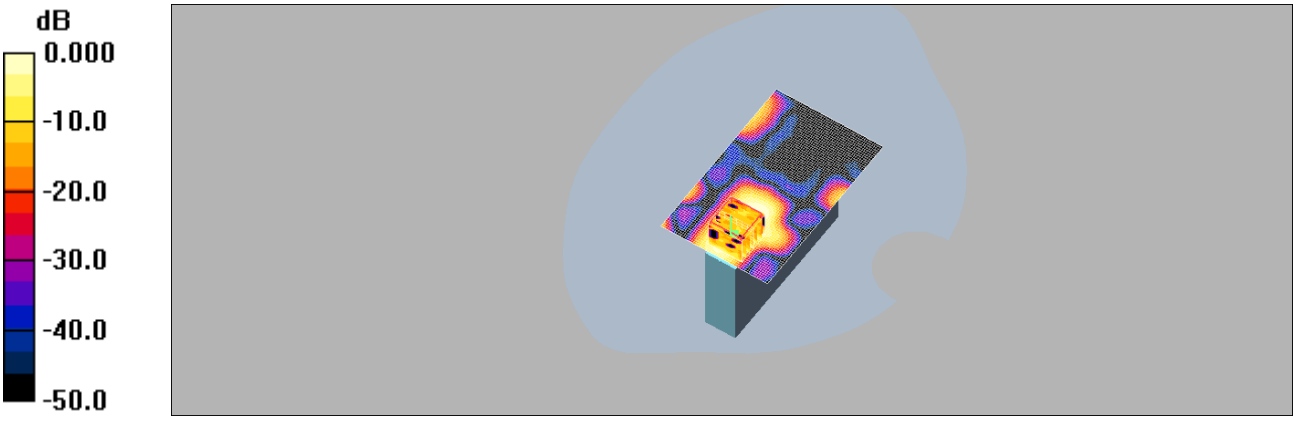
Date: 2012/1/11

WLAN 802.11a_36_Bottom side

Communication System: WiFi a_5G_FCC; Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5180 MHz; σ = 5.44 mho/m; ε_r = 49.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.113 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.404 V/m; Power Drift = 0.144 dB
Peak SAR (extrapolated) = 0.176 W/kg
SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.00978 mW/g
Maximum value of SAR (measured) = 0.064 mW/g



0 dB = 0.064mW/g

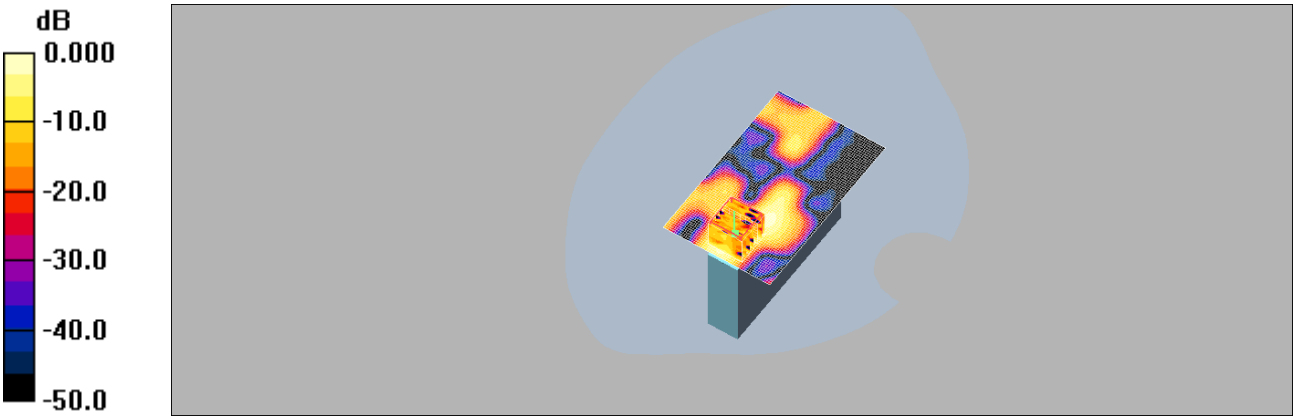
Date: 2012/1/11

WLAN 802.11a_48_Bottom side

Communication System: WiFi a_5G_FCC; Frequency: 5240 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5240 MHz; σ = 5.53 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.144 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.572 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.119 W/kg
SAR(1 g) = 0.038 mW/g; SAR(10 g) = 0.012 mW/g
Maximum value of SAR (measured) = 0.076 mW/g



0 dB = 0.076mW/g

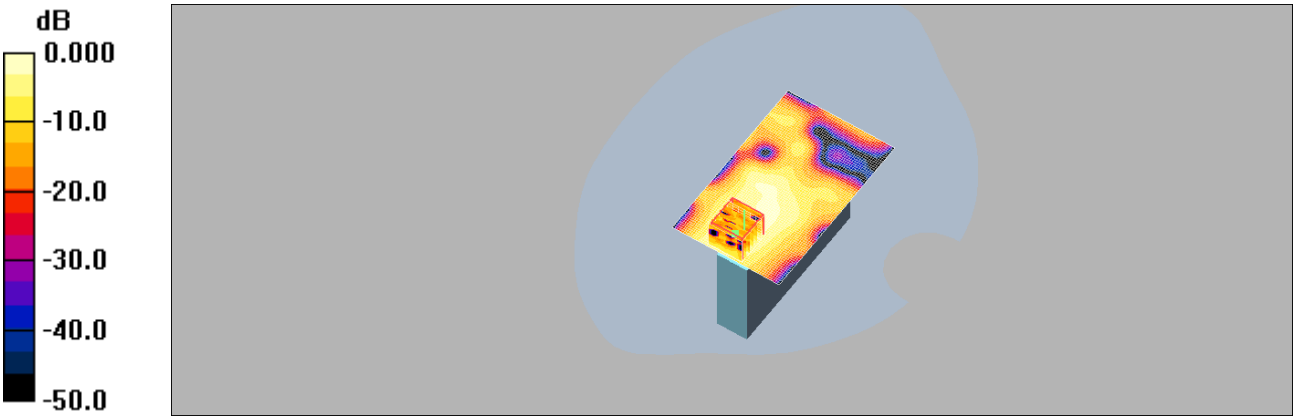
Date: 2012/1/11

WLAN 802.11a_52_Bottom side

Communication System: WiFi a_5G_FCC; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5260 MHz; σ = 5.55 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.060 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.96 V/m; Power Drift = -0.106 dB
Peak SAR (extrapolated) = 0.123 W/kg
SAR(1 g) = 0.038 mW/g; SAR(10 g) = 0.011 mW/g
Maximum value of SAR (measured) = 0.083 mW/g



0 dB = 0.083mW/g

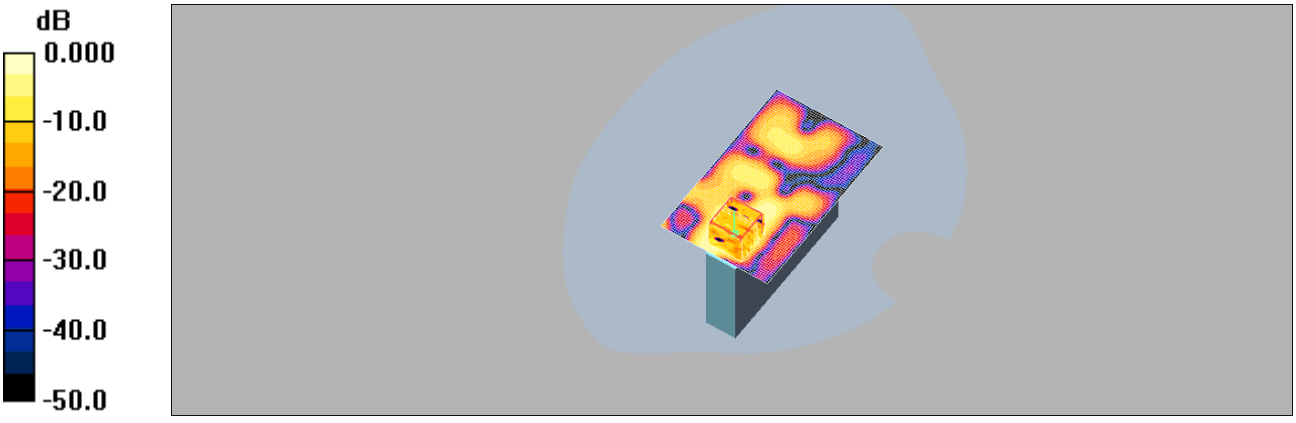
Date: 2012/1/11

WLAN 802.11a_64_Bottom side

Communication System: WiFi a_5G_FCC; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5320 MHz; σ = 5.65 mho/m; ε_r = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.052 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.817 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.218 W/kg
SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.00911 mW/g
Maximum value of SAR (measured) = 0.067 mW/g



0 dB = 0.067mW/g

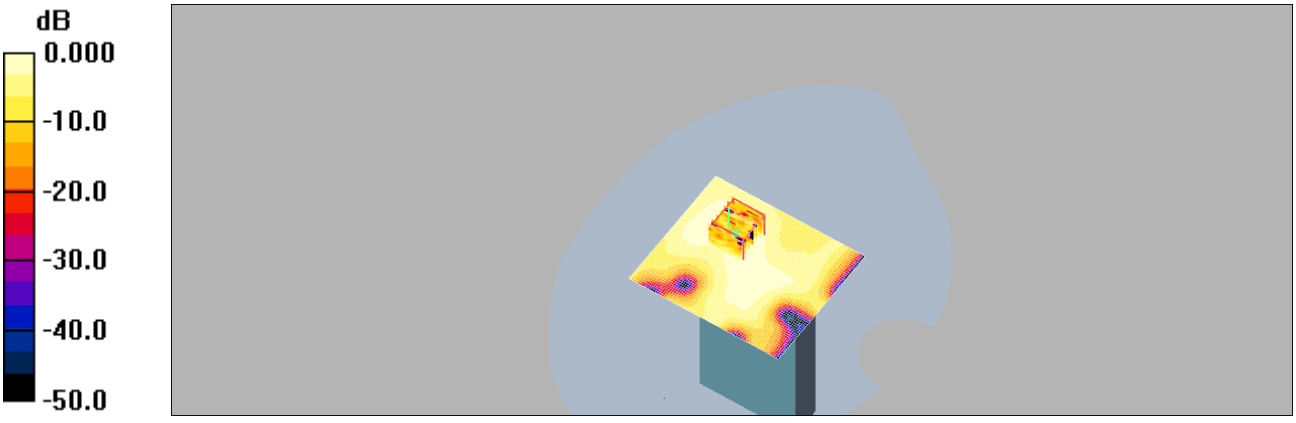
Date: 2012/1/11

WLAN 802.11a_36_Left side

Communication System: WiFi a_5G_FCC; Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5180 MHz; σ = 5.44 mho/m; ε_r = 49.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.041 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.30 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.144 W/kg
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.00837 mW/g
Maximum value of SAR (measured) = 0.044 mW/g



0 dB = 0.044mW/g

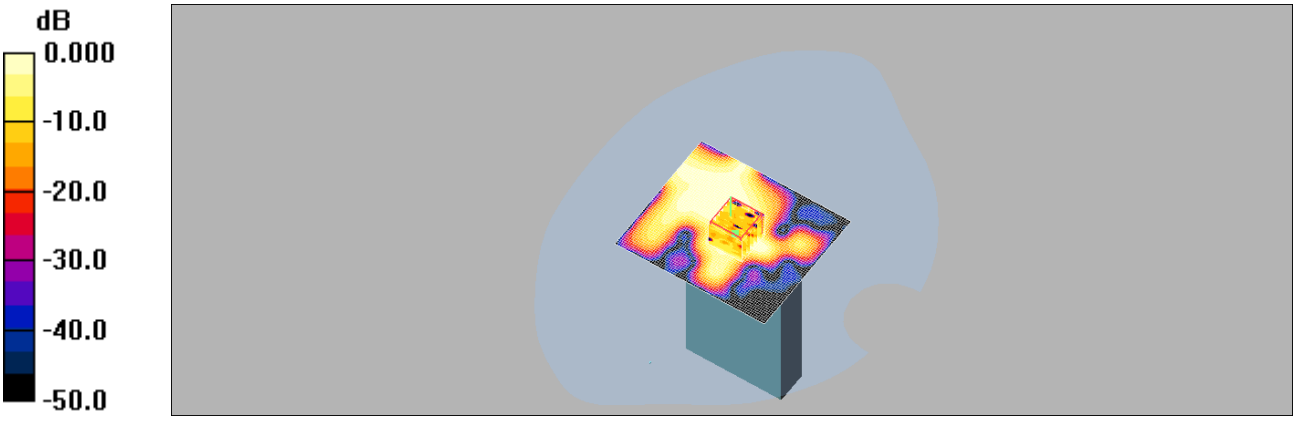
Date: 2012/1/11

WLAN 802.11a_48_Left side

Communication System: WiFi a_5G_FCC; Frequency: 5240 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5240 MHz; σ = 5.53 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.066 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.85 V/m; Power Drift = -0.130 dB
Peak SAR (extrapolated) = 0.089 W/kg
SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.00754 mW/g
Maximum value of SAR (measured) = 0.045 mW/g



0 dB = 0.045mW/g

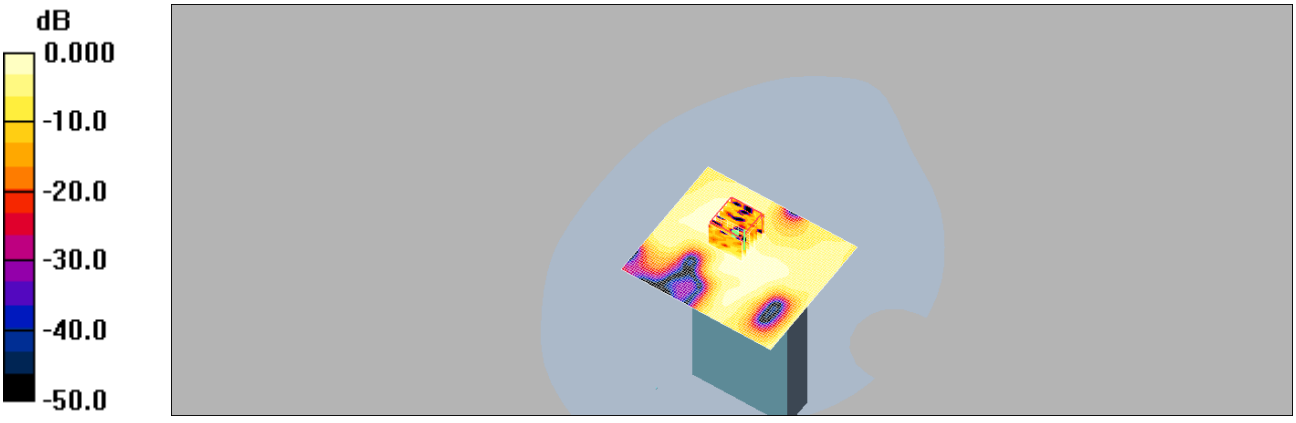
Date: 2012/1/11

WLAN 802.11a_52_Left side

Communication System: WiFi a_5G_FCC; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5260 MHz; σ = 5.55 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.046 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 3.60 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.107 W/kg
SAR(1 g) = 0.023 mW/g; SAR(10 g) = 0.0091 mW/g
Maximum value of SAR (measured) = 0.051 mW/g



0 dB = 0.051mW/g

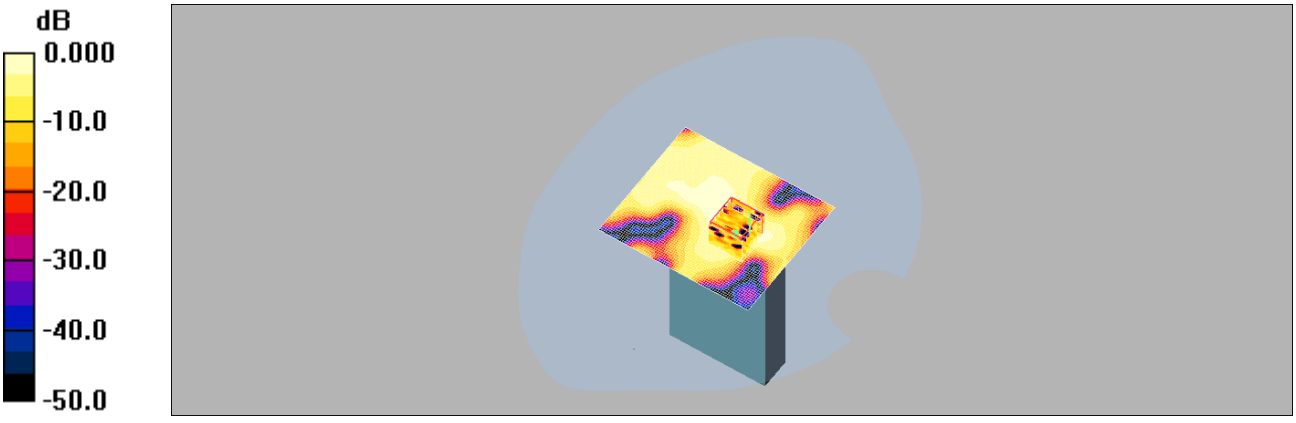
Date: 2012/1/11

WLAN 802.11a_64_Left side

Communication System: WiFi a_5G_FCC; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5320 MHz; σ = 5.65 mho/m; ε_r = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.049 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.96 V/m; Power Drift = -0.168 dB
Peak SAR (extrapolated) = 0.216 W/kg
SAR(1 g) = 0.020 mW/g; SAR(10 g) = 0.00728 mW/g
Maximum value of SAR (measured) = 0.045 mW/g



0 dB = 0.045mW/g

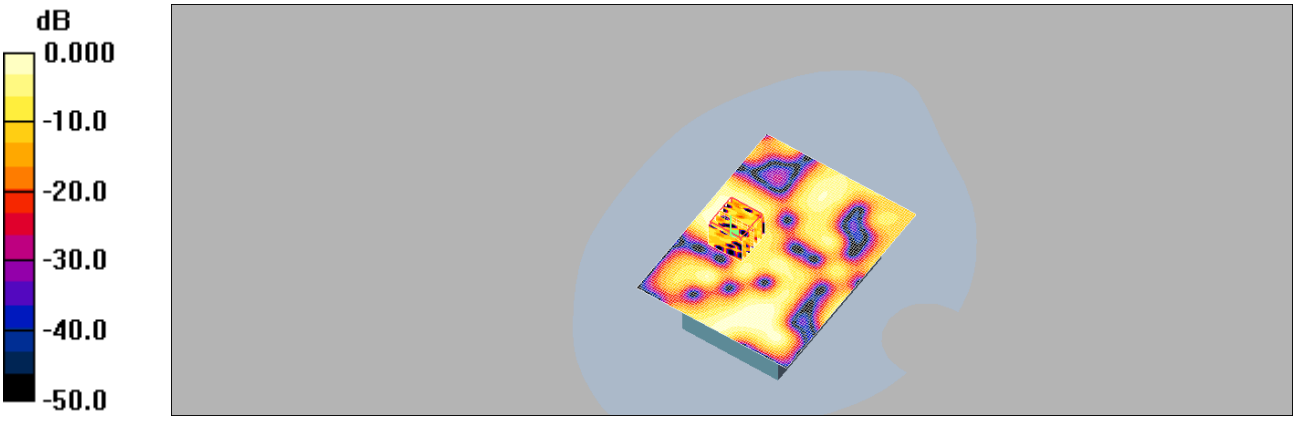
Date: 2012/1/11

WLAN 802.11a_36_Front side

Communication System: WiFi a_5G_FCC; Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5180 MHz; σ = 5.44 mho/m; ε_r = 49.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.047 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.11 V/m; Power Drift = -0.180 dB
Peak SAR (extrapolated) = 0.056 W/kg
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.00493 mW/g
Maximum value of SAR (measured) = 0.035 mW/g



0 dB = 0.035mW/g

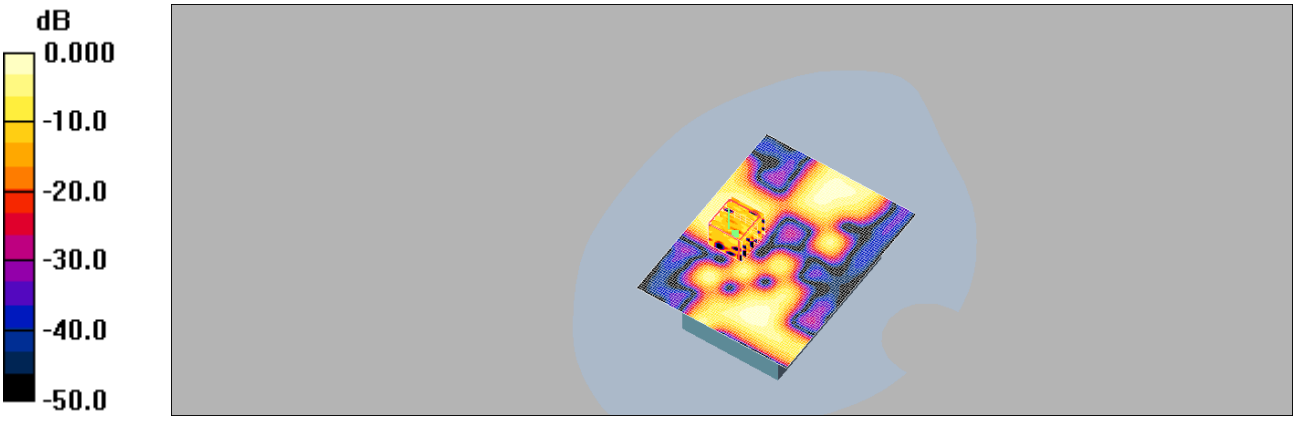
Date: 2012/1/11

WLAN 802.11a_48_Front side

Communication System: WiFi a_5G_FCC; Frequency: 5240 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5240 MHz; σ = 5.53 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.073 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.823 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.245 W/kg
SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00122 mW/g
Maximum value of SAR (measured) = 0.045 mW/g



0 dB = 0.045mW/g

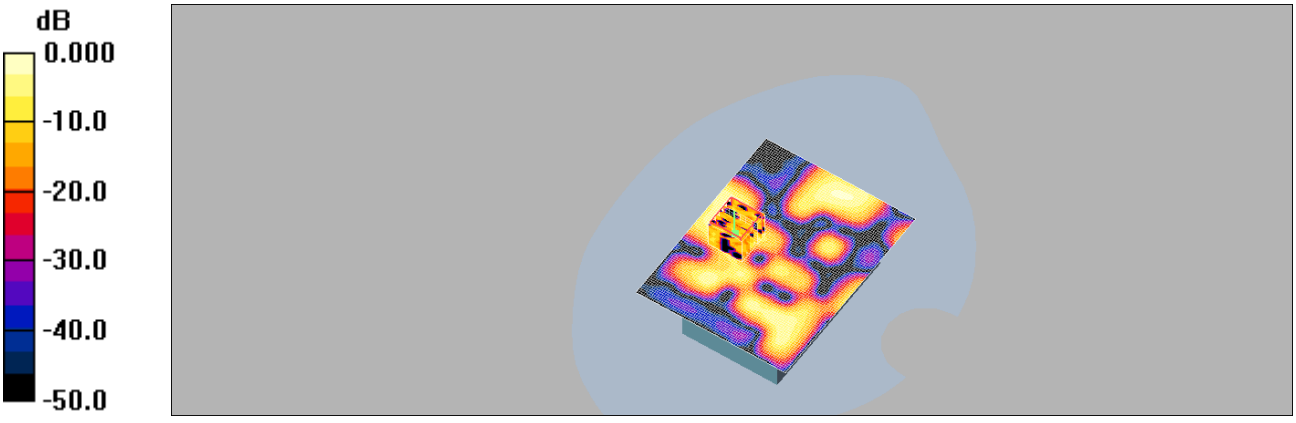
Date: 2012/1/11

WLAN 802.11a_52_Front side

Communication System: WiFi a_5G_FCC; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5260 MHz; σ = 5.55 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.068 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.08 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 0.090 W/kg
SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.00712 mW/g
Maximum value of SAR (measured) = 0.058 mW/g



0 dB = 0.058mW/g

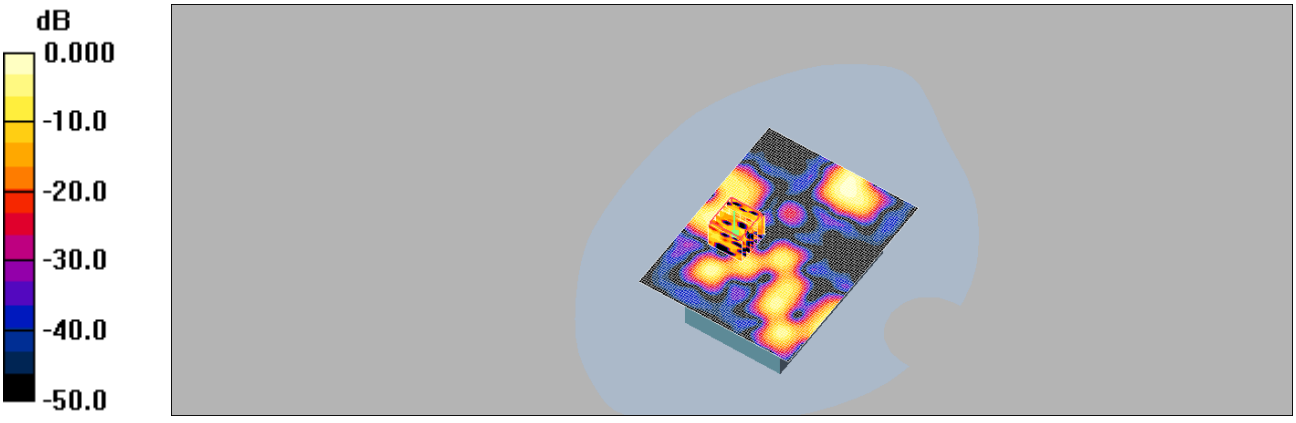
Date: 2012/1/11

WLAN 802.11a_64_Front side

Communication System: WiFi a_5G_FCC; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5320 MHz; σ = 5.65 mho/m; ε_r = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.058 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.740 V/m; Power Drift = -0.1 dB
Peak SAR (extrapolated) = 0.102 W/kg
SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.00664 mW/g
Maximum value of SAR (measured) = 0.053 mW/g



0 dB = 0.053mW/g

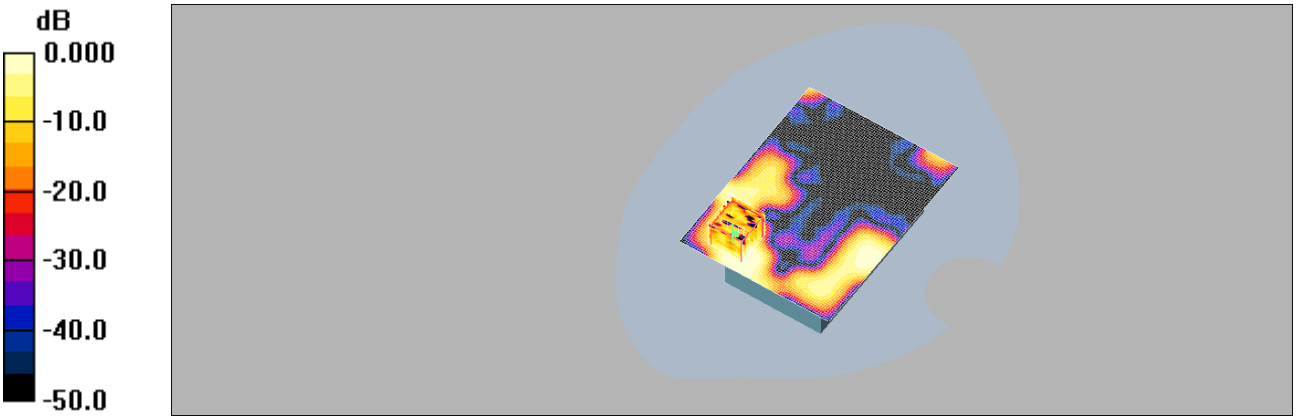
Date: 2012/1/11

WLAN 802.11a_36_Back side

Communication System: WiFi a_5G_FCC; Frequency: 5180 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5180 MHz; σ = 5.44 mho/m; ε_r = 49.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.073 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.329 V/m; Power Drift = 0.140 dB
Peak SAR (extrapolated) = 0.122 W/kg
SAR(1 g) = 0.018 mW/g; SAR(10 g) = 0.00789 mW/g
Maximum value of SAR (measured) = 0.038 mW/g



0 dB = 0.038mW/g

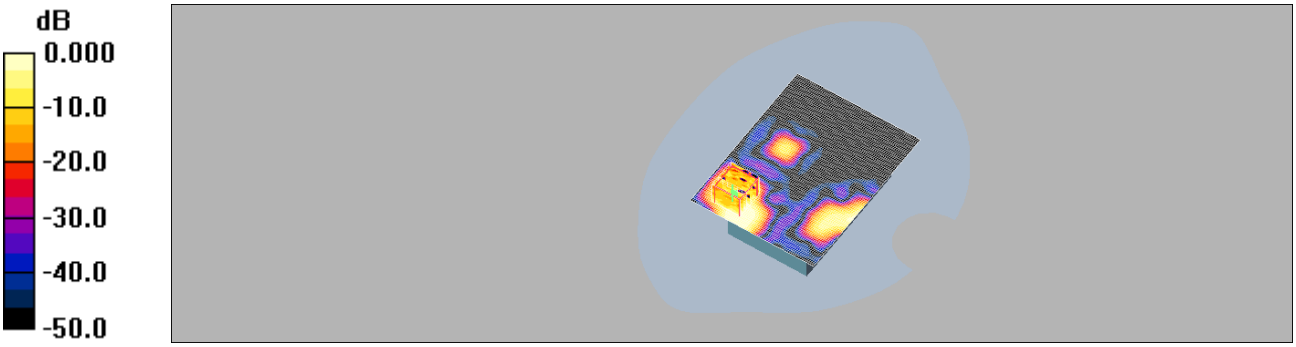
Date: 2012/1/11

WLAN 802.11a_48_Back side

Communication System: WiFi a_5G_FCC; Frequency: 5240 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5240 MHz; σ = 5.53 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.74, 3.74, 3.74); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.131 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.303 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.140 W/kg
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.00852 mW/g
Maximum value of SAR (measured) = 0.044 mW/g



0 dB = 0.044mW/g

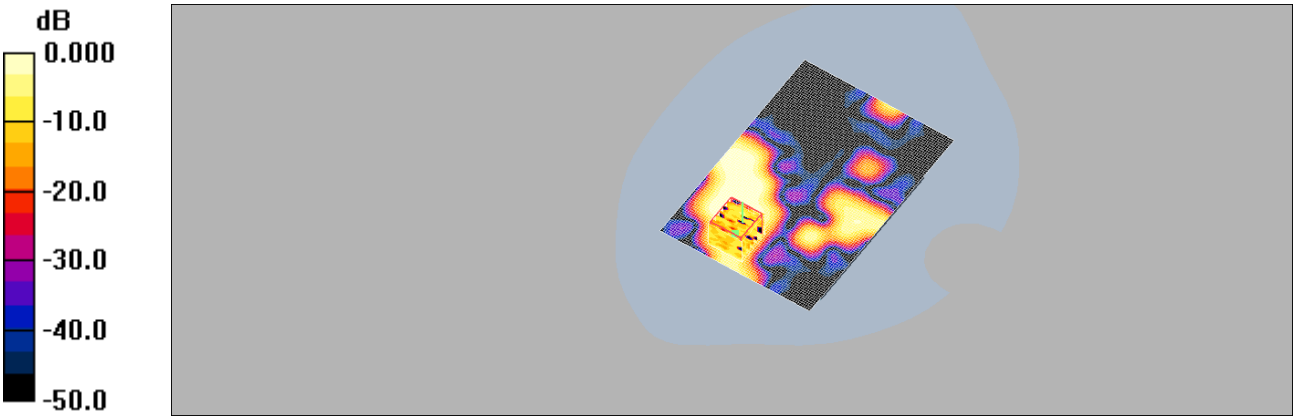
Date: 2012/1/11

WLAN 802.11a_52_Back side

Communication System: WiFi a_5G_FCC; Frequency: 5260 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5260 MHz; σ = 5.55 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.072 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.374 V/m; Power Drift = -0.139 dB
Peak SAR (extrapolated) = 0.109 W/kg
SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00517 mW/g
Maximum value of SAR (measured) = 0.033 mW/g



0 dB = 0.033mW/g

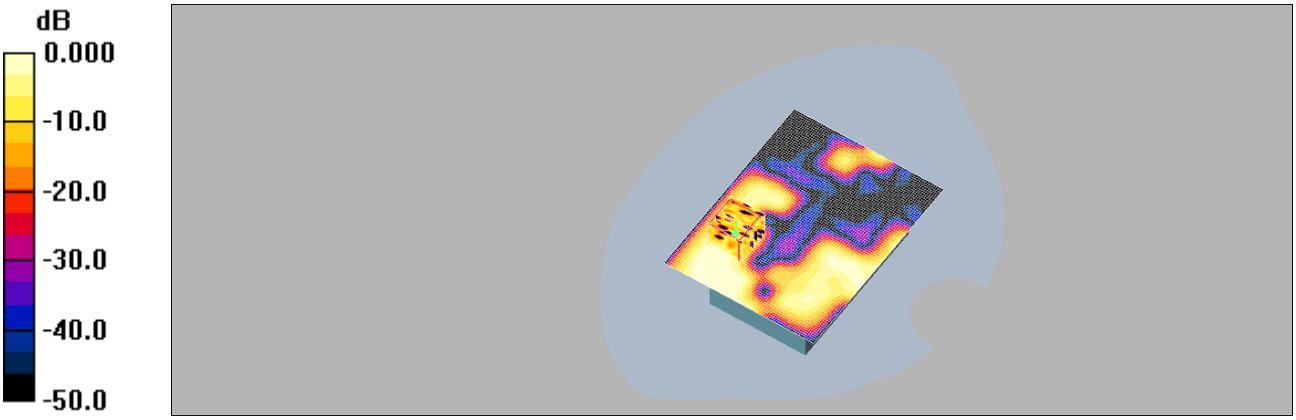
Date: 2012/1/11

WLAN 802.11a_64_Back side

Communication System: WiFi a_5G_FCC; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5320 MHz; σ = 5.65 mho/m; ε_r = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (71x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.069 mW/g
Body/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 0.554 V/m; Power Drift = -0.148 dB
Peak SAR (extrapolated) = 0.169 W/kg
SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.00573 mW/g
Maximum value of SAR (measured) = 0.030 mW/g



0 dB = 0.030mW/g

5. SAR System Performance Verification

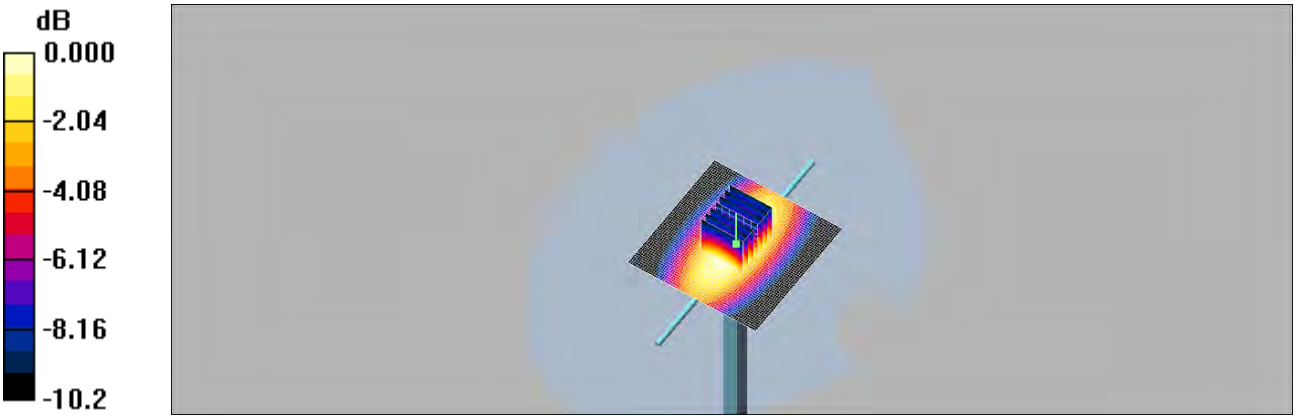
Date: 2012/1/9

DUT: Dipole 835 MHz;

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: Muscle 900 MHz Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(8.45, 8.45, 8.45); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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 (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.59 mW/g
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.0 V/m; Power Drift = 0.006 dB
Peak SAR (extrapolated) = 3.64 W/kg
SAR(1 g) = 2.41 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 2.60 mW/g



0 dB = 2.60mW/g

Date: 2012/1/9

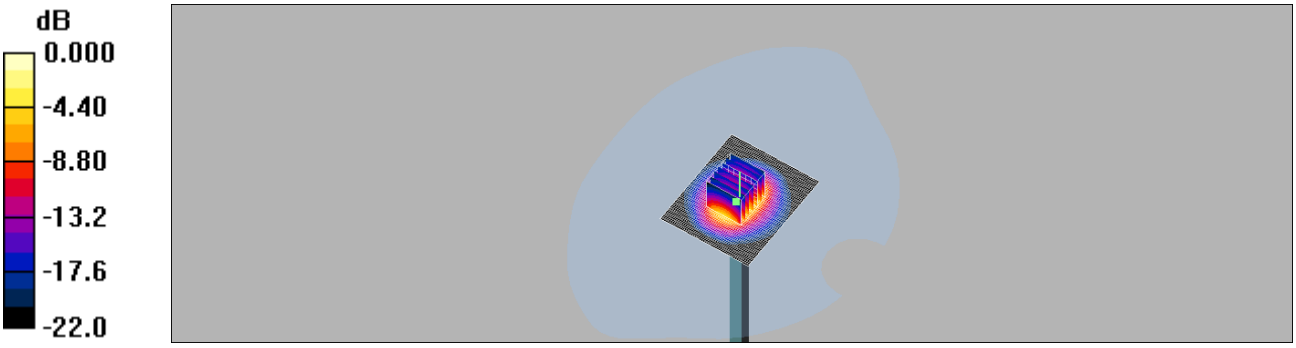
DUT: Dipole 2450 MHz;

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: Muscle 2450 Medium parameters used: f = 2450 MHz; σ = 1.97 mho/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(6.18, 6.18, 6.18); Calibrated: 2011/6/21
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- 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) = 15.1 mW/g
Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 82.0 V/m; Power Drift = 0.006 dB
Peak SAR (extrapolated) = 23.7 W/kg
SAR(1 g) = 11.6 mW/g; SAR(10 g) = 5.35 mW/g
Maximum value of SAR (measured) = 13.2 mW/g



0 dB = 13.2mW/g

Date: 2012/1/11

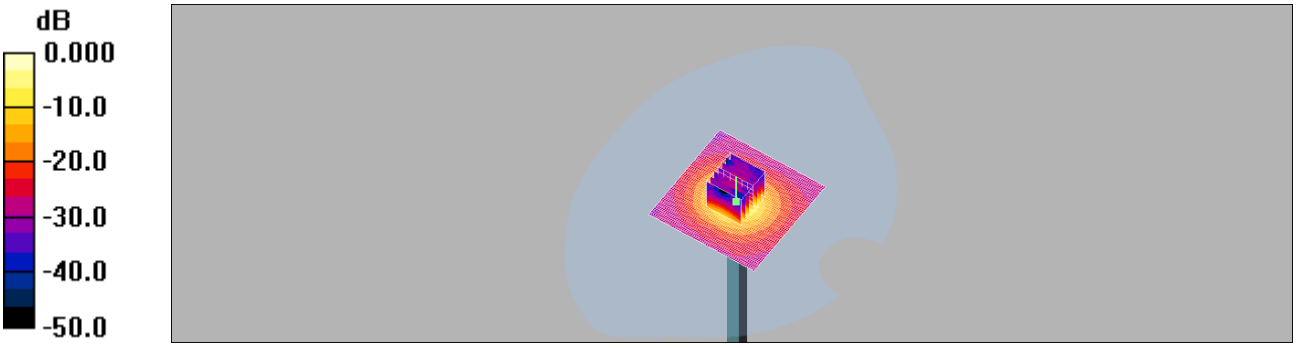
DUT: Dipole 5200 MHz;

Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: Muscle5800 Medium parameters used: f = 5200 MHz; σ = 5.48 mho/m; ε_r = 49.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3578; ConvF(3.49, 3.49, 3.49); Calibrated: 2011/6/21
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn547; Calibrated: 2011/8/29
- Phantom: SAM1; Type: SAM 4.0; Serial: TP:1419
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Pin=100mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 16.5 mW/g
Pin=100mW/ Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 43.9 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 32.7 W/kg
SAR(1 g) = 7.9 mW/g; SAR(10 g) = 2.26 mW/g
Maximum value of SAR (measured) = 16.9 mW/g



0 dB = 16.9mW/g

6. DAE & Probe Calibration certificate

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

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Accreditation No.: SCS 108

Client SGS-TW

Certificate No: DAE4-547_Aug11

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 547
Calibration procedure(s)	QA CAL-06.v23 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	August 29, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: August 29, 2011

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Accreditation No.: SCS 108

Client: Auden

Certificate No: EX3-3578_Jun11

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3578

Calibration procedure(s): QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: June 21, 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: June 21, 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 EX3DV4

SN:3578

Manufactured: November 4, 2005
Calibrated: June 21, 2011

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

EX3DV4– SN:3578 June 21, 2011

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)^2)^A	0.53	0.50	0.56	± 10.1 %
DCP (mV)^B	101.0	99.8	100.5	

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	117.4	±1.7 %
			Y	0.00	0.00	1.00	116.2	
			Z	0.00	0.00	1.00	123.2	

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

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

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

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	8.66	8.66	8.66	0.80	0.71	± 12.0 %
835	41.5	0.90	8.33	8.33	8.33	0.80	0.69	± 12.0 %
900	41.5	0.97	8.21	8.21	8.21	0.80	0.69	± 12.0 %
1750	40.1	1.37	7.62	7.62	7.62	0.80	0.70	± 12.0 %
1900	40.0	1.40	7.26	7.26	7.26	0.80	0.69	± 12.0 %
2000	40.0	1.40	7.21	7.21	7.21	0.80	0.68	± 12.0 %
2450	39.2	1.80	6.42	6.42	6.42	0.80	0.68	± 12.0 %
5200	36.0	4.66	4.26	4.26	4.26	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.06	4.06	4.06	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.12	4.12	4.12	0.45	1.80	± 13.1 %
5600	35.5	5.07	3.94	3.94	3.94	0.40	1.80	± 13.1 %
5800	35.3	5.27	3.84	3.84	3.84	0.50	1.80	± 13.1 %

[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.

EX3DV4– SN:3578 June 21, 2011

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

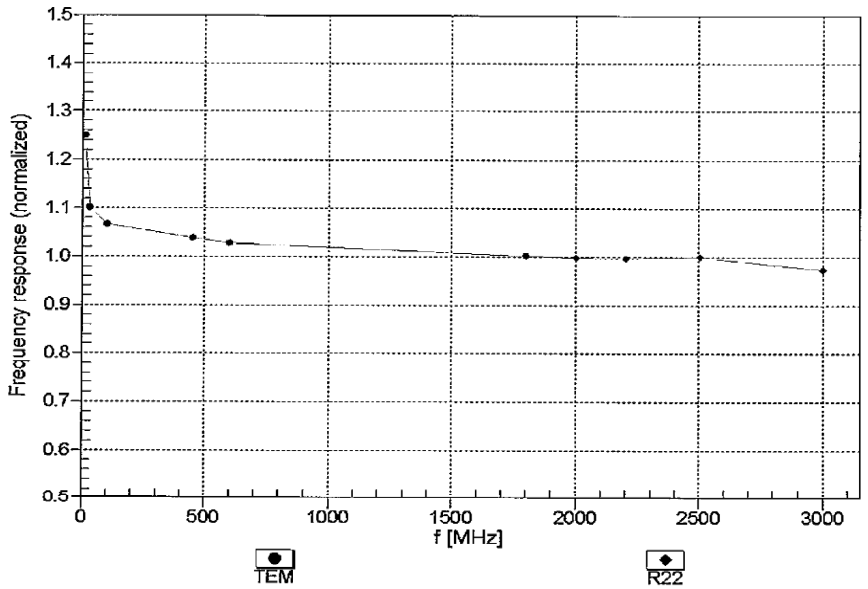
Calibration Parameter Determined in Body Tissue Simulating Media

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	8.77	8.77	8.77	0.80	0.75	± 12.0 %
835	55.2	0.97	8.45	8.45	8.45	0.80	0.75	± 12.0 %
900	55.0	1.05	8.34	8.34	8.34	0.80	0.72	± 12.0 %
1750	53.4	1.49	7.19	7.19	7.19	0.80	0.75	± 12.0 %
1900	53.3	1.52	6.68	6.68	6.68	0.80	0.73	± 12.0 %
2000	53.3	1.52	6.68	6.68	6.68	0.80	0.73	± 12.0 %
2450	52.7	1.95	6.18	6.18	6.18	0.80	0.50	± 12.0 %
5200	49.0	5.30	3.74	3.74	3.74	0.55	1.90	± 13.1 %
5300	48.9	5.42	3.49	3.49	3.49	0.55	1.90	± 13.1 %
5500	48.6	5.65	3.40	3.40	3.40	0.60	1.90	± 13.1 %
5600	48.5	5.77	3.11	3.11	3.11	0.65	1.90	± 13.1 %
5800	48.2	6.00	3.23	3.23	3.23	0.65	1.90	± 13.1 %

[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.

EX3DV4– SN:3578 June 21, 2011

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

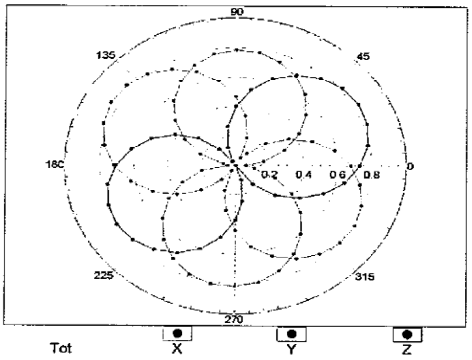


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

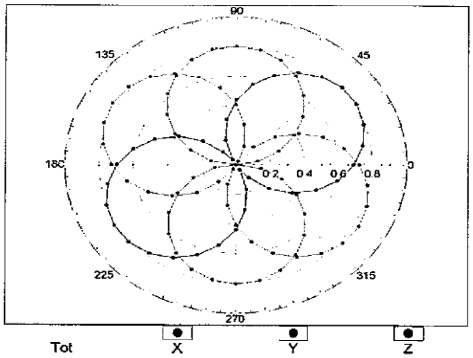
EX3DV4– SN:3578 June 21, 2011

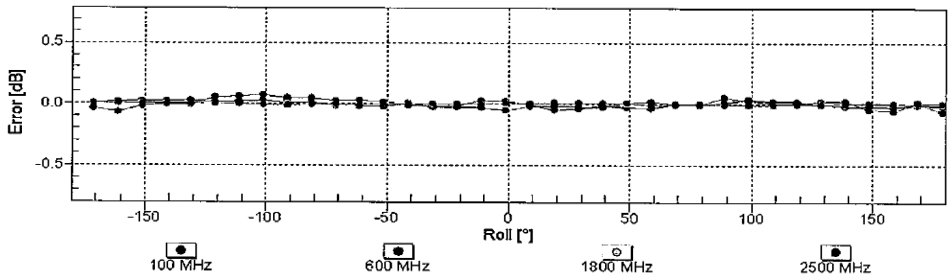
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

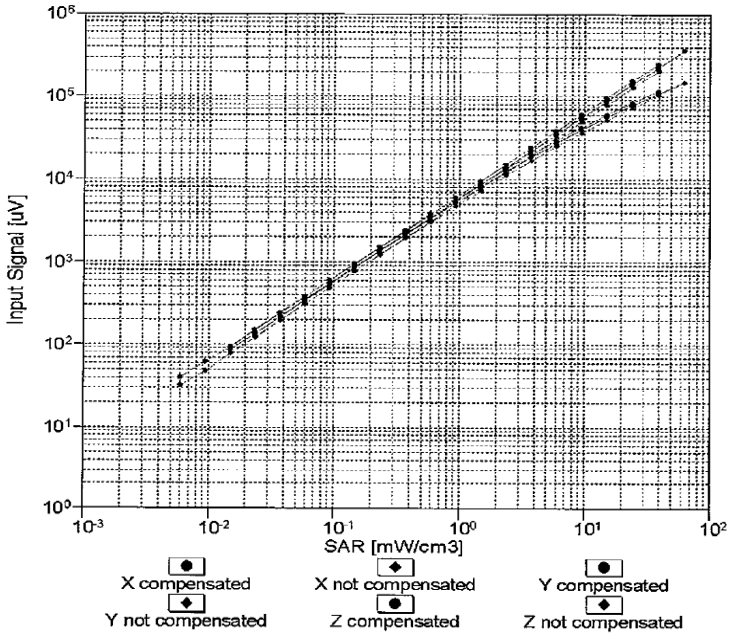


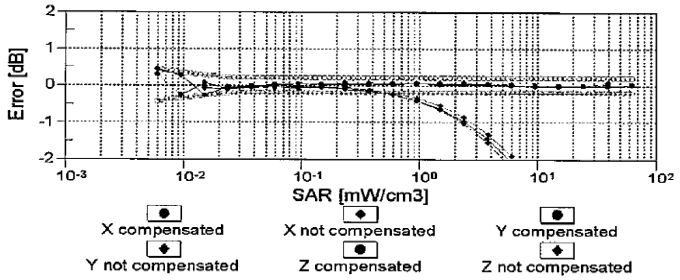


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4– SN:3578 June 21, 2011

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



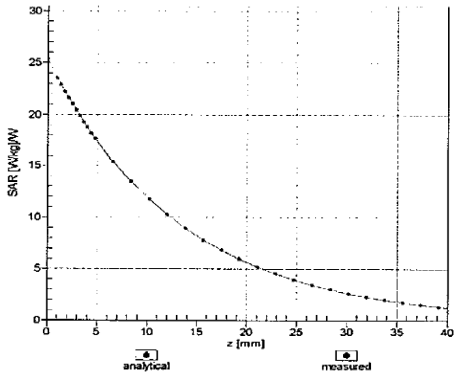


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

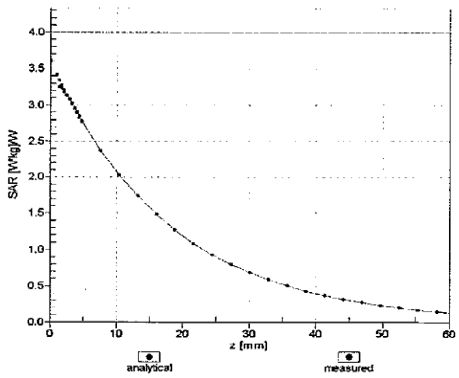
EX3DV4– SN:3578 June 21, 2011

Conversion Factor Assessment

f = 1750 MHz,WGLS R22 (H_convF)

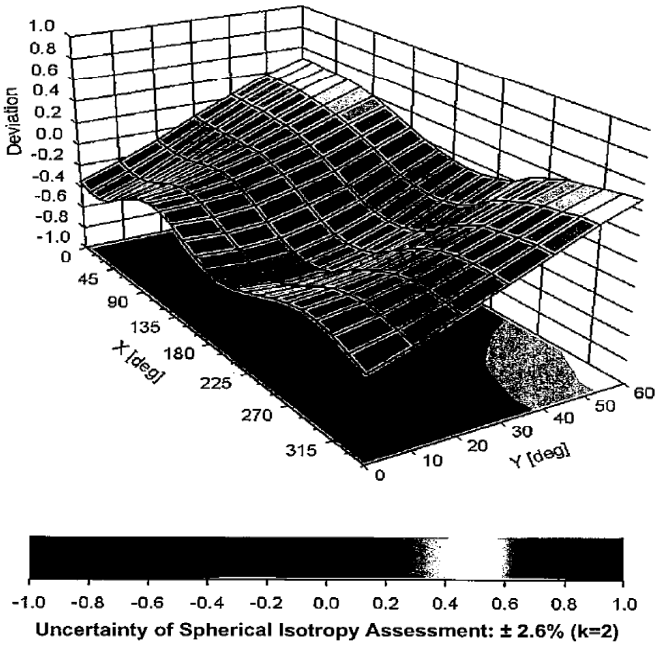


f = 900 MHz,WGLS R9 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

EX3DV4– SN:3578 June 21, 2011

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

Other Probe Parameters

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

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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 (Frequency below 2GHz)	6.0%	N	1	1	1	6.0%	6.0%	∞
Isotropy , Axial	4.7%	R	√3	1	1	2.7%	2.7%	∞
Isotropy, Hemispherical	9.6%	R	√3	1	1	5.5%	5.5%	∞
Boundary Effect	1.0%	R	√3	1	1	0.6%	0.6%	∞
Linearity	4.7%	R	√3	1	1	2.7%	2.7%	∞
Detection Limits	1.0%	R	√3	1	1	0.6%	0.6%	∞
Readout Electronics	0.3%	N	1	1	1	0.3%	0.3%	∞
Response time	0.8%	R	√3	1	1	0.5%	0.5%	∞
Integration Time	2.6%	R	√3	1	1	1.5%	1.5%	∞
Measurement drift (class A evaluation)	1.8%	R	√3	1	1	1.0%	1.0%	∞
RF ambient condition - noise	3.0%	R	√3	1	1	1.7%	1.7%	∞
RF ambient conditions -reflections	3.0%	R	√3	1	1	1.7%	1.7%	∞
Probe positioner Mechanical restrictions	0.4%	R	√3	1	1	0.2%	0.2%	∞
Probe Positioning with respect to phantom	2.9%	R	√3	1	1	1.7%	1.7%	∞
Post-processing	1.0%	R	√3	1	1	0.6%	0.6%	∞
Max SAR Eval	1.0%	R	√3	1	1	0.6%	0.6%	∞
Test Sample related								
Test sample	2.9%	N	1	1	1	2.9%	2.9%	M-1
Device Holder Uncertainty	3.6%	N	1	1	1	3.6%	3.6%	M-1
Drift of output power	5.0%	R	√3	1	1	2.9%	2.9%	∞
Phantom and Setup								
Phantom Uncertainty	4.0%	R	√3	1	1	2.3%	2.3%	∞
Liquid conductivity(meas.) Max at 1900 band	4.6%	N	1	0.64	0.43	2.9%	2.0%	M
Liquid permitivity(meas.) Max at 835 band	2.2%	N	1	0.6	0.49	1.3%	1.1%	M
Combined standard uncertainty		RSS				11.9%	11.6%	
Expant uncertainty (95% confidence interval), K=2						23.7%	23.3%	

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

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Doc No 581 – QD 000 P40 C – F Page 1 (1)

9. System Validation from Original equipment supplier

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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: D835V2-4d063_May11

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, 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 EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

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

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 25, 2011

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Certificate No: D835V2-4d063_May11 Page 1 of 8

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Swiss Calibration Service

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.4 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.31 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.34 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.13 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.9 ± 6 %	1.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.43 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.45 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.27 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.4 Ω - 1.5 jΩ
Return Loss	- 28.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7 Ω - 4.1 jΩ
Return Loss	- 27.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.426 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 27, 2006

DASY5 Validation Report for Head TSL

Date: 25.05.2011

Test Laboratory: SPEAG, Zurich, Switzerland

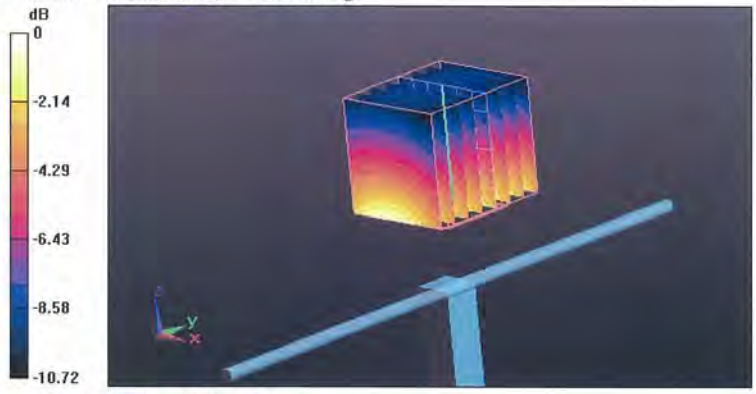
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d063

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; σ = 0.88 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

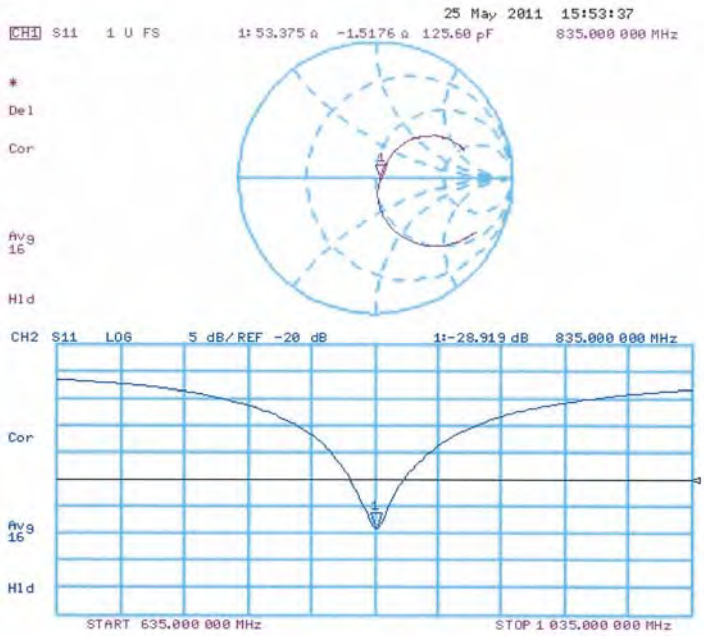
- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.554 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.427 W/kg
SAR(1 g) = 2.31 mW/g; SAR(10 g) = 1.52 mW/g
Maximum value of SAR (measured) = 2.669 mW/g



0 dB = 2.670mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.05.2011

Test Laboratory: SPEAG, Zurich, Switzerland

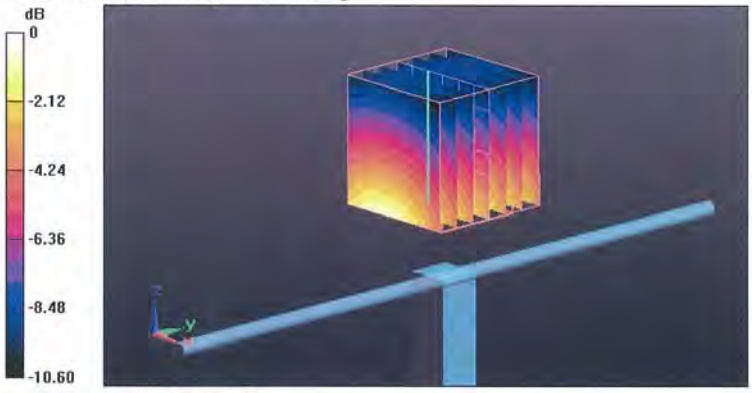
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d063

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 53.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

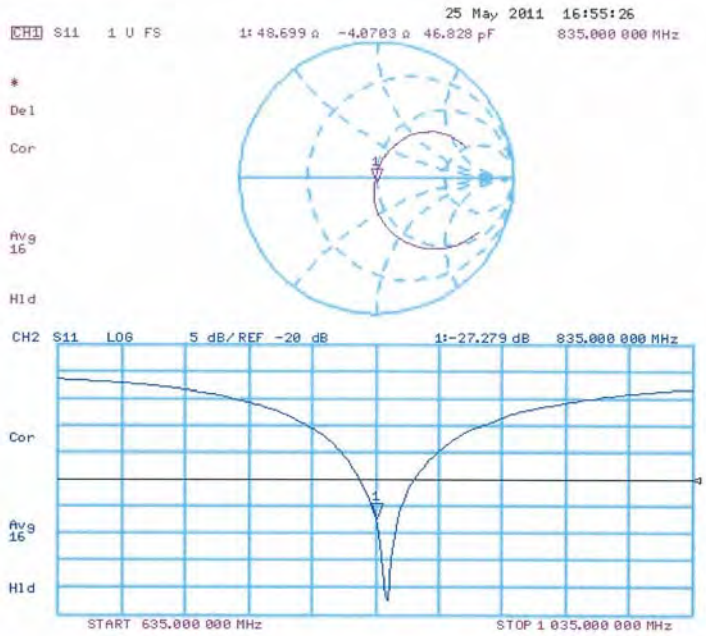
- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.297 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 3.530 W/kg
SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.6 mW/g
Maximum value of SAR (measured) = 2.804 mW/g



0 dB = 2.800mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client SGS TW (Auden)

Certificate No: D2450V2- 727_Apr11

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 727
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits
Calibration date:	April 19, 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 EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

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

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 19, 2011

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Certificate No: D2450V2-727_Apr11 Page 1 of 9

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.7 ± 6 %	1.72 mho/m ± 6 %
Head TSL temperature during test	(21.0 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.7 mW / g
SAR normalized	normalized to 1W	54.8 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**55.8 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.39 mW / g
SAR normalized	normalized to 1W	25.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.7 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.6 ± 6 %	1.91 mho/m ± 6 %
Body TSL temperature during test	(21.5 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.7 mW / g
SAR normalized	normalized to 1W	50.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**50.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.84 mW / g
SAR normalized	normalized to 1W	23.4 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**23.3 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.3 Ω + 2.0 jΩ
Return Loss	- 26.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.9 Ω + 3.7 jΩ
Return Loss	- 28.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.149 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 9, 2003

DASY5 Validation Report for Head TSL

Date/Time: 18.04.2011 16:55:19

Test Laboratory: SPEAG, Zurich, Switzerland

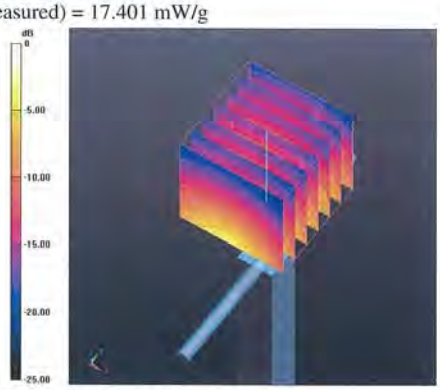
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:727

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 2450 MHz; σ = 1.74 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

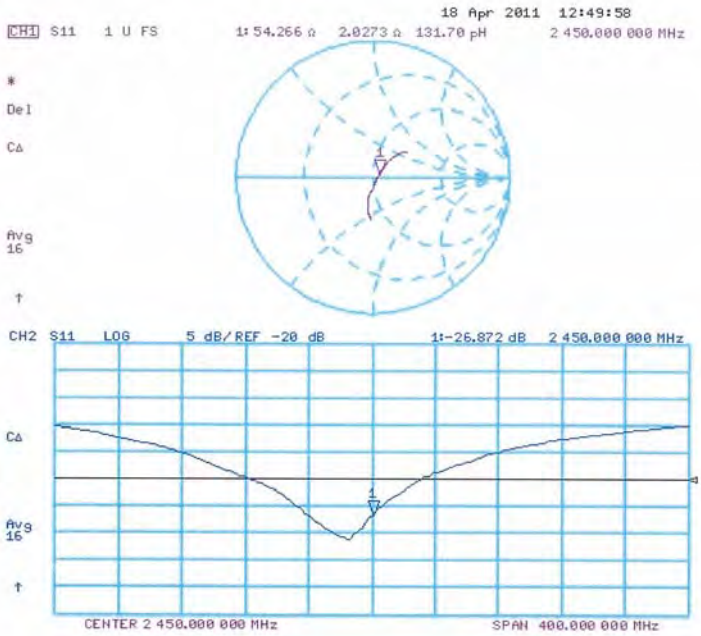
- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2829)

Pin=250 mW, Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.6 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 27.919 W/kg
SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.39 mW/g
Maximum value of SAR (measured) = 17.401 mW/g



0 dB = 17.400mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date/Time: 19.04.2011 14:37:11

Test Laboratory: SPEAG, Zurich, Switzerland

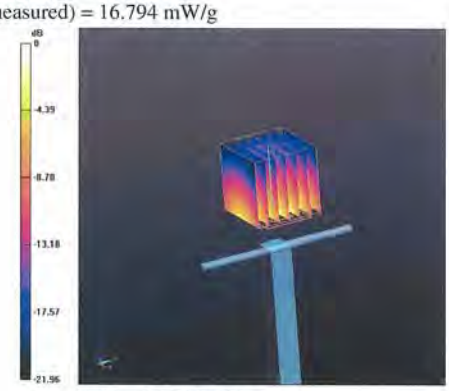
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:727

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: MSL U12 BB
Medium parameters used: f = 2450 MHz; σ = 1.91 mho/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

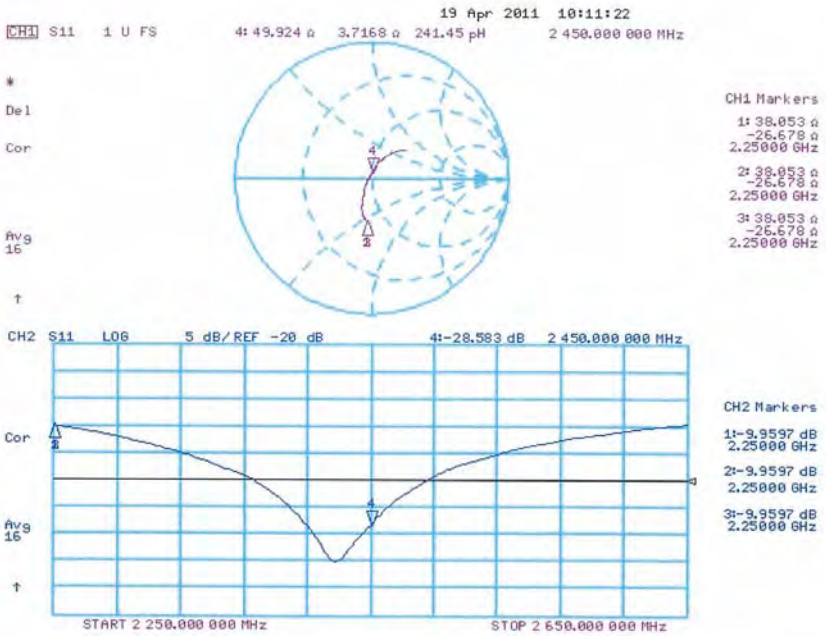
- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2829)

Pin=250 mW, Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.949 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 26.888 W/kg
SAR(1 g) = 12.7 mW/g; SAR(10 g) = 5.84 mW/g
Maximum value of SAR (measured) = 16.794 mW/g



0 dB = 16.790mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: D5GHzV2-1104_Apr11

CALIBRATION CERTIFICATE

Object	D5GHzV2 - SN: 1104
Calibration procedure(s)	QA CAL-22.v1 Calibration procedure for dipole validation kits between 3-6 GHz
Calibration date:	April 11, 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 EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe EX3DV4	SN: 3503	04-Mar-11 (No. EX3-3503_Mar11)	Mar-12
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

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

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

Issued: April 12, 2011

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010

b) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

c) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan resolution	dx, dy = 10 mm	
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	
Frequency	5200 MHz ± 1 MHz 5500 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.4 ± 6 %	5.28 mho/m ± 6 %
Body TSL temperature during test	(21.3 ± 0.2) °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	condition	
SAR measured	100 mW input power	7.66 mW / g
SAR normalized	normalized to 1W	76.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**76.4 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.13 mW / g
SAR normalized	normalized to 1W	21.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 mW / g ± 19.5 % (k=2)**

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.9 ± 6 %	5.68 mho/m ± 6 %
Body TSL temperature during test	(21.3 ± 0.2) °C	----	----

SAR averaged over 1 cm^3 (1 g) of Body TSL	condition	
SAR measured	100 mW input power	8.12 mW / g
SAR normalized	normalized to 1W	81.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**80.9 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.24 mW / g
SAR normalized	normalized to 1W	22.4 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.3 mW / g ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.4 ± 6 %	6.08 mho/m ± 6 %
Body TSL temperature during test	(21.3 ± 0.2) °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	condition	
SAR measured	100 mW input power	7.45 mW / g
SAR normalized	normalized to 1W	74.5 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**74.3 mW / g ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.05 mW / g
SAR normalized	normalized to 1W	20.5 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**20.4 mW / g ± 19.5 % (k=2)**

Appendix

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	52.4 Ω - 9.4 jΩ
Return Loss	-20.5 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	51.7 Ω - 4.9 jΩ
Return Loss	-25.9 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	55.3 Ω + 0.5 jΩ
Return Loss	-25.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.207 ns

After long term use with 40 W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 24, 2010

DASY5 Validation Report for Body TSL

Date/Time: 11.04.2011 12:52:21

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHz; Serial: D5GHzV2 - SN:1104

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz; Duty Cycle: 1:1
Medium: MSL 5000 MHz
Medium parameters used: f = 5200 MHz; σ = 5.32 mho/m; ε_r = 48.4; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5500 MHz; σ = 5.73 mho/m; ε_r = 47.8; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5800 MHz; σ = 6.13 mho/m; ε_r = 47.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

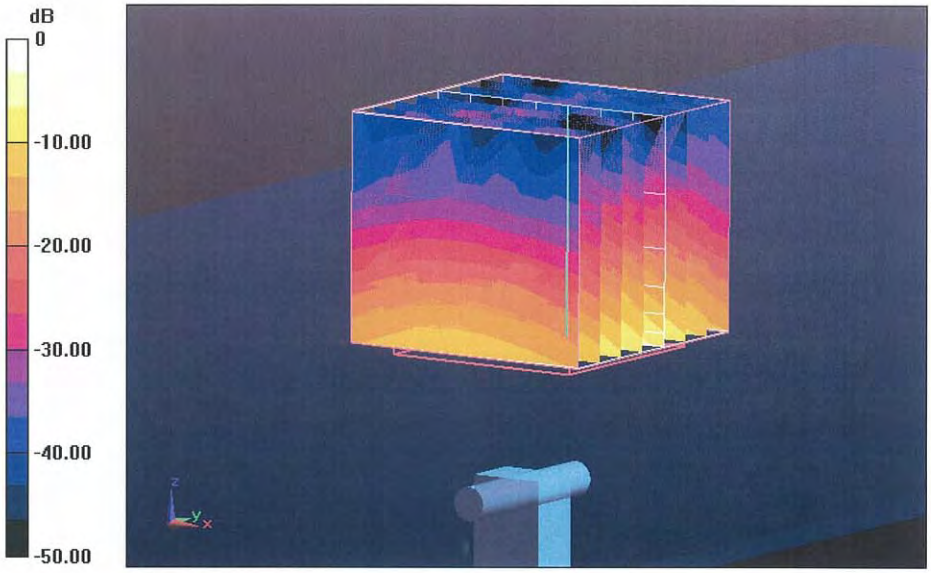
DASY5 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91), ConvF(4.43, 4.43, 4.43), ConvF(4.38, 4.38, 4.38); Calibrated: 04.03.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

Pin=100mW, f=5200 MHz/ d=10mm /Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 59.879 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 29.693 W/kg
SAR(1 g) = 7.66 mW/g; SAR(10 g) = 2.13 mW/g
Maximum value of SAR (measured) = 17.430 mW/g

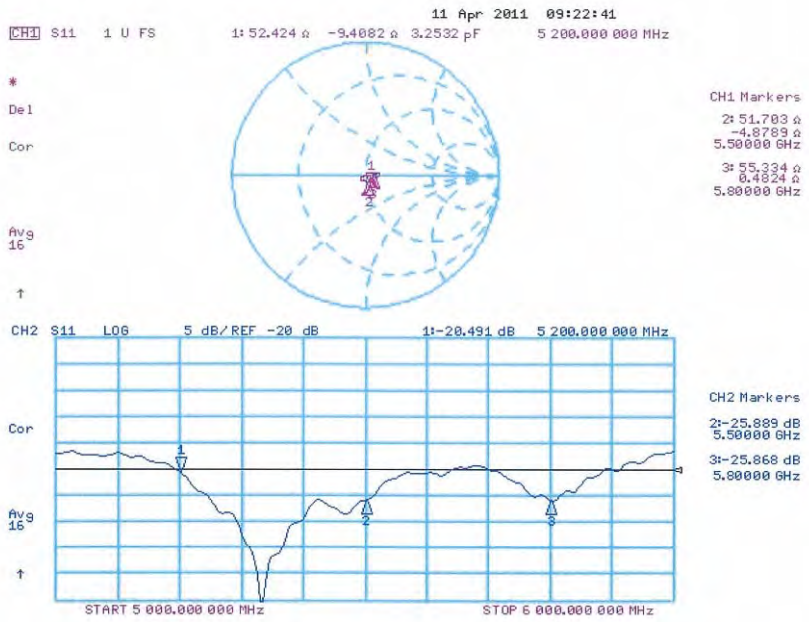
Pin=100mW, f=5500 MHz/ d=10mm /Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 59.580 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 34.500 W/kg
SAR(1 g) = 8.12 mW/g; SAR(10 g) = 2.24 mW/g
Maximum value of SAR (measured) = 19.091 mW/g

Pin=100mW, f=5800 MHz/ d=10mm /Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 55.245 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 34.123 W/kg
SAR(1 g) = 7.45 mW/g; SAR(10 g) = 2.05 mW/g
Maximum value of SAR (measured) = 18.032 mW/g



0 dB = 18.030mW/g

Impedance Measurement Plot for Body TSL



End of 1st part of report