

SAR TEST REPORT

Equipment Under Test	:	Intel Centrino Advanced-N6235
Model No.	:	6235ANHMW
Applicant	:	Samsung Electronics Co., Ltd.
Address of Applicant	:	416, Maetan-dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, Korea
FCC ID	:	A3L6235ANH
IC ID	:	649E-6235ANH
Device Category	:	Portable Device
Exposure Category	:	General Population / Uncontrolled Exposure
Date of Receipt	:	2012-08-15
Date of Test(s)	:	2012-08-16 ~ 2012-09-12
Date of Issue	:	2012-10-17
Max. SAR	:	0.777 W/kg (WLAN_2.4 GHz), 0.980 W/kg (WLAN_5.2 GHz) 0.977 W/kg (WLAN_5.3 GHz), 0.648 W/kg (WLAN_5.5 GHz) 0.475 W/kg (WLAN_5.8 GHz)

Standards: **FCC OET Bulletin 65 supplement C**
 RSS-102 (Issue 4)
 IEEE 1528, 2003
 ANSI/IEEE C95.1, C95.3

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 Korea Co., Ltd. (Gunpo Laboratory) or testing done by SGS Korea Co., Ltd. (Gunpo Laboratory) in connection with distribution or use of the product described in this report must be approved by SGS Korea Co., Ltd. (Gunpo Laboratory) in writing.

Tested by	:	Jongwon Ma		2012-10-17
Approved by	:	Feel Jeong		2012-10-17

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APPENDIX

- A. DASY4 SAR Report
- B. Uncertainty Analysis
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1. General Information

1.1 Testing Laboratory

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1.2 Details of Applicant

Applicant : Samsung Electronics Co., Ltd.
 Address : 416, Maetan-dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, Korea
 Contact : Mr. John Lee
 Email : johnlee@samsung.com
 Phone No. : 82-31-277-4784

1.3 Version of Report

Version Number	Date	Revision
00	2012-09-28	Initial issue
01	2012-10-17	Revision 01

1.4 Description of EUT(s)

EUT Type	Intel Centrino Advanced-N6235
Model	6235ANHMW
FCC ID	A3L6235ANH
IC ID	649E-6235ANH
Serial Number	HXTT91CC700037P
Mode of Operation	WLAN
Duty Cycle	1(WLAN)
Body worn Accessory	None
Tx Frequency Range	2412 MHz~ 2462 MHz (WLAN_11b/g/n) 5180 MHz ~ 5240 MHz, 5260 MHz ~ 5320 MHz (WLAN_11a/n) 5500 MHz ~ 5700 MHz, 5745 MHz ~ 5825 MHz (WLAN_11a/n) 2402 MHz ~ 2480 MHz (Bluetooth)
Conducted Max Power	16.89 dB m (WLAN_2.4 GHz), 16.41 dB m (WLAN_5.2 GHz) 16.62 dB m (WLAN_5.3 GHz), 16.62 dB m (WLAN_5.5 GHz) 06.02 dB m (Bluetooth_2.4 GHz)

1.5 Test Environment

Ambient temperature	: (22 ± 2) ° C
Tissue Simulating Liquid	: (22 ± 2) ° C
Relative Humidity	: (55 ± 5) % R.H.

1.6 Operation Configuration

The client provided a special driver and test program which can control the frequency and power of the WLAN. Measurements were performed at the lowest, middle and highest channels of the operating band. The EUT was set to maximum power level during all tests and at the beginning of each test the battery was fully charged. The DASY4 system measures power drift during SAR testing by comparing e-field in the same location at the beginning and at the end of measurement.

1.7 Host PC Information

Model Name	XE700T1C
Serial No.	HXTT91CC700037P
Manufacturer	Samsung Electronics Co., Ltd.

1.8 SAR Measurement Procedures

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures 7x7x9 (above 4.5 GHz) or 5x5x7 (below 3 GHz) points within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation, the extrapolated distance should not be larger than the step size in Z-direction.

1.9 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (Speag Dasy 4 professional system). A Model ET3DV6 1782/Ex3DV4 3791 E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation $SAR = \sigma (|E_i|^2) / \rho$ where σ and ρ are the conductivity and mass density of the tissue-simulant. The DASY4 system for performing compliance tests consists of the following items:

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

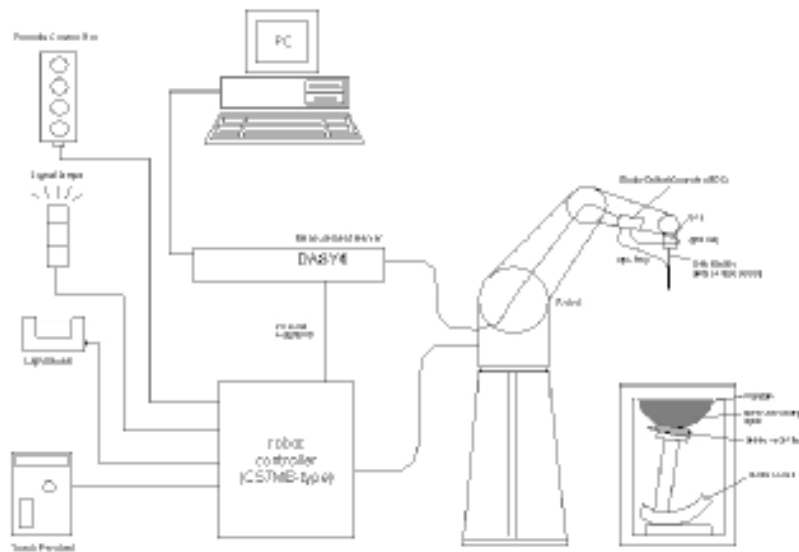


Fig a. The microwave circuit arrangement used for SAR system verification

- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DAS4Y4 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The ELI phantom enabling testing body usage.
- The device holder for flat phantom.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

1.10 System Components

ET3DV6 E-Field Probe

- Construction** : Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol).
- Calibration** : In air from 10 MHz to 2.5 GHz In brain simulating tissue (accuracy $\pm 8\%$)
- Frequency** : 10 MHz to >6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)
- Directivity** : ± 0.2 dB in brain tissue (rotation around probe axis)
 ± 0.4 dB in brain tissue (rotation normal to probe axis)
- Dynamic Range** : $5 \mu\text{W/g}$ to >100 mW/g; Linearity: ± 0.2 dB
- Srfce. Detect** : ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
- Dimensions** : Overall length: 330 mm
 Tip length: 16 mm
 Body diameter: 12 mm
 Tip diameter: 6.8 mm
 Distance from probe tip to dipole centers: 2.7 mm
- Application** : General dosimetry up to 3 GHz Compliance tests of mobile phone



ET3DV6 E-Field Probe

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 HSL 2600 and HSL5800.
 Additional CF-Calibration 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** : $10 \mu\text{W/g}$ to > 100 m W/g;
 Linearity: ± 0.2 dB(noise: typically $< 1 \mu\text{W/g}$)
- Dimensions** : Overall length: 337 mm (Tip length: 20 mm)
 Tip diameter: 2.5 mm (Body diameter: 12 mm)
 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%



EX3DV4 E-Field Probe

NOTE:

1. The Probe parameters have been calibrated by the SPEAG. Please reference "APPENDIX D" for the Calibration Certification Report.

ELI Phantom

Construction:

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

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



ELI Phantom

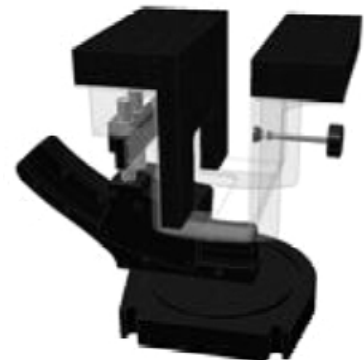
Shell Thickness: 2.0 mm \pm 0.2 mm

Dimensions Major axis: 600 mm
Minor axis: 400 mm

DEVICE HOLDER

Construction

Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (a.q. laptops, Cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioned.



Device Holder

1.11 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 ELI phantom. A SAR measurement was performed to see if the measured SAR was within $\pm 10\%$ from the target SAR values. These tests were done at 2450 MHz, 5200 MHz, 5500 MHz and 5800 MHz. The tests for EUT were conducted within 24 hours after each validation. The obtained results from the system accuracy verification are displayed in the table 1. During the tests, the ambient temperature of the laboratory was in the range $(22 \pm 2)^\circ\text{C}$, the relative humidity was in the range

(55 ± 5) % R.H. 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.

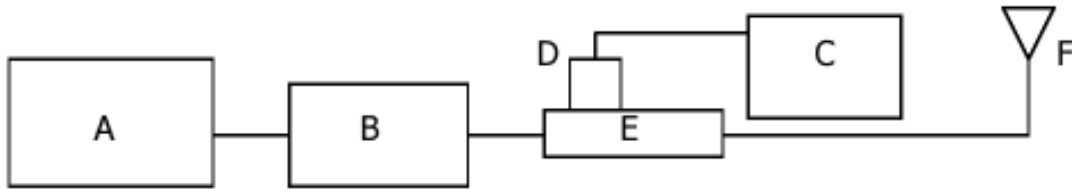


Fig b. The microwave circuit arrangement used for SAR system verification

- A. Agilent Model E4421B Signal Generator
- B. EMPOWER Model (2001-BBS3Q7ECK), (2057-BBS3Q5KCK) Amplifier
- C. Agilent Model E4419B Power Meter
- D. Agilent Model 9300H Power Sensor
- E. Agilent Model 778D/86205A Dual directional coupler
- F. Reference dipole Antenna

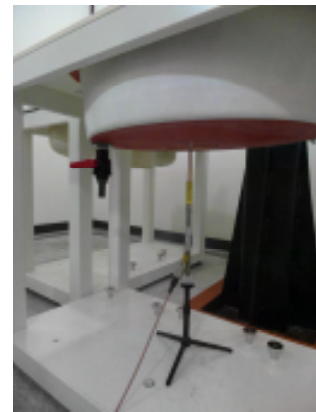


Photo of the dipole Antenna

System Validation Results

Validation Kit	Tissue	Target SAR 1 g from Calibration Certificate (1 W)	Measured SAR 1 g (0.1 W)	Measured SAR 1 g (1 W)	Deviation (%)	Date	Liquid Temp. (°C)
D2450V2 S/N: 734	2450 MHz Body	50.2 W/kg	5.12 W/kg	51.2 W/kg	1.99	2012-09-10	22.4
D5 GHz V2 S/N: 1023	5200 MHz Body	75.8 W/kg	7.87 W/kg	78.7 W/kg	3.83	2012-08-16	22.2
D5 GHz V2 S/N: 1023	5200 MHz Body	75.8 W/kg	7.89 W/kg	78.8 W/kg	4.09	2012-08-17	22.9
D5 GHz V2 S/N: 1106	5500 MHz Body	81.7 W/kg	8.49 W/kg	84.9 W/kg	3.92	2012-09-11	22.2
D5 GHz V2 S/N: 1106	5500 MHz Body	81.7 W/kg	8.47 W/kg	84.7 W/kg	3.67	2012-09-12	22.1
D5 GHz V2 S/N: 1106	5800 MHz Body	76.5 W/kg	8.03 W/kg	80.3 W/kg	4.97	2012-09-11	22.2

Table 1. Results system validation

1.12 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this simulant fluid were measured by using the Agilent Model 85070B Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with Agilent E5071B Network Analyzer (300 kHz - 6 GHz) by using a procedure detailed in Section V.

f (MHz)	Tissue type	Limits / Measured	Dielectric Parameters			
			Permittivity	Conductivity	Simulated Tissue Temp(°C)	
2450	Body	Measured, 2012-09-10	52.5	2.01	22.4	
		Recommended Limits	52.7	1.95	21.0 ~ 23.0	
		Deviation(%)	-0.38	3.08	-	
2412		Measured, 2012-09-10	52.7	1.93	22.4	
		Deviation(%)	0.00	-1.03	-	
2462		Measured, 2012-09-10	52.5	2.04	22.4	
	Deviation(%)	-0.38	4.62	-		
5200	Body	Measured, 2012-08-16	48.8	5.22	22.2	
		Recommended Limits	49.0	5.30	21.0 ~ 23.0	
		Deviation(%)	-0.41	-1.51	-	
5180		Measured, 2012-08-16	48.8	5.12	22.2	
		Deviation(%)	-0.41	-3.40	-	
5300		Measured, 2012-08-16	48.6	5.34	22.2	
	Deviation(%)	-0.82	0.75	-		
5200	Body	Measured, 2012-08-17	49.1	5.26	22.9	
		Recommended Limits	49.0	5.30	21.0 ~ 23.0	
		Deviation(%)	0.20	-0.75	-	
5180		Measured, 2012-08-17	49.1	5.23	22.9	
		Deviation(%)	0.20	-1.32	-	
5300		Measured, 2012-08-17	49.0	5.38	22.9	
	Deviation(%)	0.00	1.51	-		
5500	Body	Measured, 2012-09-11	48.1	5.54	22.2	
		Recommended Limits	48.6	5.65	21.0 ~ 23.0	
		Deviation(%)	-1.03	-1.95	-	
5520		Measured, 2012-09-11	48.0	5.55	22.2	
		Deviation(%)	-1.23	-1.77	-	
5580		Body	Measured, 2012-09-11	47.8	5.64	22.2
	Recommended Limits		48.5	5.77	21.0 ~ 23.0	
	Deviation(%)		-1.65	-0.18	-	
5660	Body		Measured, 2012-09-11	47.6	5.71	22.2
			Recommended Limits	48.3	5.88	21.0 ~ 23.0
			Deviation(%)	-1.45	-2.89	-
5680		Measured, 2012-09-11	47.6	5.74	22.2	
		Deviation(%)	-1.45	-2.38	-	
5700		Measured, 2012-09-11	47.6	5.78	22.2	
	Deviation(%)	-1.45	-1.70	-		

5500	Body	Measured, 2012-09-12	50.6	5.54	22.1
		Recommended Limits	48.6	5.65	21.0 ~ 23.0
		<u>Deviation(%)</u>	<u>4.12</u>	<u>-1.95</u>	-
5520	Body	Measured, 2012-09-12	50.6	5.57	22.1
		<u>Deviation(%)</u>	<u>4.12</u>	<u>-1.42</u>	-
5580	Body	Measured, 2012-09-12	50.5	5.65	22.1
		Recommended Limits	48.5	5.77	21.0 ~ 23.0
		<u>Deviation(%)</u>	<u>4.12</u>	<u>-2.08</u>	-
5660	Body	Measured, 2012-09-12	50.4	5.75	22.1
		Recommended Limits	48.3	5.88	21.0 ~ 23.0
		<u>Deviation(%)</u>	<u>4.34</u>	<u>-2.21</u>	-
5680	Body	Measured, 2012-09-12	50.3	5.78	22.1
		<u>Deviation(%)</u>	<u>4.14</u>	<u>-1.70</u>	-
5700	Body	Measured, 2012-09-12	50.3	5.81	22.1
		<u>Deviation(%)</u>	<u>4.14</u>	<u>-1.19</u>	-
5800	Body	Measured, 2012-09-11	47.4	5.89	22.2
		Recommended Limits	48.2	6.00	21.0 ~ 23.0
		<u>Deviation(%)</u>	<u>-1.66</u>	<u>-1.83</u>	-
5745	Body	Measured, 2012-09-11	47.6	5.83	22.2
		<u>Deviation(%)</u>	<u>-1.24</u>	<u>-2.83</u>	-
5825	Body	Measured, 2012-09-11	47.4	5.92	22.2
		<u>Deviation(%)</u>	<u>-1.66</u>	<u>-1.33</u>	-

The composition of the tissue simulating liquid

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Diethyleneglycol monohexylether	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Water	Mineral oil	Emulsifiers	Additives and Salt
78	11	9	2

Salt: 99 +% Pure Sodium Chloride

Sugar: 98 +% Pure Sucrose

Water: De-ionized, 16 MΩ⁺ resistivity

HEC: Hydroxyethyl Cellulose

DGBE: 99 +% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

1.13 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (“SAR”) in Section 4.2 of “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,” ANSI/IEEE C95.3–2003, Copyright 2003 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in “Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields,” NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the

frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

(1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube). Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

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

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

Table .1 RF exposure limits

1.14 Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 2 years ago but more than 1 year ago were confirmed in maintaining return loss (< -20 dB, within 20 % of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB publication 450824:

2. Instruments List

Manufacturer	Device	Type	Serial Number	Due date of Calibration
Stäubli	Robot	RX90BL	F03/5W05A1/A/01	N/A
Schmid & Partner Engineering AG	Dosimetric E-Field Probe	ET3DV6	1782	April 27, 2013
Schmid & Partner Engineering AG	Dosimetric E-Field Probe	EX3DV4	3791	May 23, 2013
Schmid & Partner Engineering AG	2450 MHz System Validation Dipole	D2450V2	734	January 19, 2014
Schmid & Partner Engineering AG	5000 MHz System Validation Dipole	D5 GHz V2	1106	June 21, 2013
Schmid & Partner Engineering AG	Data acquisition Electronics	DAE3	567	January 20, 2013
Schmid & Partner Engineering AG	Software	DASY 4 V4.7	-	N/A
Schmid & Partner Engineering AG	Phantom	ELI 4.0	1169	N/A
Agilent	Network Analyzer	E5071C	MY46111535	July 3, 2013
Agilent	Dielectric Probe Kit	85070D	2184	N/A
Agilent	Power Meter	E4419B	GB43311125	July 01, 2013
Agilent	Power Sensor	E9300H	MY41495314	September 29, 2012
			MY41495307	September 29, 2012
Agilent	Signal Generator	E4421B	MY42082477	March 29, 2013
Empower RF Systems	Power Amplifier	2001-BBS3Q7ECK	1032 D/C 0336	March 31, 2013
Empower RF Systems	Power Amplifier	2092-BBS5K8CAJ	1010	September 06, 2012
Empower RF Systems	Power Amplifier	2092-BBS5K8CAJ	1010	November 07, 2012
Agilent	Directional RF Bridges	86205A	MY31402302	July 03, 2013
Microlab	LP Filter	LA-30N	N/A	September 29, 2012
Microlab	LP Filter	LA-60N	N/A	September 29, 2012
Agilent	Attenuator	8491B	50566	September 29, 2012
R & S	Spectrum Analyzer	FSV30	100768	March 29, 2013

3.Summary of Results

3.1 FCC Power Measurement Procedures

Power measurements were performed using a power meter under digital average mode.

In order to verify that the device was tested and maintained at full power, this was configured with the base station simulator. The SAR measurement Software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5 % occurred, the tests were repeated.

3.2 RF Conducted Average Power

WLAN

2.4 GHz

Mode	Freq. (MHz)	Ch. #	Rate	Measured Power [dB m]	
				Main	AUX
802.11b	2412	1	1	16.72	16.49
	2437	6	1	16.89	14.98
	2462	11	1	16.82	15.94
802.11g	2412	1	6	14.16	13.72
	2437	6	6	16.44	16.58
	2462	11	6	13.94	13.42
802.11n HT20	2412	1	HT0	13.25	12.41
	2437	6	HT0	16.59	16.62
	2462	11	HT0	12.45	12.34
802.11n HT40	2422	3	HT7	10.75	9.22
	2437	6	HT7	13.48	12.81
	2452	9	HT7	10.21	10.50
802.11n HT20_MIMO	2412	1	HT8	11.41	11.49
	2437	6	HT8	13.47	12.98
	2462	11	HT8	11.15	10.26
802.11n HT40_MIMO	2422	3	HT8	7.51	7.35
	2437	6	HT8	13.35	12.65
	2452	9	HT8	6.71	6.72

Note:

1. The modes with highest output power channel were chosen for the conducted output power.
2. Original target power is from EMC report R84672. Please refer to original report (FCC ID:PD96235ANH) for Average Power information as documented in 10/11/2011 original filing.

5.2 GHz

Mode	Freq. (MHz)	Ch. #	Rate	Measured Power [dB m]	
				Main	AUX
802.11a	5180	36	6	16.41	15.84
	5200	40	6	15.98	15.76
	5220	44	6	15.91	15.74
	5240	48	6	15.97	15.68
802.11n HT20	5180	36	HT0	15.81	15.78
	5200	40	HT0	16.41	15.98
	5220	44	HT0	16.37	15.95
	5240	48	HT0	16.44	15.94
802.11n HT40	5190	38	HT7	12.95	12.75
	5230	46	HT7	16.37	15.83
802.11n HT20_MIMO	5180	36	HT8	13.35	13.33
	5200	40	HT8	12.31	13.17
	5220	44	HT8	13.09	12.82
	5240	48	HT8	13.18	12.75
802.11n HT40_MIMO	5190	38	HT8	10.02	10.74
	5230	46	HT8	13.29	13.27

Note:

1. The modes with highest output power channel were chosen for the conducted output power.
2. Original target power is from EMC report R84672. Please refer to original report (FCC ID:PD96235ANH) for Average Power information as documented in 10/11/2011 original filing.

5.3 GHz

Mode	Freq. (MHz)	Ch. #	Rate	Measured Power [dB m]	
				Main	AUX
802.11a	5260	52	6	15.88	15.22
	5280	56	6	15.82	15.15
	5300	60	6	16.35	15.49
	5320	64	6	16.31	15.83
802.11n HT20	5260	52	HT0	15.99	15.49
	5280	56	HT0	15.91	15.45
	5300	60	HT0	16.62	15.27
	5320	64	HT0	16.56	15.77
802.11n HT40	5270	54	HT7	15.87	15.23
	5310	62	HT7	11.52	12.35
802.11n HT20_MIMO	5260	52	HT8	12.68	12.64
	5280	56	HT8	12.61	12.59
	5300	60	HT8	13.06	12.44
	5320	64	HT8	12.99	13.08
802.11n HT40_MIMO	5270	54	HT8	12.56	12.38
	5310	62	HT8	12.39	12.33

Note :

1. The modes with highest output power channel were chosen for the conducted output power.
2. Original target power is from EMC report R84672. Please refer to original report (FCC ID:PD96235ANH) for Average Power information as documented in 10/11/2011 original filing.

5.5 GHz

Mode	Freq. (MHz)	Ch. #	Rate	Measured Power [dB m]	
				Main	AUX
802.11a	5500	100	6	16.51	15.51
	5520	104	6	16.47	15.53
	5540	108	6	16.35	15.42
	5560	112	6	16.48	15.52
	5580	116	6	16.47	15.58
	5600	120	6	16.51	15.64
	5620	124	6	16.35	15.52
	5640	128	6	16.31	15.51
	5660	132	6	16.37	15.61
	5680	136	6	16.62	15.49
802.11n HT20	5700	140	6	16.55	15.48
	5500	100	HT0	16.54	15.59
	5520	104	HT0	16.46	15.52
	5540	108	HT0	16.31	15.68
	5560	112	HT0	16.44	15.46
	5580	116	HT0	16.42	15.52
	5600	120	HT0	16.46	15.61
	5620	124	HT0	16.31	15.82
	5640	128	HT0	16.24	15.81
	5660	132	HT0	16.29	15.49
802.11n HT40	5680	136	HT0	16.20	15.42
	5700	140	HT0	16.12	15.38
	5510	102	HT7	15.50	14.71
	5550	110	HT7	16.48	15.69
	5590	118	HT7	16.52	15.67
802.11n HT20_MIMO	5630	130	HT7	16.37	15.47
	5670	134	HT7	16.40	15.49
	5500	100	HT8	12.84	13.06
	5520	104	HT8	12.72	13.34
	5540	108	HT8	12.52	13.14
	5560	112	HT8	12.58	13.26
	5580	116	HT8	12.54	13.21
	5600	120	HT8	12.57	13.24
	5620	124	HT8	12.84	13.22
	5640	128	HT8	12.77	13.34
5660	132	HT8	12.81	13.31	
5680	136	HT8	12.71	13.24	
5700	140	HT8	12.62	13.17	

Mode	Freq. (MHz)	Ch. #	Rate	Measured Power [dB m]	
				Main	AUX
802.11n HT40_MIMO	5510	102	HT8	13.10	13.12
	5550	110	HT8	13.19	13.21
	5590	118	HT8	13.21	13.22
	5630	126	HT8	12.56	12.78
	5670	134	HT8	12.54	12.78

Note :

1. The modes with highest output power channel were chosen for the conducted output power.
2. Original target power is from EMC report R84672. Please refer to original report (FCC ID:PD96235ANH) for Average Power information as documented in 10/11/2011 original filing.

5.8 GHz

Mode	Freq. (MHz)	Ch. #	Rate	Measured Power [dB m]	
				Main	AUX
802.11a	5745	149	6	16.48	16.62
	5765	153	6	16.43	16.59
	5785	157	6	16.42	16.61
	5805	161	6	16.46	16.55
	5825	165	6	16.37	16.47
802.11n HT20	5745	149	HT0	16.47	16.62
	5765	153	HT0	16.35	16.59
	5785	157	HT0	16.38	16.61
	5805	161	HT0	16.39	16.55
	5825	165	HT0	16.29	16.47
802.11n HT40	5755	151	HT7	16.28	16.49
	5795	159	HT7	16.29	16.57
11n_20 MIMO	5745	149	HT8	13.64	13.65
	5765	153	HT8	13.45	13.53
	5785	157	HT8	13.43	13.54
	5805	161	HT8	13.46	13.51
	5825	165	HT8	13.37	13.82
11n_40 MIMO	5755	151	HT8	13.48	13.45
	5795	159	HT8	13.21	13.42

Note :

1. The modes with highest output power channel were chosen for the conducted output power.
2. Original target power is from EMC report R84672. Please refer to original report (FCC ID:PD96235ANH) for Average Power information as documented in 10/11/2011 original filing.

3.3 SAR Test Configuration

Notebook Testing for SAR

Devices are to be setup according to KDB 447498 requirements and are configured with maximum output power during SAR assessment for a worst-case SAR evaluation.

SAR Testing for Notebook per KDB 447498 & KDB 616217

Per KDB 447498 4) a), the Base is required to be tested touching the flat phantom.

SAR is required for each antenna located within 5 cm of the edge closet to the user for the applicable display orientation. For antenna(s) located ≥ 5 cm from this edge, the test reduction and exclusion procedures for laptop computers in KDB 616217 are applied.

IEEE 802.11 Transmitters

802.11 a/b/g and 4.9 GHz operating modes are tested independently according to the service requirements in each frequency band. 802.11 b/g modes are tested on channel 1, 6, and 11. 802.11a is tested for UNII operations on channels 36 and 48 in the 5.15 ~ 5.25 GHz band, channels 52 and 64 in the 5.25 ~ 5.35 GHz band, channels 104, 116, 124 and 136 in the 5.470 ~ 5.725 GHz band, and channels 149 and 161 in the 5.8 GHz band. When 5.8 GHz §15.247 is also available, channels 149, 157 and 165 should be tested instead of the UNII channels. 802.11g mode was evaluated only if the output power was 0.25 dB higher than the 802.11b mode.

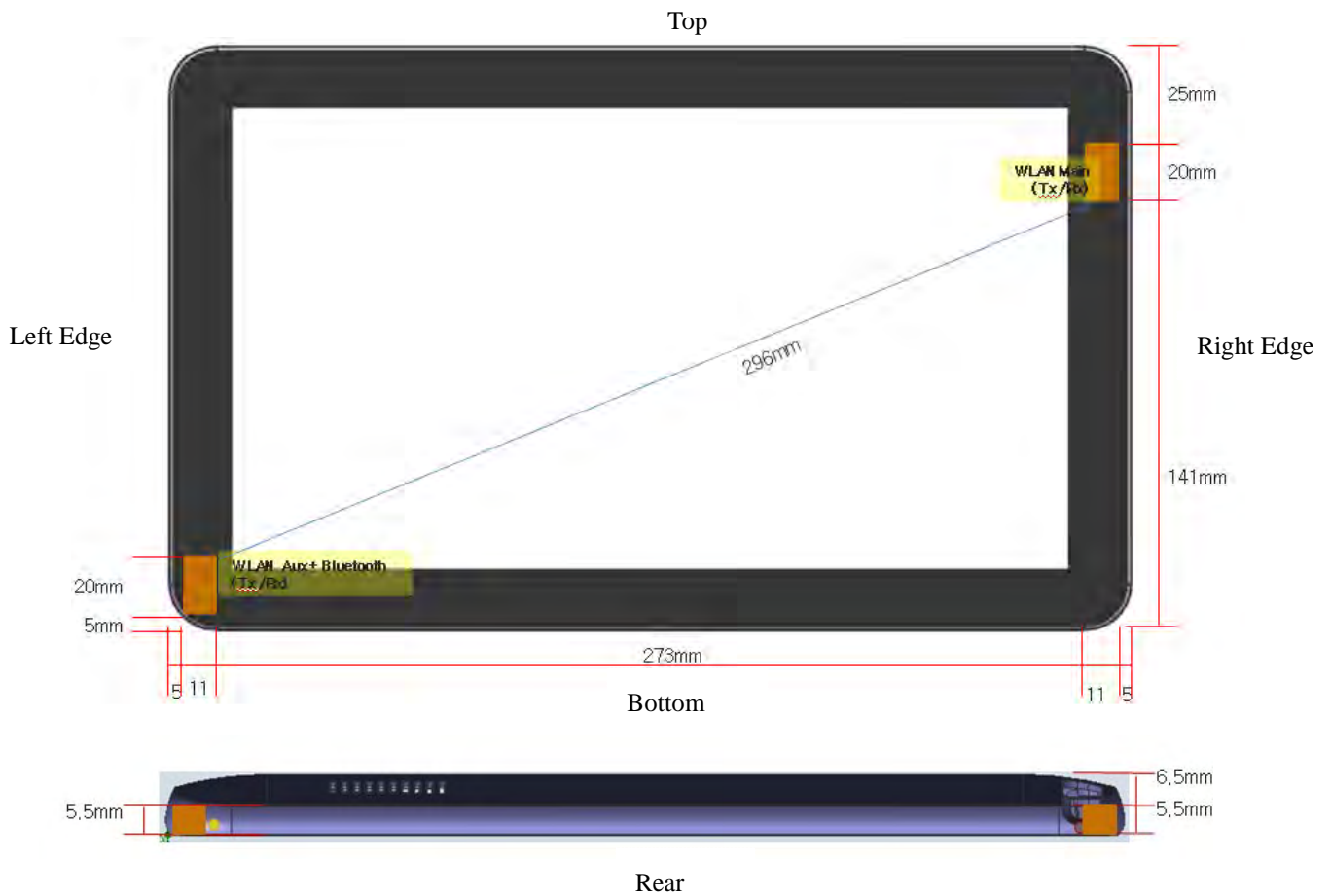
Mode	GHz	Channel	Turbo Channel	"Default Test Channels"			
				§15.247		UNII	
				802.11b	802.11g		
802.11 b/g	2.412	1 [#]		✓	▽		
	2.437	6	6	✓	▽		
	2.462	11 [#]		✓	▽		
802.11a	5.18	36	42 (5.21 GHz)			✓	•
	5.20	40				✓	•
	5.22	44				✓	•
	5.24	48	50 (5.25 GHz)			✓	
	5.26	52				✓	
	5.28	56	58 (5.29 GHz)			✓	•
	5.30	60				✓	•
	5.32	64				✓	•
	5.500	100	Unknown			✓	•
	5.520	104				✓	•
	5.540	108				✓	•
	5.560	112				✓	•
	5.580	116				✓	•
	5.600	120				✓	•
	5.620	124				✓	•
	5.640	128				✓	•
	5.660	132				✓	•
	5.680	136				✓	•
5.700	140			✓	•		
UNII or §15.247	5.745	149		✓		✓	•
	5.765	153	152 (5.76 GHz)		•		•
	5.785	157		✓			•
§15.247	5.805	161	160 (5.80 GHz)		•	✓	
	5.825	165		✓			

- ✓ = "default test channels"
- = possible 802.11 a channels with maximum average output > the "default test channels"
- ▽ = possible 802.11g channels with maximum average output $\frac{1}{4}$ dB \geq the "default test channels"
- # = when output power is reduced for channel 1 and/or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested

According to KDB 616217, the WWAN and WLAN antenna are required to be tested for SAR as below.

Mode	Front Screen	Rear	Left Edge	Right Edge	Top	Bottom
WLAN Main	X	O	X	O	O	X
WLAN AUX	X	O	O	X	X	O
WLAN MIMO	X	O	X	X	X	X

<The Distance information of Antenna to Edges of EUT>



Assessment for SAR evaluation for Simultaneous transmission

WLAN + Bluetooth

Due to Bluetooth's max. output is 4 mW [$<60/f(\text{GHz}) \text{ mW}$] and stand-alone SAR is not required, thus WLAN and Bluetooth are not considered as simultaneous transmission.

3.4 SAR Data Summary

Ambient Temperature (°C)	23.2
Liquid Temperature (°C)	22.4
Date	2012-09-10

2.4 GHz Body Test

Mode	Freq. (MHz)	Ch. #	Rate	Position	Measured Power [dB m]		SAR 1g (W/kg)	
					Main	AUX	Main	AUX
802.11b	2412	1	1	Rear	16.71	16.49	Note: 9	0.777
	2437	6	1	Rear	16.89	14.98	0.544	Note: 9
	2412	1	1	Left Edge	16.71	16.49	Note: 7	0.174
	2437	6	1	Right Edge	16.89	14.98	0.562	Note: 7
	2437	6	1	Top	16.89	14.98	0.267	Note: 7
	2437	6	1	Bottom	16.89	14.98	Note: 7	0.520
802.11n HT20_MIMO	2437	6	HT8	Rear	13.47	12.98	0.260	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Liquid tissue depth was at least 15 cm.
4. The distance from EUT to flat phantom for testing Back position is 0 mm and Base position is no gap.
5. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.
6. Justification for reduced test configuration for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n and higher data rates) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11a modes. For MIMO operation both HT20 and HT40 were tested (at their lowest data rates).
7. Other position was not tested since the antenna distance to edge was greater than 5 cm per KDB616217.
8. KDB 447498 exclusion: SAR for highest power channel was < 0.8 W/kg and the frequency range is < 100 MHz.
9. The modes with highest output power channel were chosen for the conducted output power.

5.2, 5.3 GHz Body Test

Ambient Temperature (°C)	23.5	23.8
Liquid Temperature (°C)	22.2	22.9
Date	2012-08-16	2012-08-17

Mode	Freq. (MHz)	Ch. #	Rate	Position	Measured Power [dB m]		SAR 1g (W/kg)	
					Main	AUX	Main	AUX
802.11a	5180	36	6	Rear	16.41	15.84	0.113	0.832
	5220	44	6		15.91	15.74	Note: 8	0.980
	5260	52	6		15.88	15.22	Note: 8	0.977
	5300	60	6		16.35	15.49	0.120	Note: 9
	5320	64	6		15.56	15.83	Note: 8	0.887
	5180	36	6	Left Edge	16.41	15.84	Note: 7	0.696
	5320	64	6		15.56	15.74	Note: 7	0.450
	5180	36	6	Right Edge	16.41	15.84	0.351	Note: 7
	5300	60	6		16.35	15.49	0.335	Note: 7
	5180	36	6	Top	16.41	15.84	0.021	Note: 7
	5300	60	6		16.35	15.49	0.014	Note: 7
	5180	36	6	Bottom	16.41	15.84	Note: 7	0.309
	5320	64	6		15.56	15.83	Note: 7	0.319
	802.11n HT20_MIMO	5180	36	HT8	Rear	13.35	13.33	0.435
5320		64	HT8	12.99		13.08	0.436	

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Liquid tissue depth was at least 15 cm.
4. The distance from EUT to flat phantom for testing Back position is 0 mm and Base position is no gap.
5. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.

6. Justification for reduced test configuration for WIFI channels per KDB Publication 248227 and April 2010

FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n and higher data rates) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11a modes. For MIMO operation both HT20 and HT40 were tested (at their lowest data rates).

7. Other position was not tested since the antenna distance to edge was greater than 5 cm per KDB616217.
8. KDB 447498 exclusion: SAR for highest power channel was < 0.8 W/kg and the frequency range is < 100 MHz.
9. The modes with highest output power channel were chosen for the conducted output power.

Ambient Temperature (°C)	23.4	23.0
Liquid Temperature (°C)	22.2	22.1
Date	2012-09-11	2012-09-12

5.5 GHz Body Test

Mode	Freq. (MHz)	Ch. #	Rate	Position	Measured Power [dB m]		SAR 1g (W/kg)	
					Main	AUX	Main	AUX
802.11a	5600	120	6	Rear	16.51	15.64	Note: 9	0.350
	5680	136	6		16.62		0.286	Note: 9
	5520	104	6	Left Edge	16.47	15.53	Note: 7	0.447
	5580	116	6		16.47	15.58	Note: 7	0.487
	5600	120	6		16.51	15.64	Note: 7	0.529
	5620	124	6		16.35	15.52	Note: 7	Cube 0 0.493 Cube 1 0.312
	5660	132	6		16.37	15.61	Note: 7	0.648
	5500	100	6	Right Edge	16.51	15.51	0.296	Note: 7
	5580	116	6		16.47	15.58	0.537	Note: 7
	5620	124	6		16.35	15.52	0.589	Note: 7
	5680	136	6		16.62	15.49	0.552	Note: 7
	5680	136	6	Top	16.62	15.49	0.031	Note: 7
	5600	120	6	Bottom	16.51	15.64	Note: 7	0.159
802.11n HT40_MIMO	5590	118	HT8	Rear	13.47	12.89	0.179	

<Note>

- The test data reported are the worst-case SAR value with the position set in a typical configuration.
- All modes of operation were investigated, and worst-case results are reported.
- Liquid tissue depth was at least 15 cm.
- The distance from EUT to flat phantom for testing Back position is 0 mm and Base position is no gap.
- The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.
- Justification for reduced test configuration for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n and higher data rates) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11a modes (refer to original filing which explains output power is highest at the lowest data rate for each mode). For MIMO operation both HT20 and HT40 were tested (at their lowest data rates).
- Other position was not tested since the antenna distance to edge was greater than 5 cm per KDB616217.
- KDB 447498 exclusion: SAR for highest power channel was < 0.4 W/kg and the frequency range is < 100 MHz.
- The modes with highest output power channel were chosen for the conducted output power.

5.8 GHz Body Test

Ambient Temperature (°C)	23.4
Liquid Temperature (°C)	22.2
Date	2012-09-11

Mode	Freq. (MHz)	Ch. #	Rate	Position	Measured Power [dB m]		SAR 1g (W/kg)	
					Main	AUX	Main	AUX
802.11a	5745	149	6	Rear	16.48	16.62	0.138	0.263
	5745	149	6	Left Edge	16.48	16.62	Note: 7	Cube 0 0.475
	5745	149	6	Right Edge	16.48	16.62	Note: 7	Cube 1 0.343
	5745	149	6	Top	16.48	16.62	0.291	Note: 7
	5745	149	6	Bottom	16.48	16.62	0.019	Note: 7
802.11n HT40_MIMO	5745	149	HT8	Rear	13.64	13.65	Note: 7	0.158
								0.170

<Note>

1. The test data reported are the worst-case SAR value with the position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Liquid tissue depth was at least 15 cm.
4. The distance from EUT to flat phantom for testing Back position is 0 mm and Base position is no gap.
5. The EUT is tested 2nd hot-spot peak, if it is less than 2 dB below the highest peak.
6. Justification for reduced test configuration for WIFI channels per KDB Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for the lowest data rate were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n and higher data rates) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11a modes.
7. Other position was not tested since the antenna distance to edge was greater than 5 cm per KDB616217.
8. KDB 447498 exclusion: SAR for highest power channel was < 0.8 W/kg and the frequency range is < 100 MHz.
9. The modes with highest output power channel were chosen for the conducted output power.

Appendix

List

Appendix A	DASY4 Report (Plots of the SAR Measurements)	- 2450 MHz Validation Test - 5200 MHz Validation Test - 5500 MHz Validation Test - 5800 MHz Validation Test - WLAN Test
Appendix B	Uncertainty Analysis	
Appendix C	Calibration Certificate	- PROBE - DAE3 - DIPOLE

Appendix A

Test Plot - DASY4 Report

2450 MHz Validation Test_Body

Date: 2012-09-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [Validation 2450 MHz_Body.dad](#)

Input Power : 100 mW

Ambient Temp : 23.2 °C Tissue Temp : 22.4°C

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:746
Program Name: Validation 2450 MHz_Body

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 2450$ MHz; $\sigma = 2.01$ mho/m; $\epsilon_r = 52.5$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

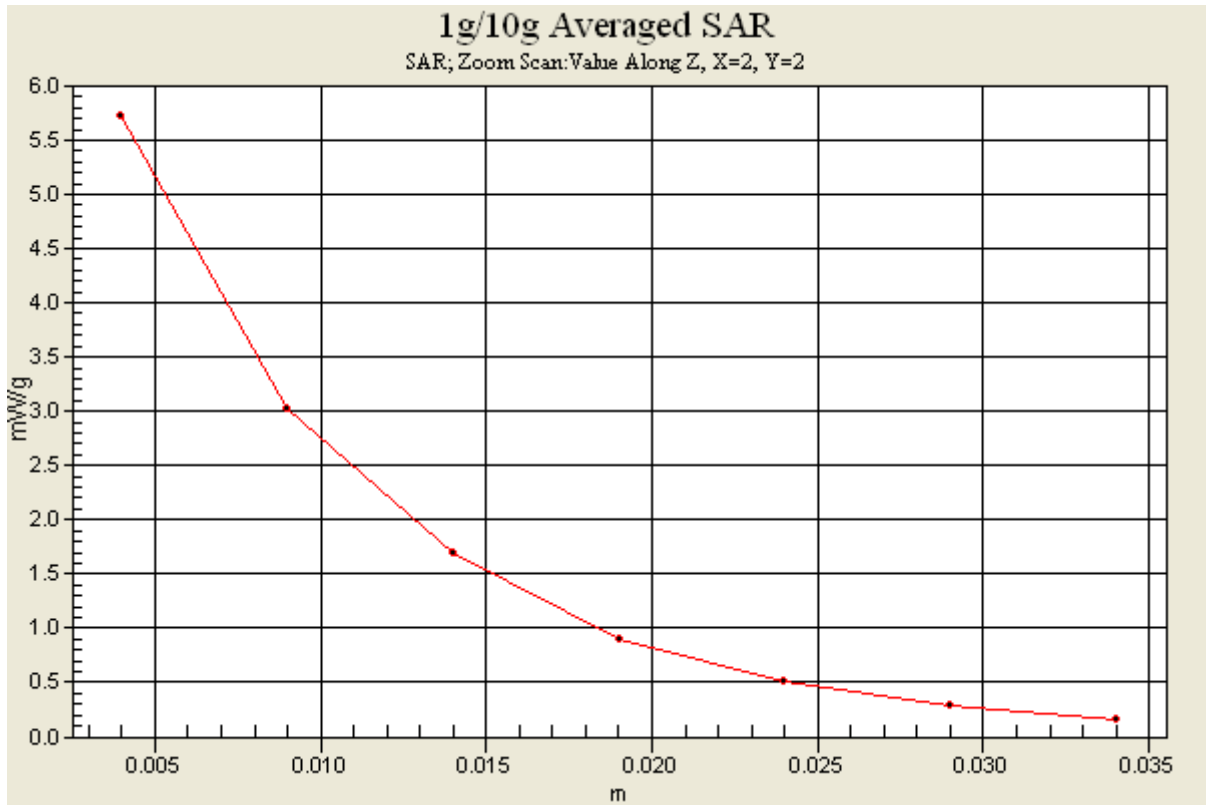
- Probe: ET3DV6 - SN1782; ConvF(4.11, 4.11, 4.11); Calibrated: 2012-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Validation 2450 MHz_Body/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 6.04 mW/g

Validation 2450 MHz_Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 57.0 V/m; Power Drift = -0.006 dB
 Peak SAR (extrapolated) = 10.6 W/kg
SAR(1 g) = 5.12 mW/g; SAR(10 g) = 2.42 mW/g
 Maximum value of SAR (measured) = 5.73 mW/g



Z-Scan



5200 MHz Validation Test_Body

Date: 2012-08-16

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [Validation 5200 MHz_Body.da4](#)

Input Power : 100 mW

Ambient Temp : 23.5 °C Tissue Temp : 22.2°C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106
Program Name: Body Validation

Communication System: CW; Frequency: 5200 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5200$ MHz; $\sigma = 5.22$ mho/m; $\epsilon_r = 48.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

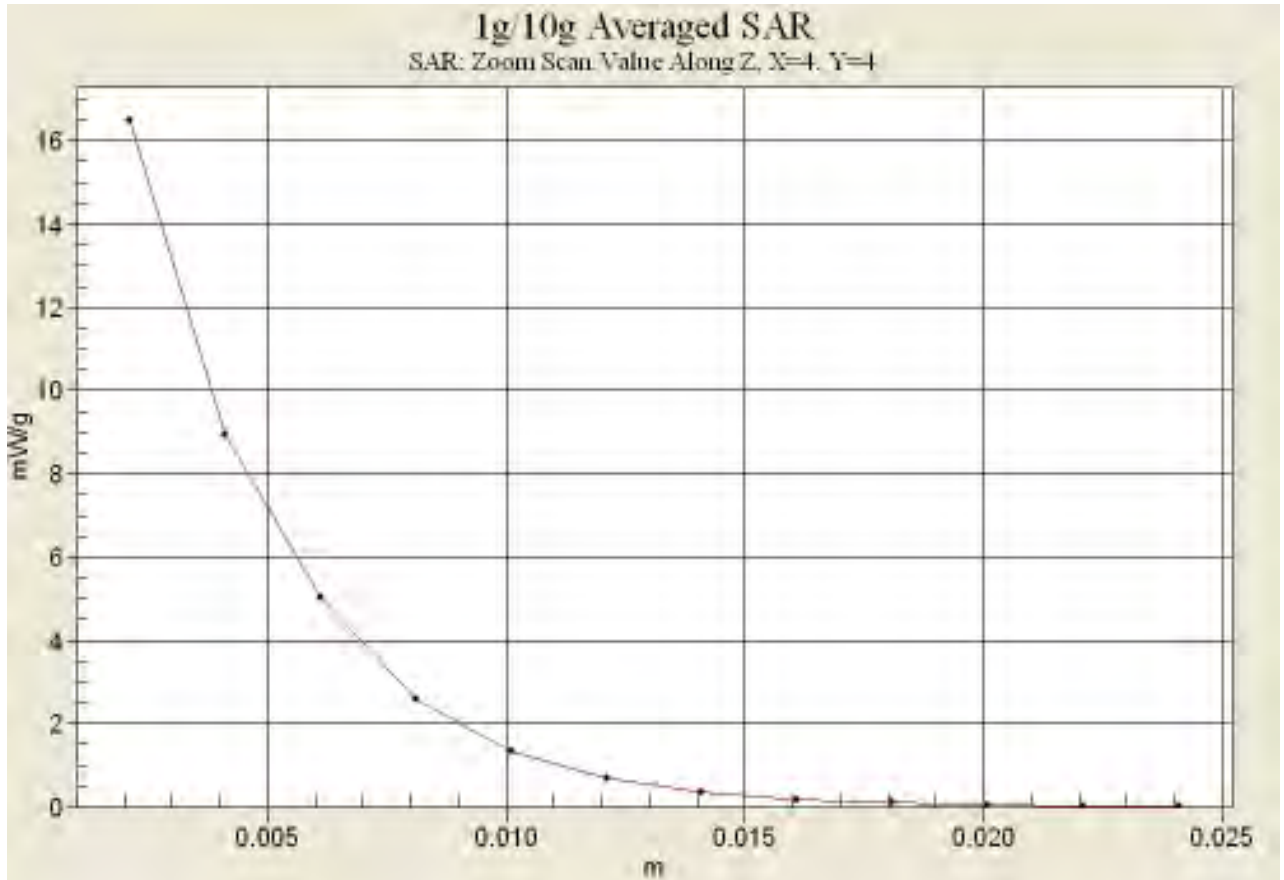
- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0 12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Validation/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 17.4 mW/g

Validation/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 51.5 V/m; Power Drift = 0.005 dB
 Peak SAR (extrapolated) = 33.6 W/kg
SAR(1 g) = 7.87 mW/g; SAR(10 g) = 2.16 mW/g
 Maximum value of SAR (measured) = 16.5 mW/g



Z-Scan



Date: 2012-08-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [Validation 5200 MHz_Body.daf](#)

Input Power : 100 mW

Ambient Temp : 23.8 °C Tissue Temp : 22.9°C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106
Program Name: Body Validation

Communication System: CW; Frequency: 5200 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5200$ MHz; $\sigma = 5.26$ mho/m; $\epsilon_r = 49.1$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

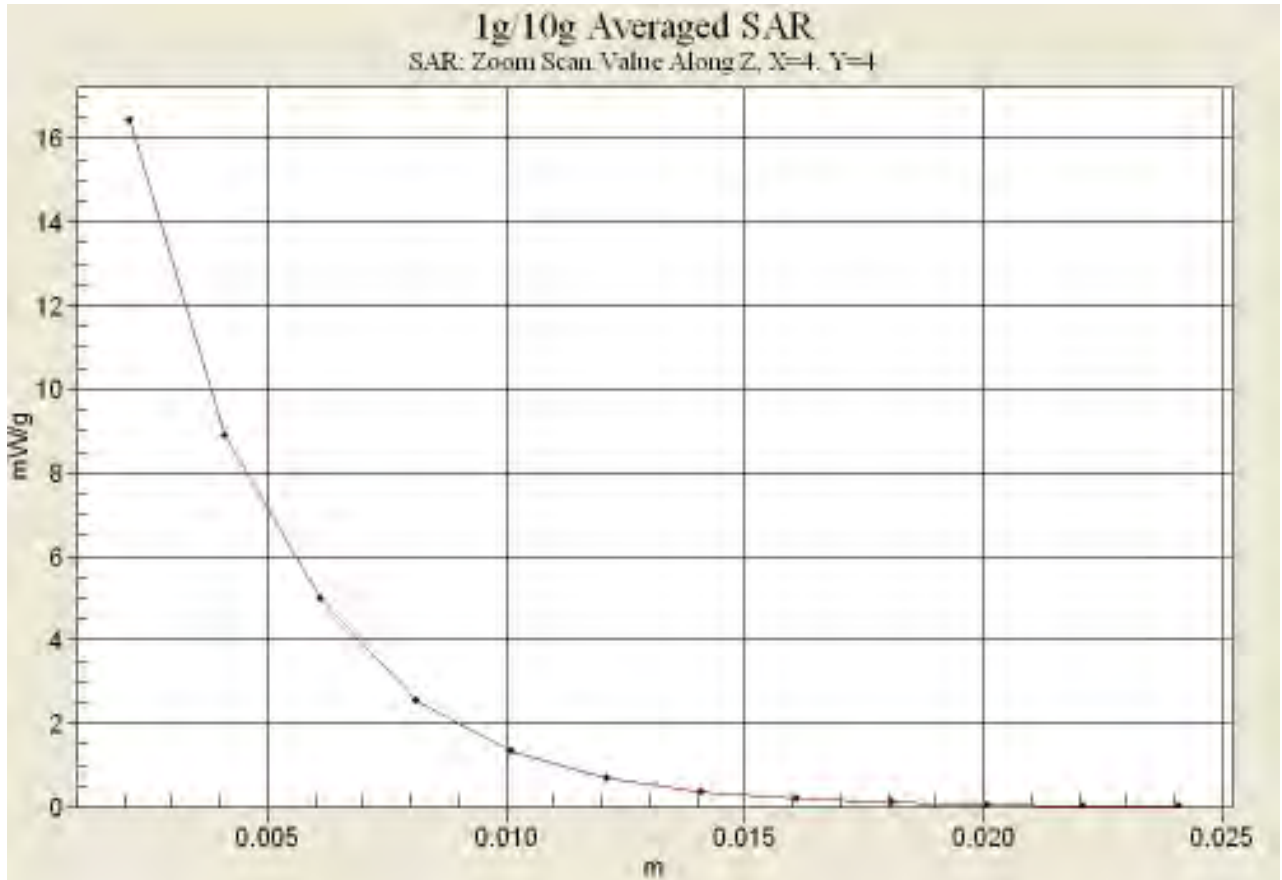
- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Validation/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 16.9 mW/g

Validation/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 51.0 V/m; Power Drift = -0.164 dB
 Peak SAR (extrapolated) = 33.7 W/kg
SAR(1 g) = 7.89 mW/g; SAR(10 g) = 2.16 mW/g
 Maximum value of SAR (measured) = 16.4 mW/g



Z-Scan



5500 MHz Validation Test_Body

Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: Validation_5500_MHz_Body.daq

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106
Program Name: Body Validation

Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5500$ MHz; $\sigma = 5.54$ mho/m; $\epsilon_r = 48.3$; $\rho = 1000$ kg/m³

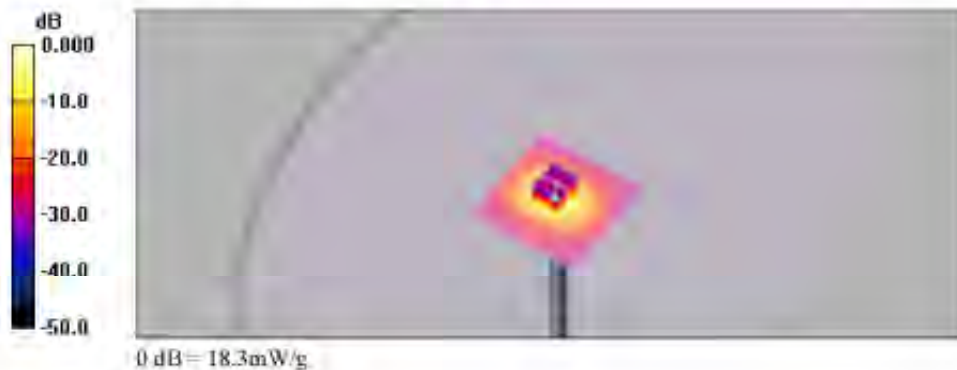
Phantom section: Flat Section

DASY4 Configuration:

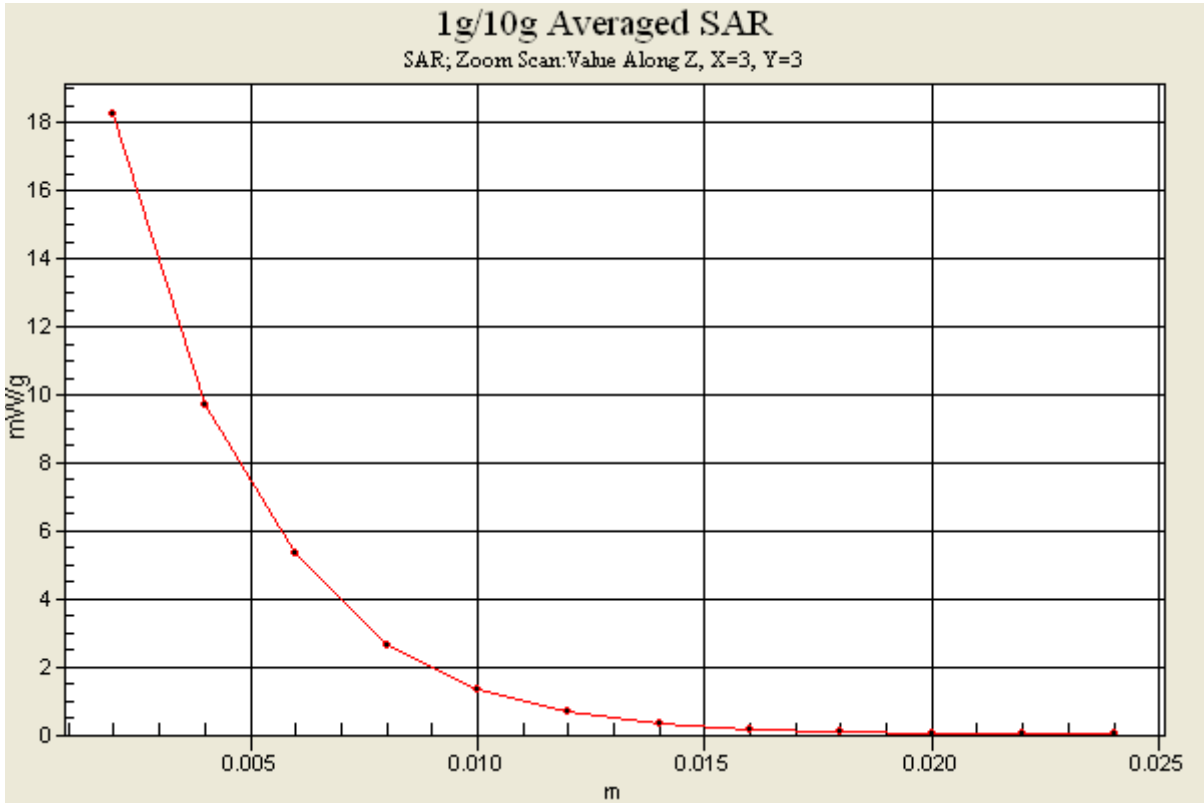
- Probe: EX3DV4 - SN3791; ConvF(3.64, 3.64, 3.64); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0 12 05 30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Validation/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 18.2 mW/g

Validation/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 48.1 V/m; Power Drift = -0.067 dB
 Peak SAR (extrapolated) = 36.6 W/kg
SAR(1 g) = 8.49 mW/g; SAR(10 g) = 2.37 mW/g
 Maximum value of SAR (measured) = 18.3 mW/g



Z Scan



Date: 2012-09-12

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: Validation_5500_MHz_Body.dad

Input Power : 100 mW

Ambient Temp : 23.0 °C Tissue Temp : 22.1 °C

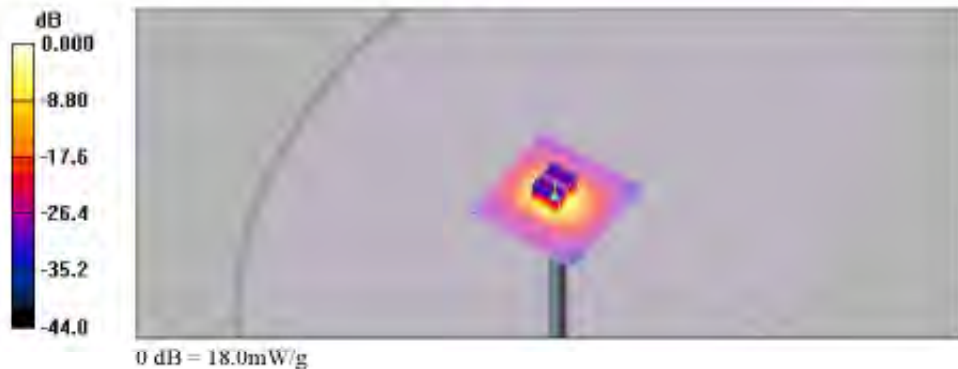
DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106
Program Name: Body Validation

Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5500$ MHz; $\sigma = 5.54$ mho/m; $\epsilon_r = 50.6$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

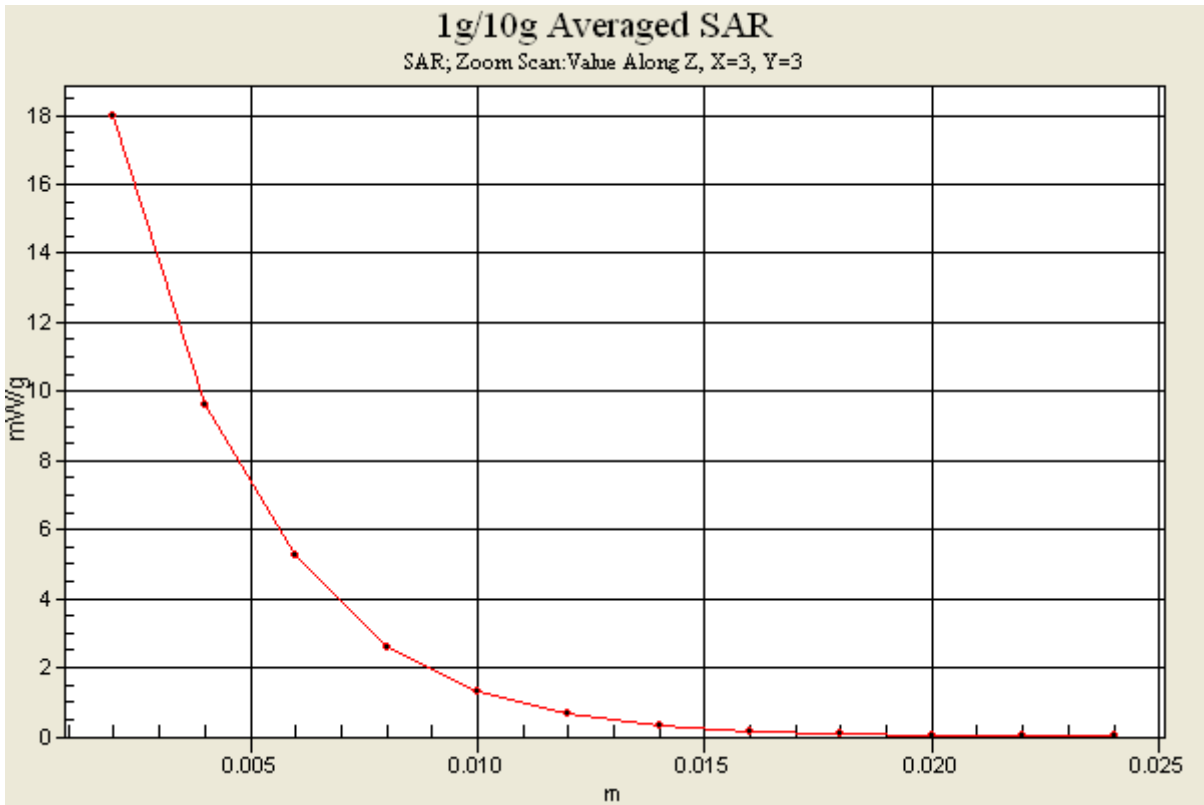
DASY4 Configuration:
 - Probe: EX3DV4 - SN3791; ConvF(3.64, 3.64, 3.64); Calibrated: 2012-05-23
 - Sensor-Surface: 2mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn567; Calibrated: 2012-01-20
 - Phantom: ELI 4.0 12 05 30; Type: QDOVA001BA; Serial: 1169
 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Validation/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 17.1 mW/g

Validation/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 46.6 V/m; Power Drift = 0.158 dB
 Peak SAR (extrapolated) = 36.0 W/kg
SAR(1 g) = 8.47 mW/g; SAR(10 g) = 2.38 mW/g
 Maximum value of SAR (measured) = 18.0 mW/g



Z-Scan



5800 MHz Validation Test_Body

Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [Validation_5800MHz_Body.doc](#)

Input Power : 100 mW

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1106
Program Name: Validation 5800MHz_Body

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.89$ mho/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

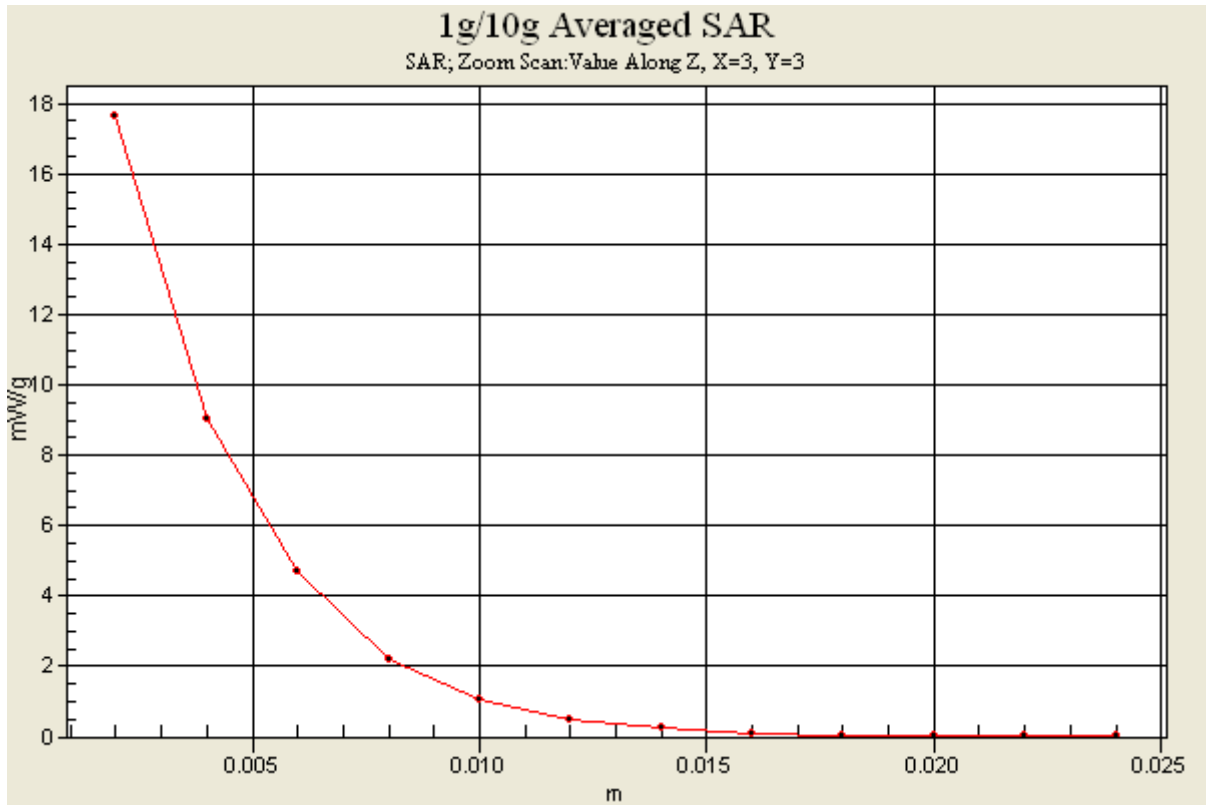
DASY4 Configuration:
 - Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2012-05-23
 - Sensor-Surface: 2mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn567; Calibrated: 2012-01-20
 - Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Validation 5800MHz_Body/Area Scan (91x91x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 17.1 mW/g

Validation 5800MHz_Body/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 47.6 V/m; Power Drift = -0.106 dB
 Peak SAR (extrapolated) = 36.3 W/kg
SAR(1 g) = 8.03 mW/g; SAR(10 g) = 2.23 mW/g
 Maximum value of SAR (measured) = 17.6 mW/g



Z-Scan



2.45 GHz WLAN Body SAR

Date: 2012-09-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [WLAN_Rear_11b_1Mbps_CH1_AUX_ANT.da4](#)

Ambient Temp : 23.2 °C Tissue Temp : 22.4°C

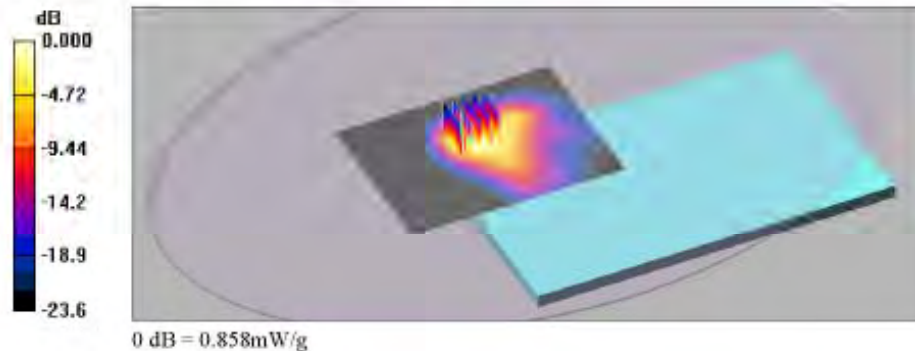
DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN; Frequency: 2412 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 2412 \text{ MHz}$; $\sigma = 1.93 \text{ mho/m}$; $\epsilon_r = 52.7$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

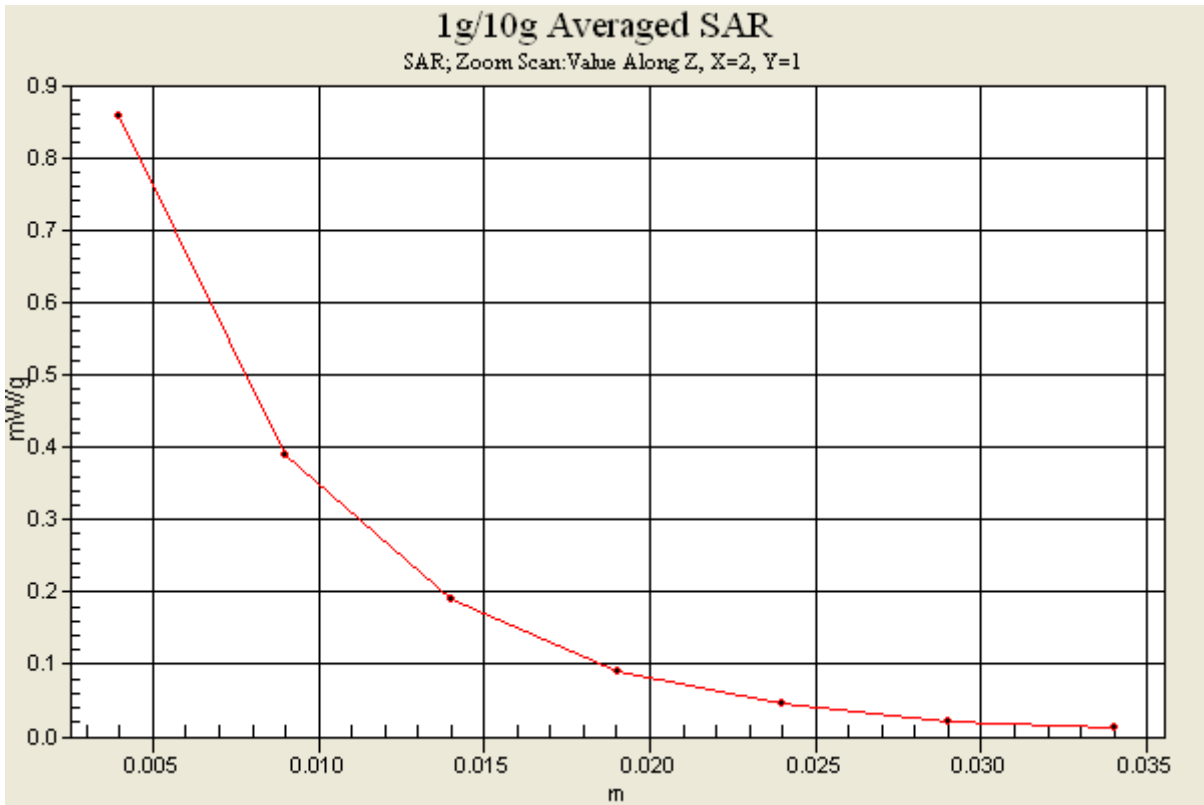
DASY4 Configuration:
 - Probe: ET3DV6 - SN1782; ConvF(4.11, 4.11, 4.11); Calibrated: 2012-04-27
 - Sensor-Surface: 4mm (Mechanical Surface Detection)
 - Electronics: DAE3 Sn567; Calibrated: 2012-01-20
 - Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11b_CH1_Rear_AUX ANT/Area Scan (91x121x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
 Maximum value of SAR (interpolated) = 0.795 mW/g

WLAN_11b_CH1_Rear_AUX ANT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 8.69 V/m; Power Drift = -0.038 dB
 Peak SAR (extrapolated) = 1.91 W/kg
SAR(1 g) = 0.777 mW/g; SAR(10 g) = 0.346 mW/g
 Maximum value of SAR (measured) = 0.858 mW/g



Z-Scan



Date: 2012-09-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [WLAN_Rear_11b_1Mbps_CH6_Main_ANT.da4](#)

Ambient Temp : 23.2 °C Tissue Temp : 22.4°C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

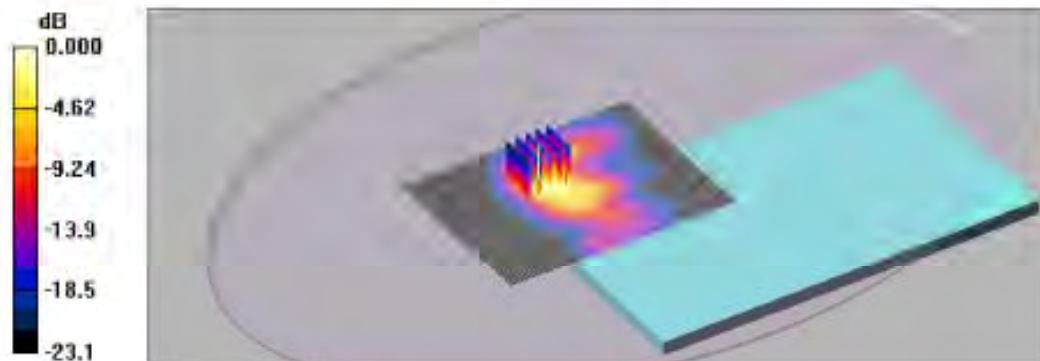
Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.98 \text{ mho/m}$; $\epsilon_r = 52.5$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.11, 4.11, 4.11); Calibrated: 2012-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11b_CH6_Rear_Main ANT/Area Scan (91x121x1): Measurement grid:
 $dx=15\text{mm}$, $dy=15\text{mm}$
 Maximum value of SAR (interpolated) = 0.624 mW/g

WLAN_11b_CH6_Rear_Main ANT/Zoom Scan (5x5x7)/Cube 0: Measurement grid:
 $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 6.01 V/m; Power Drift = -0.005 dB
 Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.544 mW/g; SAR(10 g) = 0.246 mW/g
 Maximum value of SAR (measured) = 0.612 mW/g



0 dB = 0.612mW/g

Date: 2012-09-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11b_1Mbps_CH6_AUX ANT.da4

Ambient Temp : 23.2 °C Tissue Temp : 22.4°C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

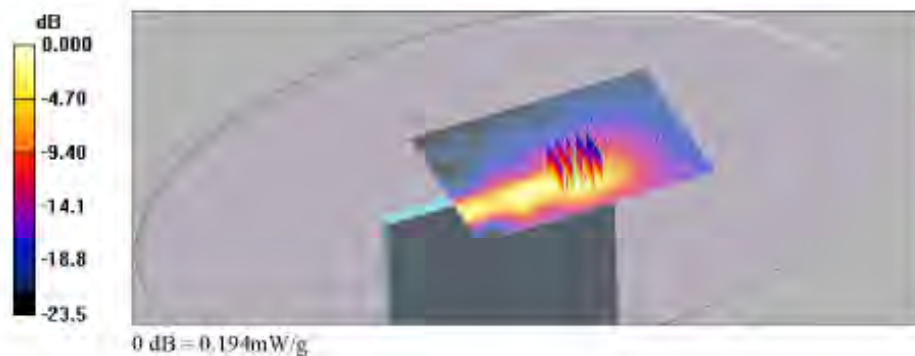
Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.98 \text{ mho/m}$; $\epsilon_r = 52.5$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.11, 4.11, 4.11); Calibrated: 2012-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11b_CH6_Left Edge_AUX ANT/Area Scan (91x131x1): Measurement grid:
 $dx=15\text{mm}$, $dy=15\text{mm}$
 Maximum value of SAR (interpolated) = 0.188 mW/g

WLAN_11b_CH6_Left Edge_AUX ANT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 6.49 V/m; Power Drift = -0.050 dB
 Peak SAR (extrapolated) = 0.351 W/kg
SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.087 mW/g
 Maximum value of SAR (measured) = 0.194 mW/g



Date: 2012-09-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [WLAN_Right Edge_11b_1Mbps_CH6_Main ANT.daf](#)

Ambient Temp : 23.2 °C Tissue Temp : 22.4°C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

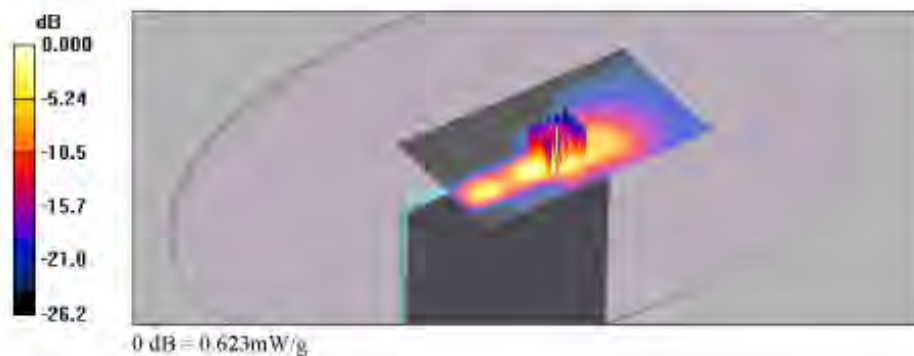
Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.98 \text{ mho/m}$; $\epsilon_r = 52.5$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.11, 4.11, 4.11); Calibrated: 2012-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11b_CH6_Right Edge_Main ANT/Area Scan (81x141x1): Measurement grid:
 $dx=15\text{mm}$, $dy=15\text{mm}$
 Maximum value of SAR (interpolated) = 0.551 mW/g

WLAN_11b_CH6_Right Edge_Main ANT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 10.7 V/m; Power Drift = 0.007 dB
 Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.562 mW/g; SAR(10 g) = 0.249 mW/g
 Maximum value of SAR (measured) = 0.623 mW/g



Date: 2012-09-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [WLAN_Top_11b_1Mbps_CH6_Main ANT.dad](#)

Ambient Temp : 23.2 °C Tissue Temp : 22.4°C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

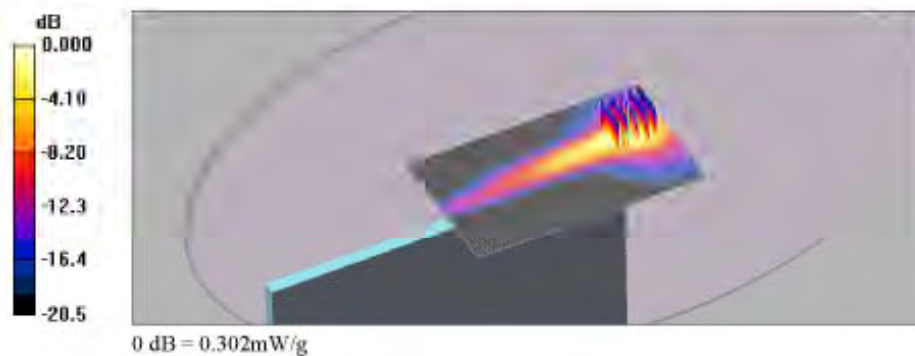
Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.98 \text{ mho/m}$; $\epsilon_r = 52.5$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.11, 4.11, 4.11); Calibrated: 2012-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11b_CH6_Top_Main ANT/Area Scan (81x131x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 0.313 mW/g

WLAN_11b_CH6_Top_Main ANT/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 7.29 V/m; Power Drift = -0.033 dB
 Peak SAR (extrapolated) = 0.557 W/kg
SAR(1 g) = 0.267 mW/g; SAR(10 g) = 0.130 mW/g
 Maximum value of SAR (measured) = 0.302 mW/g



Date: 2012-09-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Bottom_11b_1Mbps_CH6_AUX_ANT.d4

Ambient Temp : 23.2 °C Tissue Temp : 22.4°C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

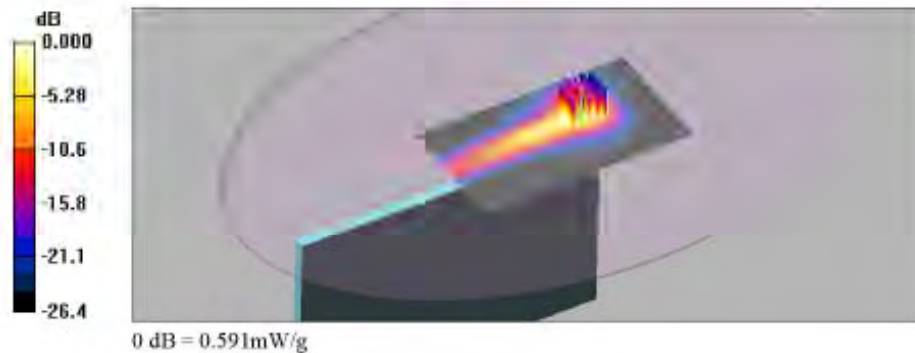
Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 2437 \text{ MHz}$; $\sigma = 1.98 \text{ mho/m}$; $\epsilon_r = 52.5$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.11, 4.11, 4.11); Calibrated: 2012-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11b_CH6_Bottom_AUX ANT/Area Scan (81x141x1): Measurement grid:
 $dx=15\text{mm}$, $dy=15\text{mm}$
 Maximum value of SAR (interpolated) = 0.617 mW/g

WLAN_11b_CH6_Bottom_AUX ANT/Zoom Scan (5x5x7)/Cube 0: Measurement grid:
 $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 11.6 V/m; Power Drift = -0.103 dB
 Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.520 mW/g; SAR(10 g) = 0.239 mW/g
 Maximum value of SAR (measured) = 0.591 mW/g



Date: 2012-09-10

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11nHT20_HT8_CH6_MIMO ANT.da4

Ambient Temp : 23.2 °C Tissue Temp : 22.4°C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

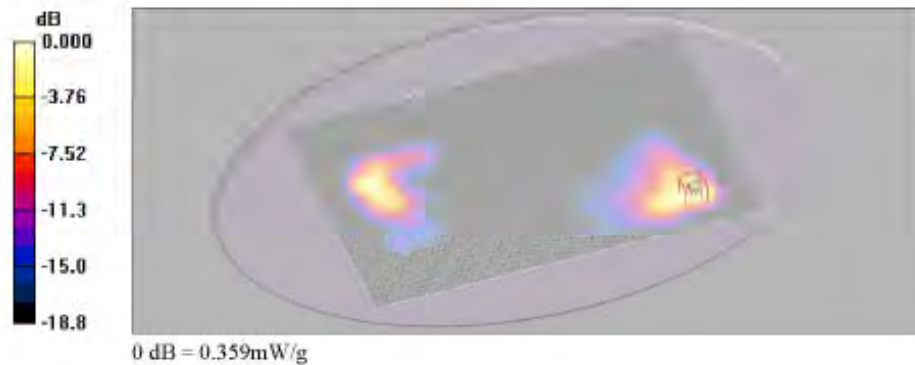
Communication System: WLAN; Frequency: 2437 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 2437$ MHz; $\sigma = 1.98$ mho/m; $\epsilon_r = 52.5$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1782; ConvF(4.11, 4.11, 4.11); Calibrated: 2012-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11nHT20_CH6_Rear_MIMO ANT/Area Scan (261x391x1): Measurement grid:
 $dx=10$ mm, $dy=10$ mm
 Maximum value of SAR (interpolated) = 0.351 mW/g

WLAN_11nHT20_CH6_Rear_MIMO ANT/Zoom Scan (7x7x12)/Cube 0:
 Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=2$ mm
 Reference Value = 0.854 V/m; Power Drift = -0.009 dB
 Peak SAR (extrapolated) = 0.648 W/kg
SAR(1 g) = 0.260 mW/g; SAR(10 g) = 0.115 mW/g
 Maximum value of SAR (measured) = 0.359 mW/g



5.2 GHz, 5.3 GHz WLAN Body SAR

Date: 2012-08-16

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11a_6Mbps_CH36_Main ANT.dsf

Ambient Temp : 23.5 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXT191CC700037P
 Program Name: WLAN_Body

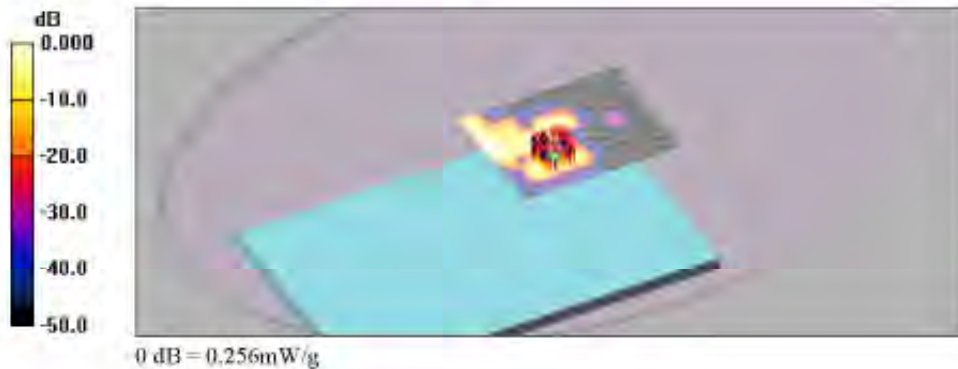
Communication System: WLAN(11a U-NII Low); Frequency: 5180 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5180$ MHz; $\sigma = 5.19$ mho/m; $\epsilon_r = 48.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH36_Rear_Main ANT/Area Scan (101x131x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.279 mW/g

WLAN_11a_CH36_Rear_Main ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 2.77 V/m; Power Drift = 0.063 dB
 Peak SAR (extrapolated) = 0.477 W/kg
SAR(1 g) = 0.113 mW/g; SAR(10 g) = 0.026 mW/g
 Maximum value of SAR (measured) = 0.256 mW/g



Date: 2012-08-16

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11a_6Mbps_CH36_AUX_ANT.dad

Ambient Temp : 23.5 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

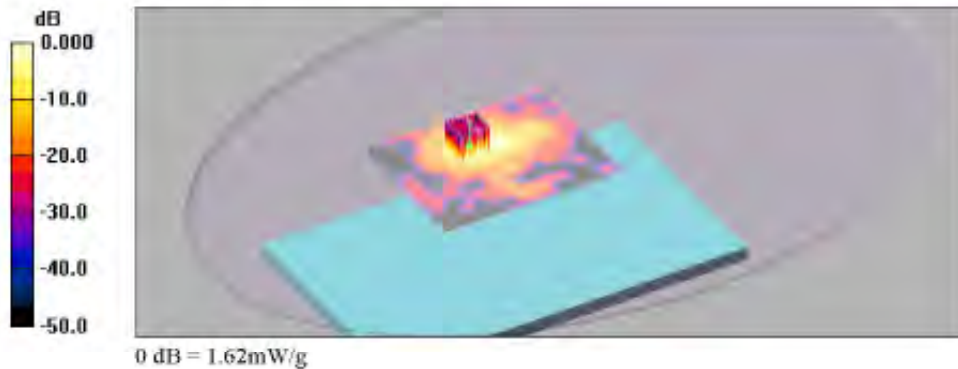
Communication System: WLAN(11a_U-NII Low); Frequency: 5180 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5180$ MHz; $\sigma = 5.19$ mho/m; $\epsilon_r = 48.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH36_Rear_AUX ANT/Area Scan (121x151x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.56 mW/g

WLAN_11a_CH36_Rear_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 0.762 V/m; Power Drift = 0.149 dB
 Peak SAR (extrapolated) = 3.40 W/kg
SAR(1 g) = 0.832 mW/g; SAR(10 g) = 0.248 mW/g
 Maximum value of SAR (measured) = 1.62 mW/g



Date: 2012-08-16

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11a_6Mbps_CH44_AUX_ANT.dad

Ambient Temp : 23.5 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

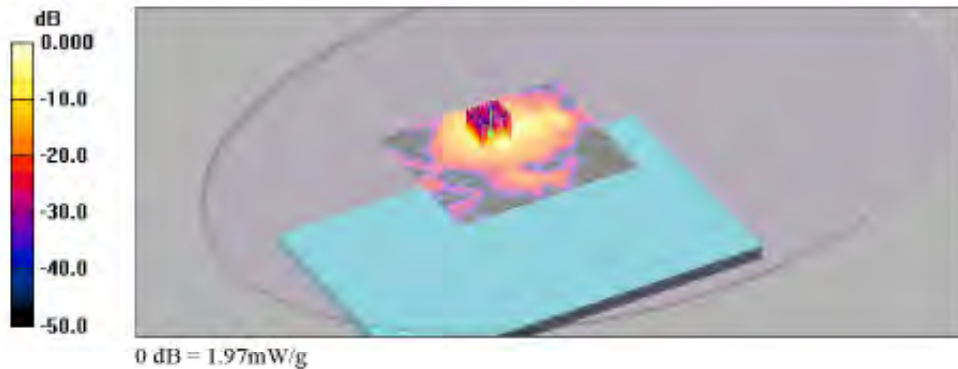
Communication System: WLAN(11a_U-NII Low); Frequency: 5220 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5220$ MHz; $\sigma = 5.24$ mho/m; $\epsilon_r = 48.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

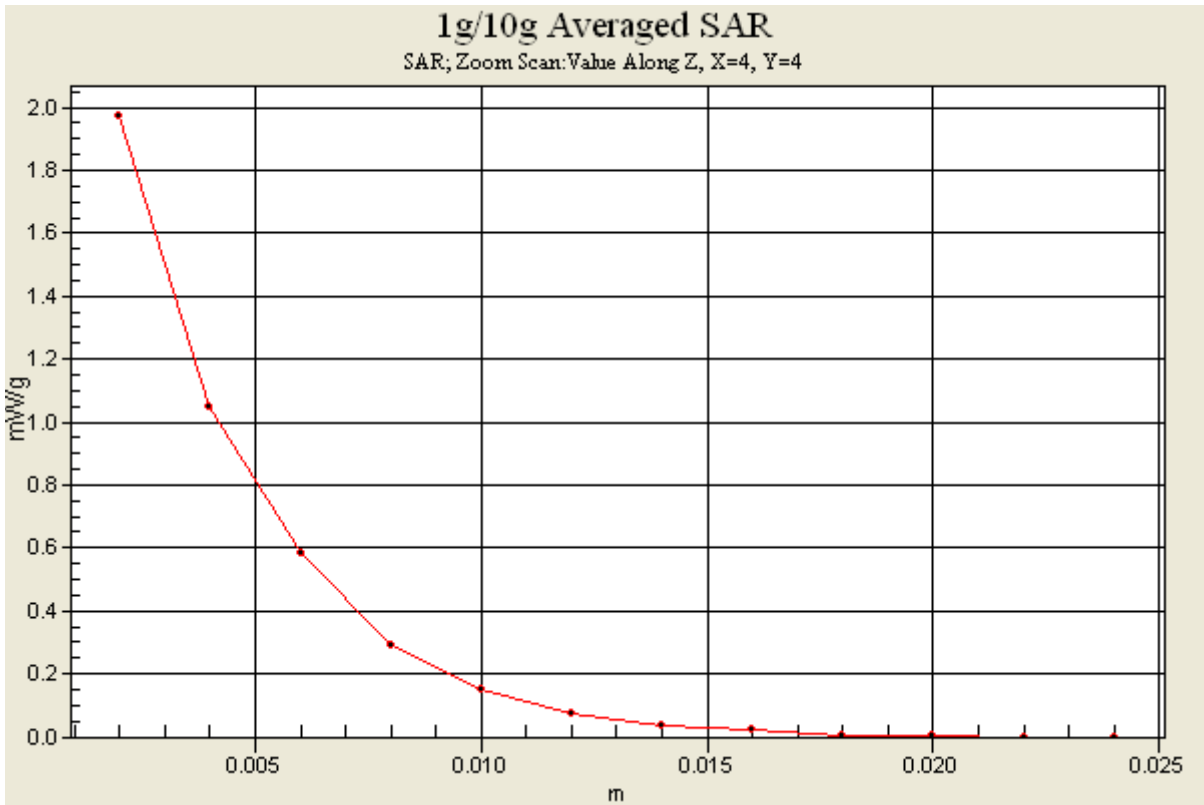
- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH44_Rear_AUX ANT/Area Scan (121x151x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.90 mW/g

WLAN_11a_CH44_Rear_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 1.14 V/m; Power Drift = 0.188 dB
 Peak SAR (extrapolated) = 4.22 W/kg
SAR(1 g) = 0.980 mW/g; SAR(10 g) = 0.294 mW/g
 Maximum value of SAR (measured) = 1.97 mW/g



Z-Scan



Date: 2012-08-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11a_6Mbps_CH52_AUX_ANT.dad

Ambient Temp : 23.8 °C Tissue Temp : 22.9 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

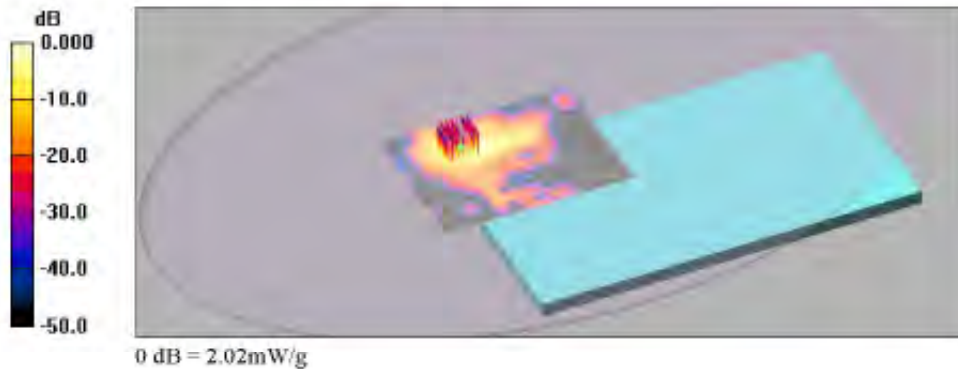
Communication System: WLAN(11a_U-NII Low); Frequency: 5260 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5260$ MHz; $\sigma = 5.34$ mho/m; $\epsilon_r = 49.1$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.7, 3.7, 3.7); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH52_Rear_AUX ANT/Area Scan (121x151x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 2.08 mW/g

WLAN_11a_CH52_Rear_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 1.67 V/m; Power Drift = -0.066 dB
 Peak SAR (extrapolated) = 4.09 W/kg
SAR(1 g) = 0.977 mW/g; SAR(10 g) = 0.282 mW/g
 Maximum value of SAR (measured) = 2.02 mW/g



Date: 2012-08-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11a_6Mbps_CH60_Main_ANT.diel

Ambient Temp : 23.8 °C Tissue Temp : 22.9 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

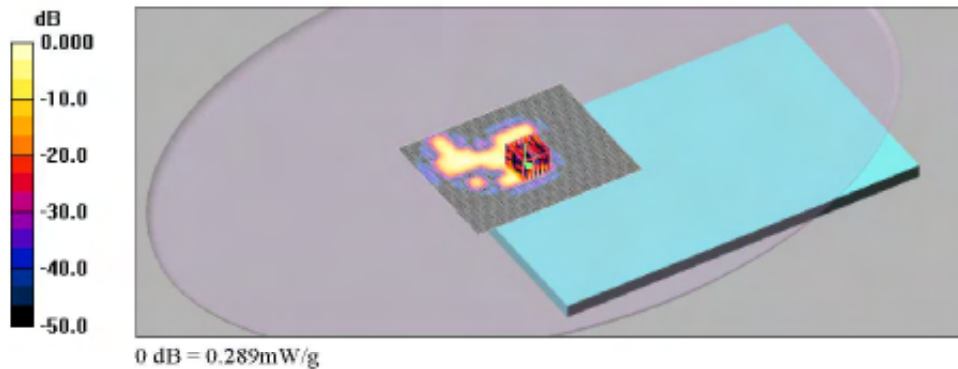
Communication System: WLAN(11a_U-NII Low); Frequency: 5300 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5300$ MHz; $\sigma = 5.38$ mho/m; $\epsilon_r = 49$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.7, 3.7, 3.7); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH60_Rear_Main ANT/Area Scan (111x141x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.390 mW/g

WLAN_11a_CH60_Rear_Main ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 3.01 V/m; Power Drift = 0.097 dB
 Peak SAR (extrapolated) = 0.500 W/kg
SAR(1 g) = 0.120 mW/g; SAR(10 g) = 0.027 mW/g
 Maximum value of SAR (measured) = 0.289 mW/g



Date: 2012-08-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11a_6Mbps_CH64_AUX_ANT.dad

Ambient Temp : 23.8 °C Tissue Temp : 22.9 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

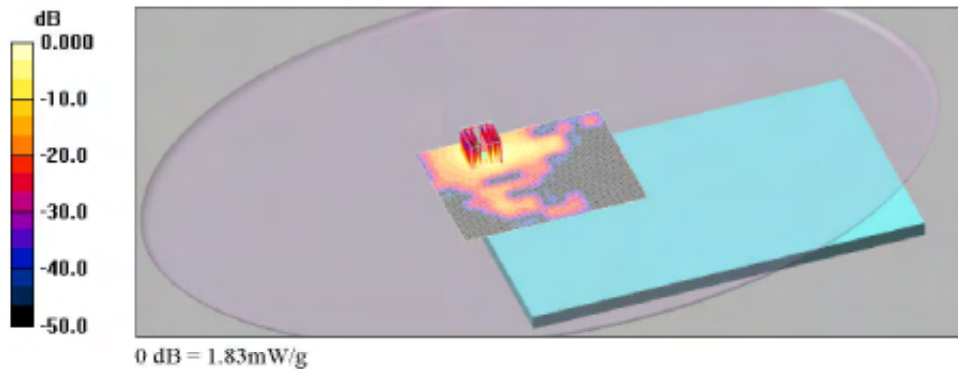
Communication System: WLAN(11a_U-NII Low); Frequency: 5320 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5320$ MHz; $\sigma = 5.41$ mho/m; $\epsilon_r = 48.9$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.7, 3.7, 3.7); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH64_Rear_AUX ANT/Area Scan (111x141x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.56 mW/g

WLAN_11a_CH64_Rear_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 1.96 V/m; Power Drift = -0.021 dB
 Peak SAR (extrapolated) = 3.93 W/kg
SAR(1 g) = 0.887 mW/g; SAR(10 g) = 0.245 mW/g
 Maximum value of SAR (measured) = 1.83 mW/g



Date: 2012-08-16

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11a_5Mbps_CH36_AUX_ANT.daf

Ambient Temp : 23.5 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

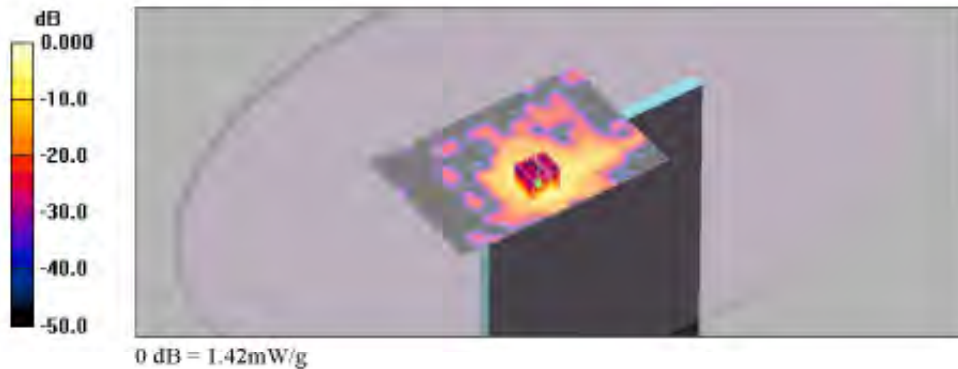
Communication System: WLAN(11a_U-NII Low); Frequency: 5180 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5180$ MHz; $\sigma = 5.19$ mho/m; $\epsilon_r = 48.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH36_Left Edge_AUX ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.41 mW/g

WLAN_11a_CH36_Left Edge_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 5.52 V/m; Power Drift = 0.102 dB
 Peak SAR (extrapolated) = 2.85 W/kg
SAR(1 g) = 0.696 mW/g; SAR(10 g) = 0.197 mW/g
 Maximum value of SAR (measured) = 1.42 mW/g



Date: 2012-08-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11a_6Mbps_CH64_AUX_ANT.dsf

Ambient Temp : 23.8 °C Tissue Temp : 22.9 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_U-NII Low); Frequency: 5320 MHz; Duty Cycle: 1:1
 Medium parameters used: $F = 5320$ MHz; $\sigma = 5.41$ mho/m; $\epsilon_r = 48.9$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.7, 3.7, 3.7); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH64_Left Edge_AUX ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.951 mW/g

WLAN_11a_CH64_Left Edge_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 4.70 V/m; Power Drift = -0.019 dB
 Peak SAR (extrapolated) = 1.69 W/kg
SAR(1 g) = 0.450 mW/g; SAR(10 g) = 0.141 mW/g
 Maximum value of SAR (measured) = 0.866 mW/g



Date: 2012-08-16

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Right Edge_11a_6Mbps_CH36_Main ANT.dad

Ambient Temp : 23.5 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

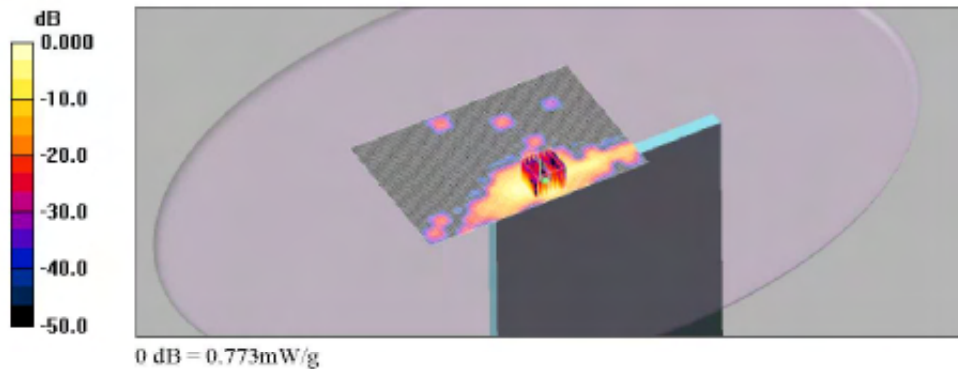
Communication System: WLAN(11a_U-NII Low); Frequency: 5180 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5180$ MHz; $\sigma = 5.19$ mho/m; $\epsilon_r = 48.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH36_Right Edge_Main ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.712 mW/g

WLAN_11a_CH36_Right Edge_Main ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 7.28 V/m; Power Drift = 0.002 dB
 Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 0.351 mW/g; SAR(10 g) = 0.090 mW/g
 Maximum value of SAR (measured) = 0.773 mW/g



Date: 2012-08-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Right Edge_11a_6Mbps_CH60_Main ANT.dad

Ambient Temp : 23.8 °C Tissue Temp : 22.9 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

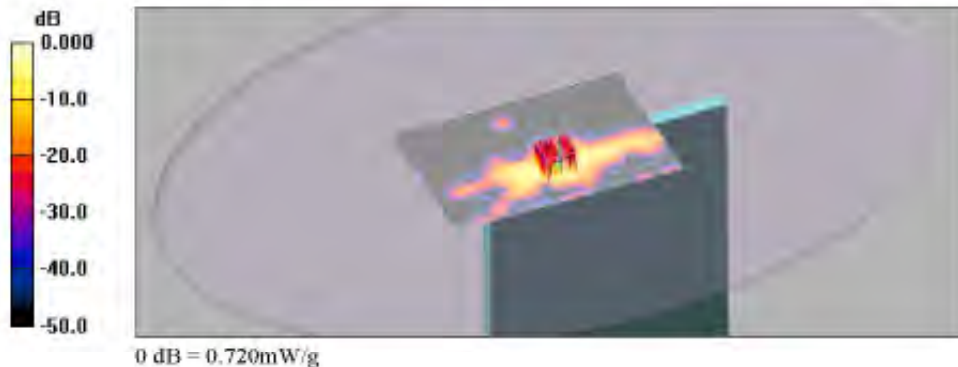
Communication System: WLAN(11a_U-NII Low); Frequency: 5300 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5300$ MHz; $\sigma = 5.38$ mho/m; $\epsilon_r = 49$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.7, 3.7, 3.7); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH60_Right Edge_Main ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.729 mW/g

WLAN_11a_CH60_Right Edge_Main ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 6.05 V/m; Power Drift = 0.053 dB
 Peak SAR (extrapolated) = 1.51 W/kg
SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.084 mW/g
 Maximum value of SAR (measured) = 0.720 mW/g



Date: 2012-08-16

Test Laboratory: SGS Korea (Gimpo Laboratory)
 File Name: WLAN_Top_11a_6Mbps_CH36_Main_ANT.dic

Ambient Temp : 23.5 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

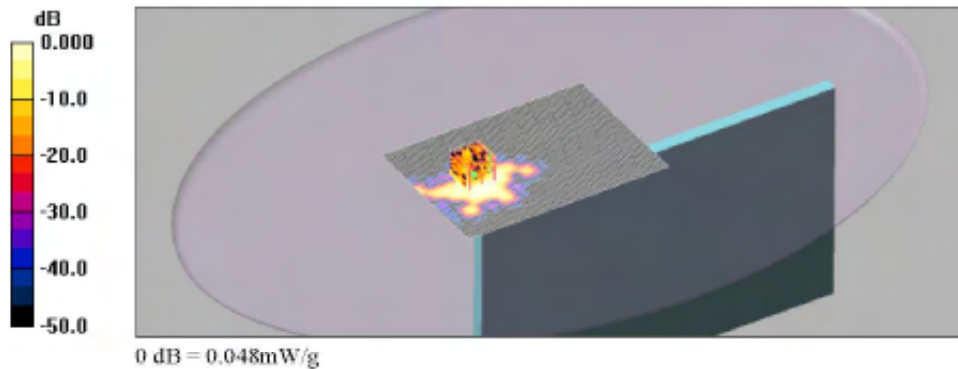
Communication System: WLAN(11a_U-NII Low); Frequency: 5180 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5180$ MHz; $\sigma = 5.19$ mho/m; $\epsilon_r = 48.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH36_Top_Main ANT/Area Scan (121x171x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.081 mW/g

WLAN_11a_CH36_Top_Main ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 1.40 V/m; Power Drift = 0.016 dB
 Peak SAR (extrapolated) = 0.090 W/kg
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.00609 mW/g
 Maximum value of SAR (measured) = 0.048 mW/g



Date: 2012-08-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Top_11a_6Mbps_CH60_Main_ANT.dic

Ambient Temp : 23.8 °C Tissue Temp : 22.9 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

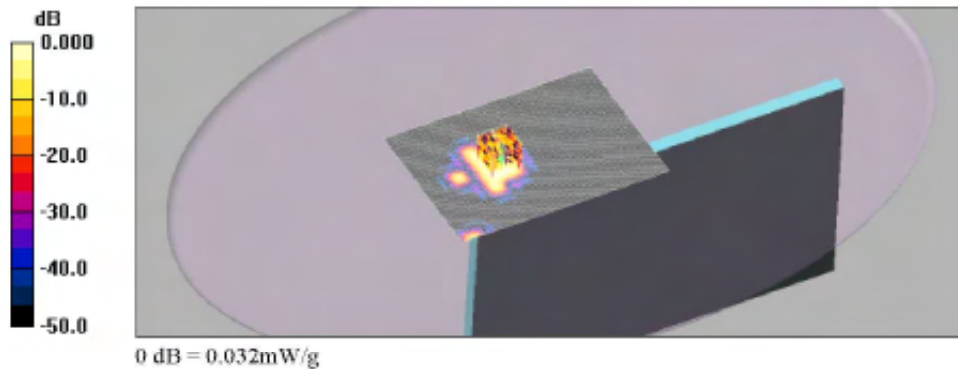
Communication System: WLAN(11a_U-NII Low); Frequency: 5300 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5300$ MHz; $\sigma = 5.38$ mho/m; $\epsilon_r = 49$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.7, 3.7, 3.7); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH60_Top_Main ANT/Area Scan (121x171x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.075 mW/g

WLAN_11a_CH60_Top_Main ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 0.963 V/m; Power Drift = -0.168 dB
 Peak SAR (extrapolated) = 0.124 W/kg
SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00526 mW/g
 Maximum value of SAR (measured) = 0.032 mW/g



Date: 2012-08-16

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Bottom_11a_6Mbps_CH36_AUX_ANT.dic

Ambient Temp : 23.5 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_U-NII Low); Frequency: 5180 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5180$ MHz; $\sigma = 5.19$ mho/m; $\epsilon_r = 48.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH36_Bottom_AUX ANT/Area Scan (121x151x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.621 mW/g

WLAN_11a_CH36_Bottom_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 5.97 V/m; Power Drift = 0.152 dB
 Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.309 mW/g; SAR(10 g) = 0.089 mW/g
 Maximum value of SAR (measured) = 0.654 mW/g



Date: 2012-08-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Bottom_11a_6Mbps_CH64_AUX_ANT.diel

Ambient Temp : 23.8 °C Tissue Temp : 22.9 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

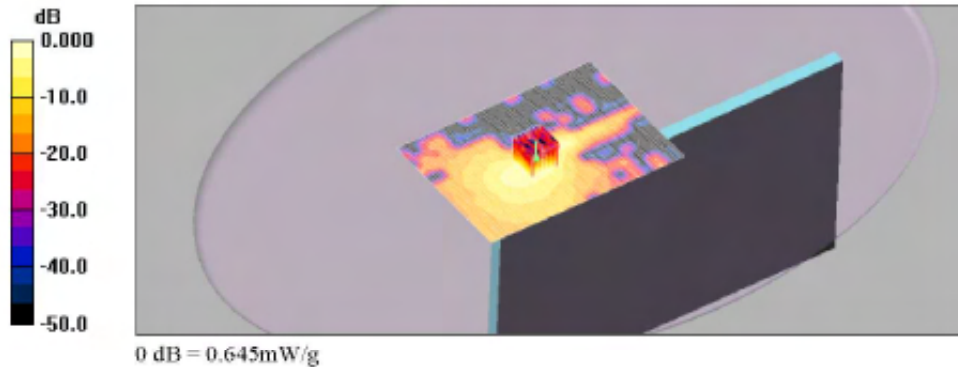
Communication System: WLAN(11a_U-NII Low); Frequency: 5320 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5320$ MHz; $\sigma = 5.41$ mho/m; $\epsilon_r = 48.9$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.7, 3.7, 3.7); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH64_Bottom_AUX ANT/Area Scan (121x171x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.594 mW/g

WLAN_11a_CH64_Bottom_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 4.29 V/m; Power Drift = 0.123 dB
 Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.319 mW/g; SAR(10 g) = 0.095 mW/g
 Maximum value of SAR (measured) = 0.645 mW/g



Date: 2012-08-16

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [WLAN_Rear_11nHT20_HT8_CH36_MIMO ANT.da4](#)

Ambient Temp : 23.5 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

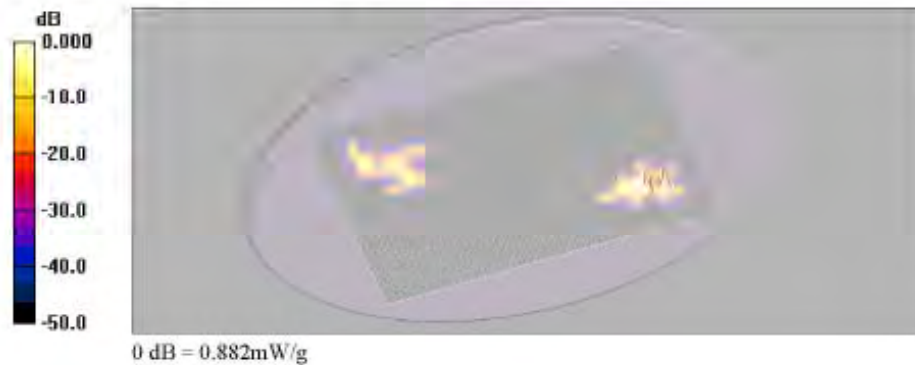
Communication System: WLAN(11a_U-NII Low); Frequency: 5180 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5180 \text{ MHz}$; $\sigma = 5.19 \text{ mho/m}$; $\epsilon_r = 48.8$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(4, 4, 4); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11nHT20_CH36_Rear_MIMO ANT/Area Scan (251x381x1): Measurement
 grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (interpolated) = 0.810 mW/g

WLAN_11nHT20_CH36_Rear_MIMO ANT/Zoom Scan (7x7x12)/Cube 0:
 Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$
 Reference Value = 0.497 V/m; Power Drift = 0.179 dB
 Peak SAR (extrapolated) = 1.86 W/kg
SAR(1 g) = 0.435 mW/g; SAR(10 g) = 0.116 mW/g
 Maximum value of SAR (measured) = 0.882 mW/g



Date: 2012-08-17

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [WLAN_Rear_11nHT20_HT8_CH64_MIMO ANT.da4](#)

Ambient Temp : 23.8 °C Tissue Temp : 22.9 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

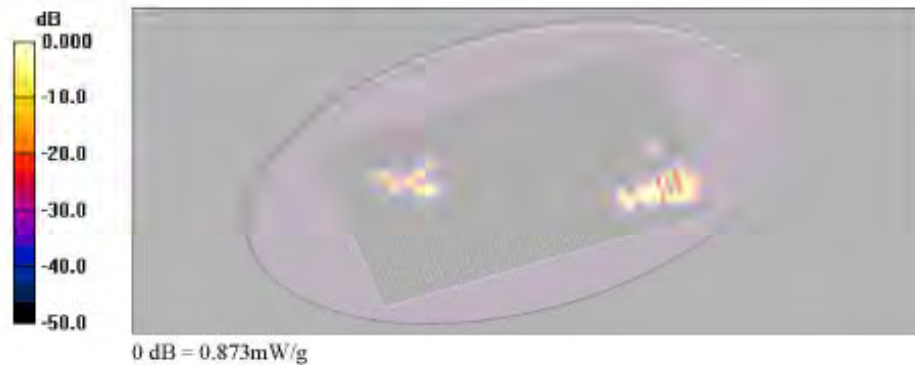
Communication System: WLAN(11a_U-NII Low); Frequency: 5320 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5320 \text{ MHz}$; $\sigma = 5.41 \text{ mho/m}$; $\epsilon_r = 48.9$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.7, 3.7, 3.7); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11nHT20_CH64_Rear_MIMO ANT/Area Scan (251x381x1): Measurement
 grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (interpolated) = 0.842 mW/g

WLAN_11nHT20_CH64_Rear_MIMO ANT/Zoom Scan (7x7x12)/Cube 0:
 Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$
 Reference Value = 1.64 V/m; Power Drift = 0.119 dB
 Peak SAR (extrapolated) = 1.83 W/kg
SAR(1 g) = 0.436 mW/g; SAR(10 g) = 0.130 mW/g
 Maximum value of SAR (measured) = 0.873 mW/g



5.5 GHz WLAN Body SAR

Date: 2012-09-12

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11a_6Mbps_CH120_AUX_ANT.dat

Ambient Temp : 23.0 °C Tissue Temp : 22.1 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_H or CEPT); Frequency: 5600 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.67$ mho/m; $\epsilon_r = 50.5$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

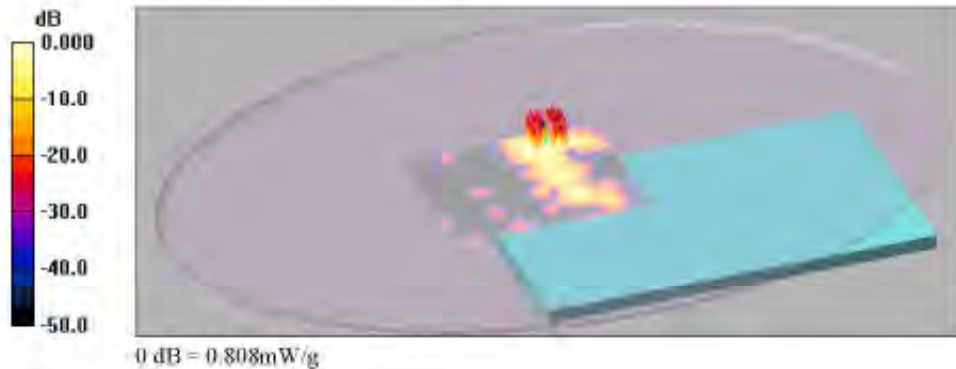
- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0 12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH120_Rear_AUX ANT/Area Scan (121x151x1): Measurement grid:

dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.834 mW/g

WLAN_11a_CH120_Rear_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:

dx=4mm, dy=4mm, dz=2mm
 Reference Value = 4.19 V/m; Power Drift = -0.017 dB
 Peak SAR (extrapolated) = 1.70 W/kg
SAR(1 g) = 0.350 mW/g; SAR(10 g) = 0.095 mW/g
 Maximum value of SAR (measured) = 0.808 mW/g



Date: 2012-09-12

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11a_6Mbps_CH136_Main_ANT.daf

Ambient Temp : 23.0 °C Tissue Temp : 22.1 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

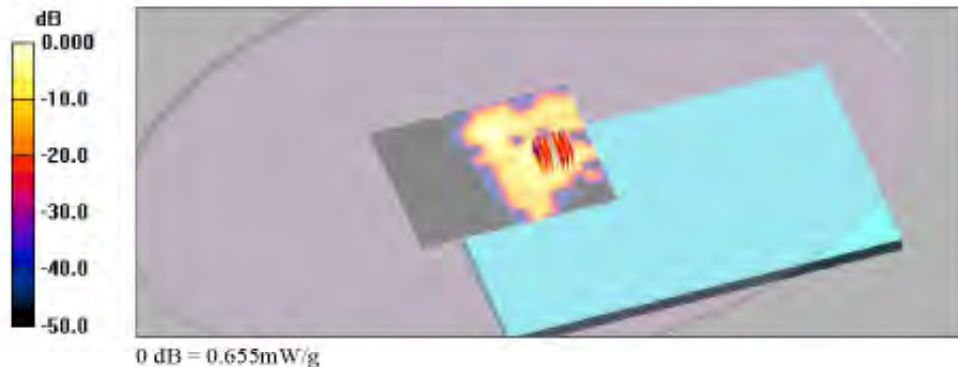
Communication System: WLAN(11a_H or CEPT); Frequency: 5680 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5680$ MHz; $\sigma = 5.78$ mho/m; $\epsilon_r = 50.3$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH136_Rear_Main ANT/Area Scan (121x151x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.561 mW/g

WLAN_11a_CH136_Rear_Main ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 5.19 V/m; Power Drift = 0.078 dB
 Peak SAR (extrapolated) = 1.55 W/kg
SAR(1 g) = 0.286 mW/g; SAR(10 g) = 0.078 mW/g
 Maximum value of SAR (measured) = 0.655 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11a_6Mbps_CH104_AUX_ANT.dad

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_H or CEPT); Frequency: 5520 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5520$ MHz; $\sigma = 5.55$ mho/m; $\epsilon_r = 48$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.64, 3.64, 3.64); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH104_Left Edge_AUX ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.857 mW/g

WLAN_11a_CH104_Left Edge_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 3.12 V/m; Power Drift = -0.187 dB
 Peak SAR (extrapolated) = 1.85 W/kg
SAR(1 g) = 0.447 mW/g; SAR(10 g) = 0.134 mW/g
 Maximum value of SAR (measured) = 0.918 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11a_6Mbps_CH116_AUX_ANT.dad

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_H or CEPT); Frequency: 5580 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5580$ MHz; $\sigma = 5.64$ mho/m; $\epsilon_r = 47.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH116_Left Edge_AUX ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.928 mW/g

WLAN_11a_CH116_Left Edge_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 2.75 V/m; Power Drift = -0.127 dB
 Peak SAR (extrapolated) = 2.00 W/kg
SAR(1 g) = 0.487 mW/g; SAR(10 g) = 0.147 mW/g
 Maximum value of SAR (measured) = 0.995 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11a_6Mbps_CH120_AUX_ANT.dad

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

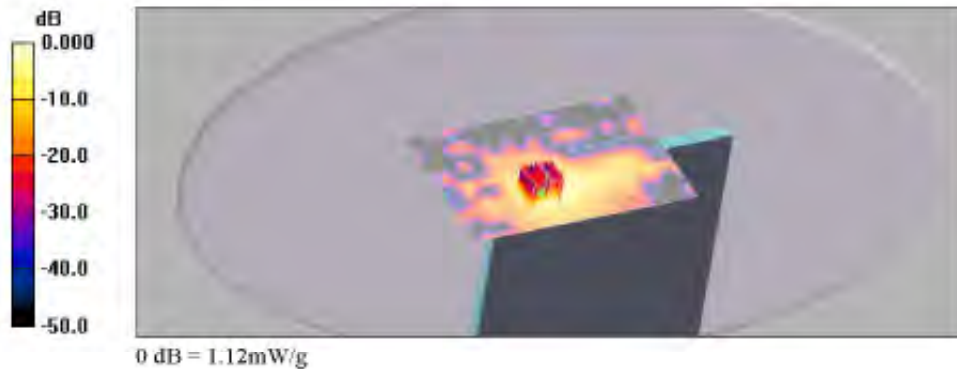
Communication System: WLAN(11a_H or CEPT); Frequency: 5600 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.66$ mho/m; $\epsilon_r = 47.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH120_Left Edge_AUX ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.02 mW/g

WLAN_11a_CH120_Left Edge_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 4.81 V/m; Power Drift = 0.192 dB
 Peak SAR (extrapolated) = 2.26 W/kg
SAR(1 g) = 0.529 mW/g; SAR(10 g) = 0.151 mW/g
 Maximum value of SAR (measured) = 1.12 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11a_6Mbps_CH124_AUX_ANT.dad

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

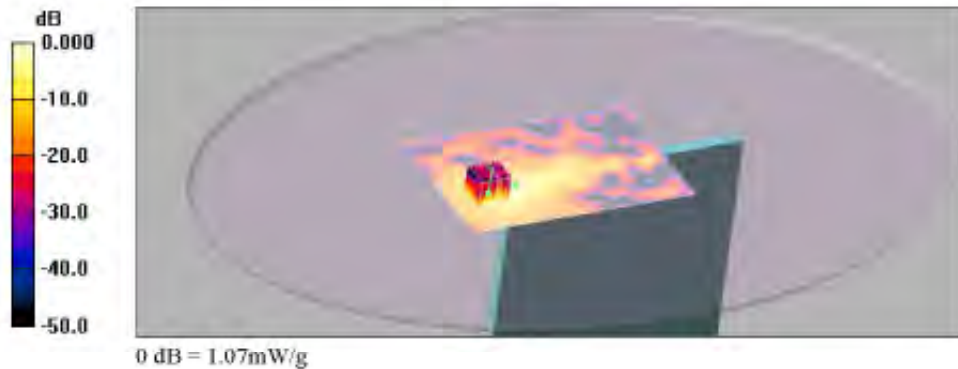
Communication System: WLAN(11a_H or CEPT); Frequency: 5620 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5620$ MHz; $\sigma = 5.67$ mho/m; $\epsilon_r = 47.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH124_Left Edge_AUX ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.888 mW/g

WLAN_11a_CH124_Left Edge_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 4.92 V/m; Power Drift = -0.131 dB
 Peak SAR (extrapolated) = 2.14 W/kg
SAR(1 g) = 0.493 mW/g; SAR(10 g) = 0.131 mW/g
 Maximum value of SAR (measured) = 1.07 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11a_6Mbps_CH124_AUX_ANT.dad

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

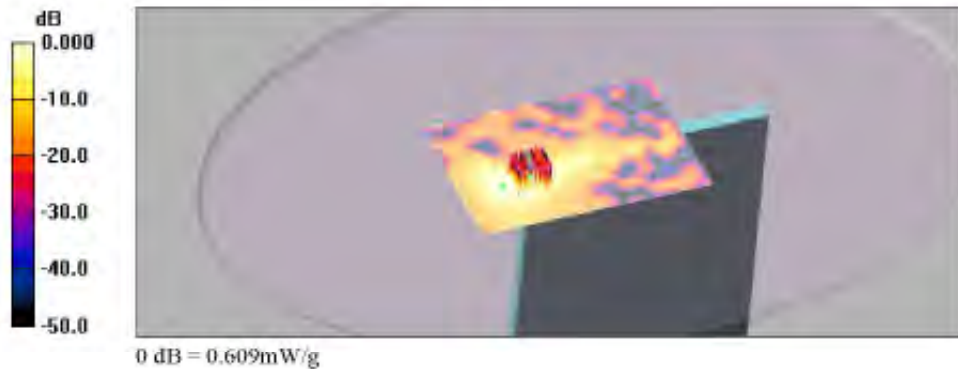
Communication System: WLAN(11a_H or CEPT); Frequency: 5620 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5620$ MHz; $\sigma = 5.67$ mho/m; $\epsilon_r = 47.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH124_Left Edge_AUX ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.888 mW/g

WLAN_11a_CH124_Left Edge_AUX ANT/Zoom Scan (7x7x12)/Cube 1: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 4.92 V/m; Power Drift = -0.131 dB
 Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.312 mW/g; SAR(10 g) = 0.101 mW/g
 Maximum value of SAR (measured) = 0.609 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11a_6Mbps_CH132_AUX_ANT.dad

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

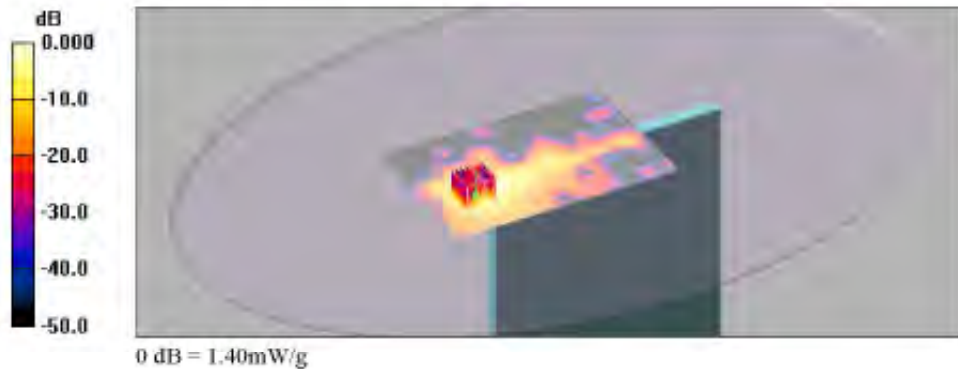
Communication System: WLAN(11a_H or CEPT); Frequency: 5660 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5660$ MHz; $\sigma = 5.71$ mho/m; $\epsilon_r = 47.6$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

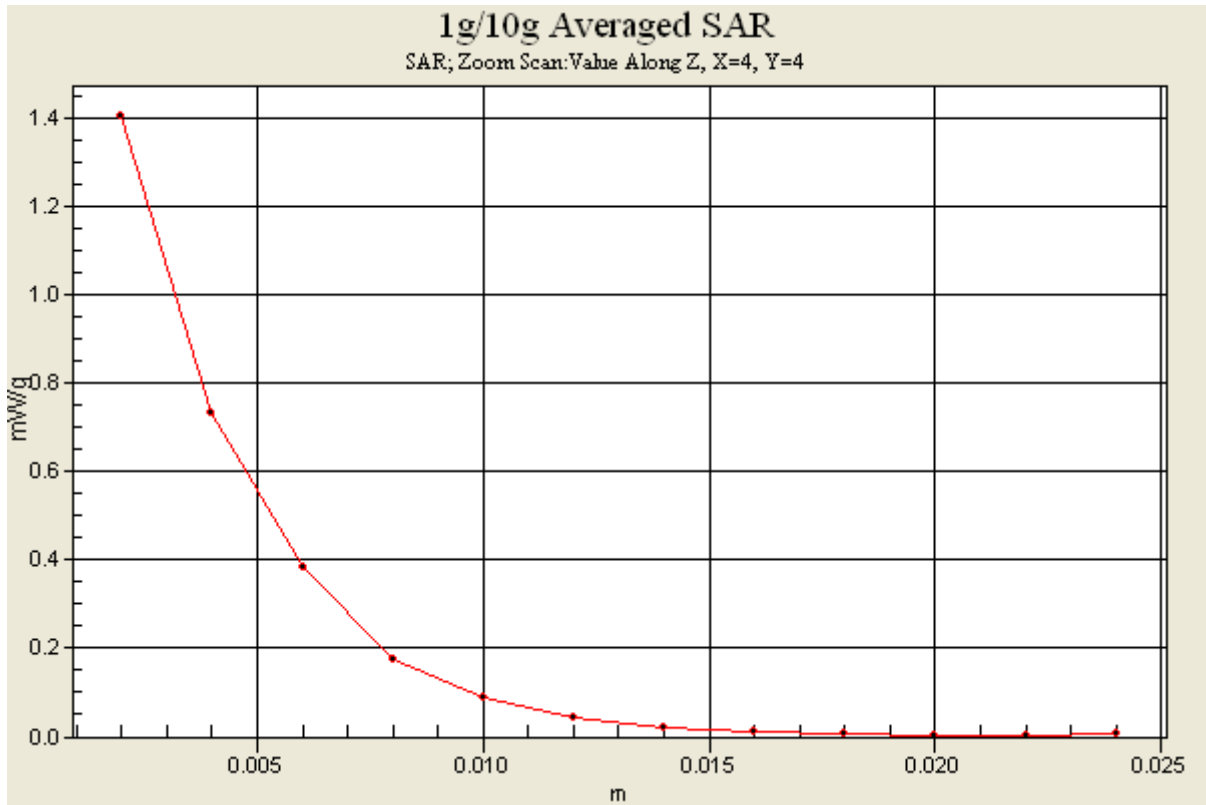
- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH132_Left Edge_AUX ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.18 mW/g

WLAN_11a_CH132_Left Edge_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 6.56 V/m; Power Drift = -0.059 dB
 Peak SAR (extrapolated) = 2.79 W/kg
SAR(1 g) = 0.648 mW/g; SAR(10 g) = 0.184 mW/g
 Maximum value of SAR (measured) = 1.40 mW/g



Z-Scan



Date: 2012-09-12

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Right Edge_11a_6Mbps_CH100_Main_ANT.diel

Ambient Temp : 23.0 °C Tissue Temp : 22.1 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_H or CEPT); Frequency: 5500 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5500$ MHz; $\sigma = 5.54$ mho/m; $\epsilon_r = 50.6$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.64, 3.64, 3.64); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH100_Right Edge_Main ANT/Area Scan (121x181x1): Measurement
 grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.569 mW/g

WLAN_11a_CH100_Right Edge_Main ANT/Zoom Scan (7x7x12)/Cube 0:
 Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 3.64 V/m; Power Drift = -0.157 dB
 Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.296 mW/g; SAR(10 g) = 0.082 mW/g
 Maximum value of SAR (measured) = 0.627 mW/g



Date: 2012-09-12

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Right Edge_11a_6Mbps_CH116_Main_ANT.diel

Ambient Temp : 23.0 °C Tissue Temp : 22.1 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_H or CEPT); Frequency: 5580 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5580$ MHz; $\sigma = 5.65$ mho/m; $\epsilon_r = 50.5$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH116_Right Edge_Main ANT/Area Scan (121x181x1): Measurement
 grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.20 mW/g

WLAN_11a_CH116_Right Edge_Main ANT/Zoom Scan (7x7x12)/Cube 0:
 Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 4.48 V/m; Power Drift = 0.081 dB
 Peak SAR (extrapolated) = 2.36 W/kg
SAR(1 g) = 0.537 mW/g; SAR(10 g) = 0.151 mW/g
 Maximum value of SAR (measured) = 1.17 mW/g



Date: 2012-09-12

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Right Edge_11a_6Mbps_CH124_Main_ANT.diel

Ambient Temp : 23.0 °C Tissue Temp : 22.1 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_H or CEPT); Frequency: 5620 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5620$ MHz; $\sigma = 5.69$ mho/m; $\epsilon_r = 50.4$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH124_Right Edge_Main ANT/Area Scan (121x181x1): Measurement
 grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.18 mW/g

WLAN_11a_CH124_Right Edge_Main ANT/Zoom Scan (7x7x12)/Cube 0:
 Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 3.87 V/m; Power Drift = -0.187 dB
 Peak SAR (extrapolated) = 2.58 W/kg
SAR(1 g) = 0.589 mW/g; SAR(10 g) = 0.168 mW/g
 Maximum value of SAR (measured) = 1.24 mW/g



Date: 2012-09-12

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Right Edge_11a_6Mbps_CH136_Main_ANT.diel

Ambient Temp : 23.0 °C Tissue Temp : 22.1 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

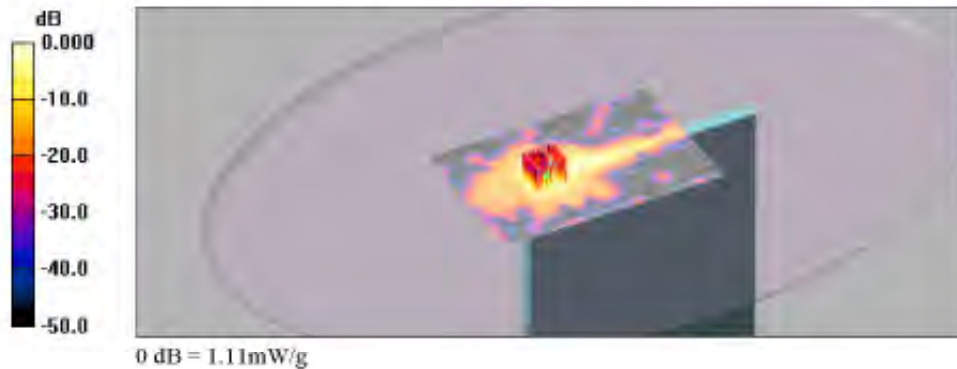
Communication System: WLAN(11a_H or CEPT); Frequency: 5680 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5680$ MHz; $\sigma = 5.78$ mho/m; $\epsilon_r = 50.3$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH136_Right Edge_Main ANT/Area Scan (121x181x1): Measurement
 grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 1.14 mW/g

WLAN_11a_CH136_Right Edge_Main ANT/Zoom Scan (7x7x12)/Cube 0:
 Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 4.04 V/m; Power Drift = 0.141 dB
 Peak SAR (extrapolated) = 2.36 W/kg
SAR(1 g) = 0.552 mW/g; SAR(10 g) = 0.158 mW/g
 Maximum value of SAR (measured) = 1.11 mW/g



Date: 2012-09-12

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Top_11a_6Mbps_CH136_Main ANT.dat

Ambient Temp : 23.0 °C Tissue Temp : 22.1 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_H or CEPT); Frequency: 5680 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5680$ MHz; $\sigma = 5.78$ mho/m; $\epsilon_r = 50.3$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH136_Top_Main ANT/Area Scan (121x171x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.117 mW/g

WLAN_11a_CH136_Top_Main ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 1.73 V/m; Power Drift = -0.196 dB
 Peak SAR (extrapolated) = 0.163 W/kg
SAR(1 g) = 0.031 mW/g; SAR(10 g) = 0.00904 mW/g
 Maximum value of SAR (measured) = 0.073 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Bottom_11a_6Mbps_CH120_AUX_ANT.dae

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_H or CEPT); Frequency: 5600 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.66$ mho/m; $\epsilon_r = 47.8$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH120_Bottom_AUX ANT/Area Scan (11x161x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.291 mW/g

WLAN_11a_CH120_Bottom_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 4.62 V/m; Power Drift = 0.144 dB
 Peak SAR (extrapolated) = 0.611 W/kg
SAR(1 g) = 0.159 mW/g; SAR(10 g) = 0.057 mW/g
 Maximum value of SAR (measured) = 0.298 mW/g



Date: 2012-09-12

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [WLAN_Rear_11nHT40_HT8_CH118_MIMO ANT.da4](#)

Ambient Temp : 23.0 °C Tissue Temp : 22.1 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

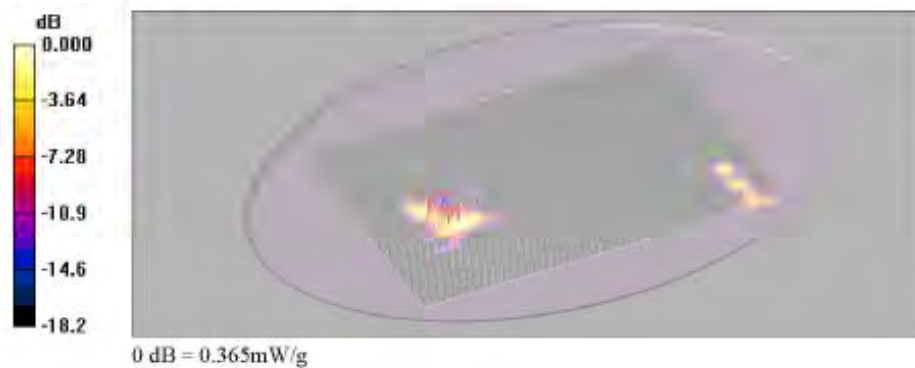
Communication System: WLAN(11a_H or CEPT); Frequency: 5590 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5590 \text{ MHz}$; $\sigma = 5.66 \text{ mho/m}$; $\epsilon_r = 50.5$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.31, 3.31, 3.31); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11nHT40_CH118_Rear_MIMO ANT/Area Scan (251x381x1): Measurement
 grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (interpolated) = 0.330 mW/g

WLAN_11nHT40_CH118_Rear_MIMO ANT/Zoom Scan (7x7x12)/Cube 0:
 Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$
 Reference Value = 1.32 V/m; Power Drift = 0.055 dB
 Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.179 mW/g; SAR(10 g) = 0.067 mW/g
 Maximum value of SAR (measured) = 0.365 mW/g



5.8 GHz WLAN Body SAR

Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11a_6Mbps_CH149_Main_ANT.daf

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5745 \text{ MHz}$; $\sigma = 5.83 \text{ mho/m}$; $\epsilon_r = 47.6$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH149_Rear_Main ANT/Area Scan (121x151x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.379 mW/g

WLAN_11a_CH149_Rear_Main ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 8.47 V/m; Power Drift = -0.030 dB
 Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.138 mW/g; SAR(10 g) = 0.041 mW/g
 Maximum value of SAR (measured) = 0.303 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Rear_11a_6Mbps_CH149_AUX_ANT.dat

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

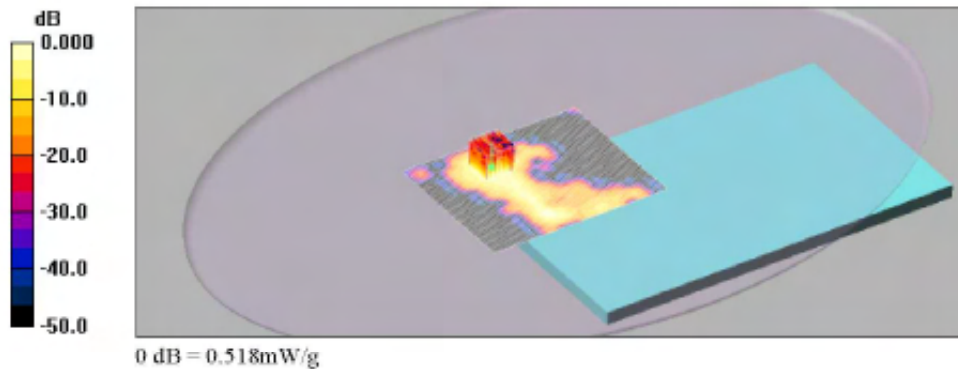
Communication System: WLAN(11a_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5745$ MHz; $\sigma = 5.83$ mho/m; $\epsilon_r = 47.6$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH149_Rear_AUX ANT/Area Scan (121x151x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.513 mW/g

WLAN_11a_CH149_Rear_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 0.983 V/m; Power Drift = 0.079 dB
 Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.263 mW/g; SAR(10 g) = 0.085 mW/g
 Maximum value of SAR (measured) = 0.518 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11a_5Mbps_CH149_AUX_ANT.dad

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

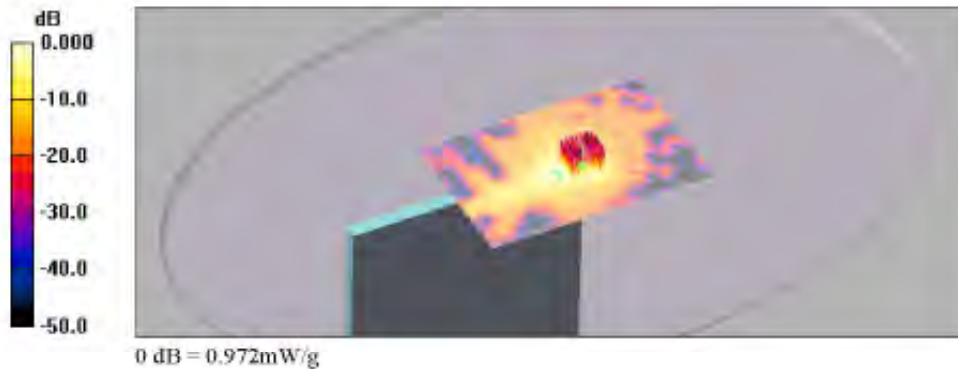
Communication System: WLAN(11a_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5745$ MHz; $\sigma = 5.83$ mho/m; $\epsilon_r = 47.6$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

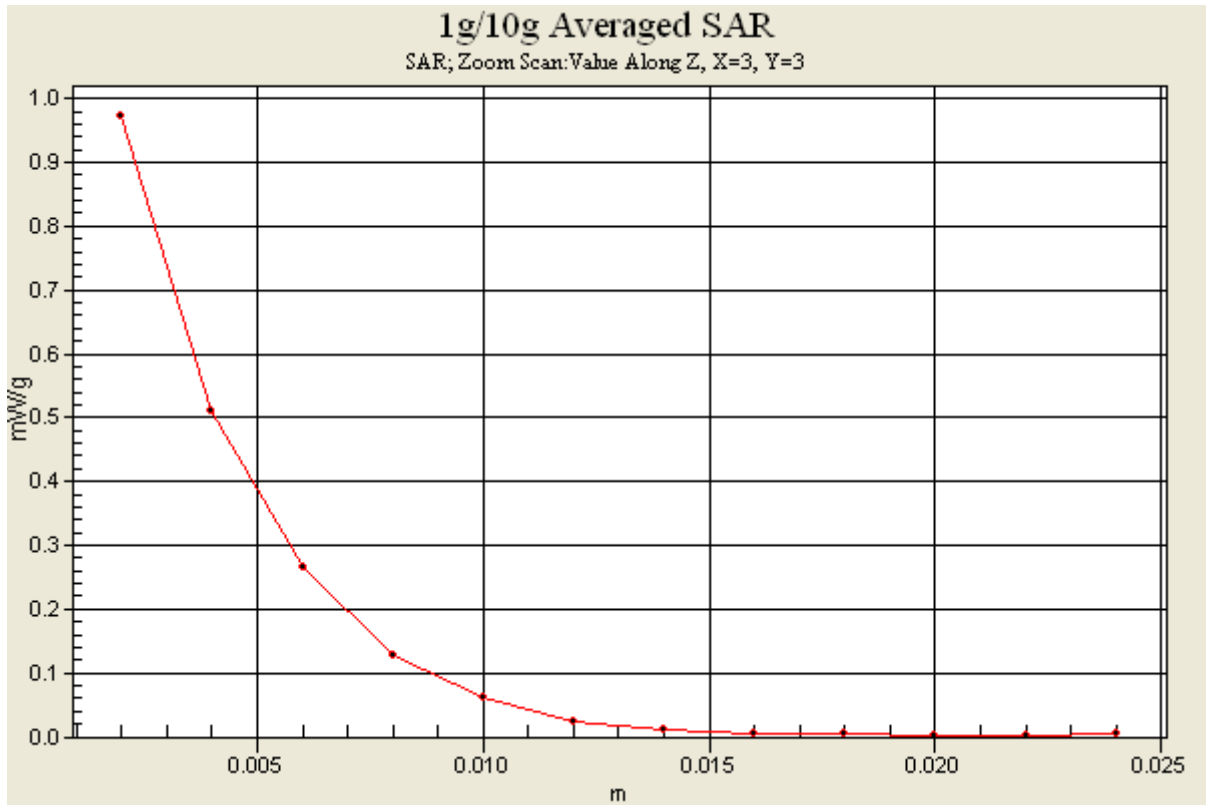
- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH149_Left Edge_AUX ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.936 mW/g

WLAN_11a_CH149_Left Edge_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 11.2 V/m; Power Drift = -0.115 dB
 Peak SAR (extrapolated) = 2.07 W/kg
SAR(1 g) = 0.475 mW/g; SAR(10 g) = 0.142 mW/g
 Maximum value of SAR (measured) = 0.972 mW/g



Z-Scan



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Left Edge_11a_5Mbps_CH149_AUX_ANT.dad

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5745$ MHz; $\sigma = 5.83$ mho/m; $\epsilon_r = 47.6$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH149_Left Edge_AUX ANT/Area Scan (121x181x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.936 mW/g

WLAN_11a_CH149_Left Edge_AUX ANT/Zoom Scan (7x7x12)/Cube 1: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 11.2 V/m; Power Drift = -0.115 dB
 Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.343 mW/g; SAR(10 g) = 0.113 mW/g
 Maximum value of SAR (measured) = 0.718 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Right Edge_11a_6Mbps_CH149_Main_ANT.diel

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5745$ MHz; $\sigma = 5.83$ mho/m; $\epsilon_r = 47.6$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH149_Right Edge_Main ANT/Area Scan (121x181x1): Measurement
 grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.628 mW/g

WLAN_11a_CH149_Right Edge_Main ANT/Zoom Scan (7x7x12)/Cube 0:
 Measurement grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 11.4 V/m; Power Drift = -0.059 dB
 Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.291 mW/g; SAR(10 g) = 0.089 mW/g
 Maximum value of SAR (measured) = 0.623 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gimpo Laboratory)
 File Name: WLAN_Top_11a_6Mbps_CH149_Main ANT.dae

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

Communication System: WLAN(11a_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5745$ MHz; $\sigma = 5.83$ mho/m; $\epsilon_r = 47.6$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH149_Top_Main ANT/Area Scan (11x171x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.058 mW/g

WLAN_11a_CH149_Top_Main ANT/Zoom Scan (7x7x12)/Cube 0: Measurement grid:
 dx=4mm, dy=4mm, dz=2mm
 Reference Value = 1.67 V/m; Power Drift = 0.001 dB
 Peak SAR (extrapolated) = 0.180 W/kg
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.0047 mW/g
 Maximum value of SAR (measured) = 0.047 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: WLAN_Bottom_11a_6Mbps_CH149_AUX_ANT.dic

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

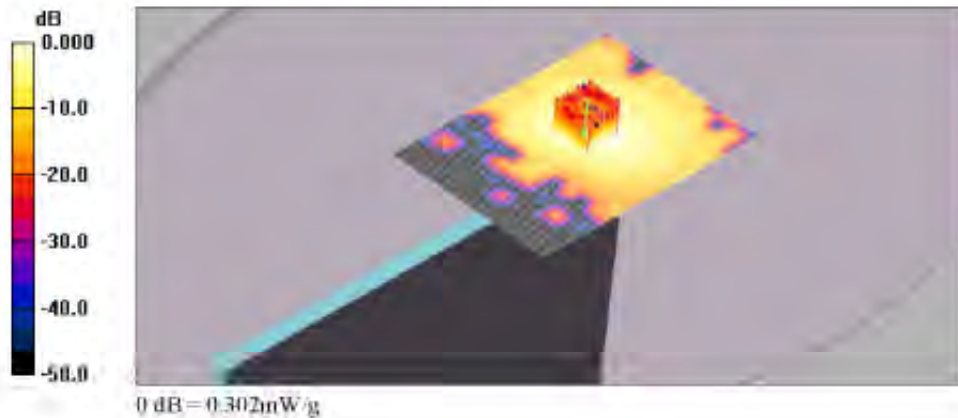
Communication System: WLAN(11a_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5745$ MHz; $\sigma = 5.83$ mho/m; $\epsilon_r = 47.6$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11a_CH149_Bottom_AUX ANT/Area Scan (11x161x1): Measurement grid:
 dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.327 mW/g

WLAN_11a_CH149_Bottom_AUX ANT/Zoom Scan (7x7x12)/Cube 0: Measurement
 grid: dx=4mm, dy=4mm, dz=2mm
 Reference Value = 1.91 V/m; Power Drift = -0.066 dB
 Peak SAR (extrapolated) = 0.579 W/kg
SAR(1 g) = 0.158 mW/g; SAR(10 g) = 0.061 mW/g
 Maximum value of SAR (measured) = 0.302 mW/g



Date: 2012-09-11

Test Laboratory: SGS Korea (Gunpo Laboratory)
 File Name: [WLAN_Rear_11nHT20_HT8_CH149_MIMO ANT.da4](#)

Ambient Temp : 23.4 °C Tissue Temp : 22.2 °C

DUT: XE700T1C; Type: Slate Device; Serial: HXTT91CC700037P
Program Name: WLAN_Body

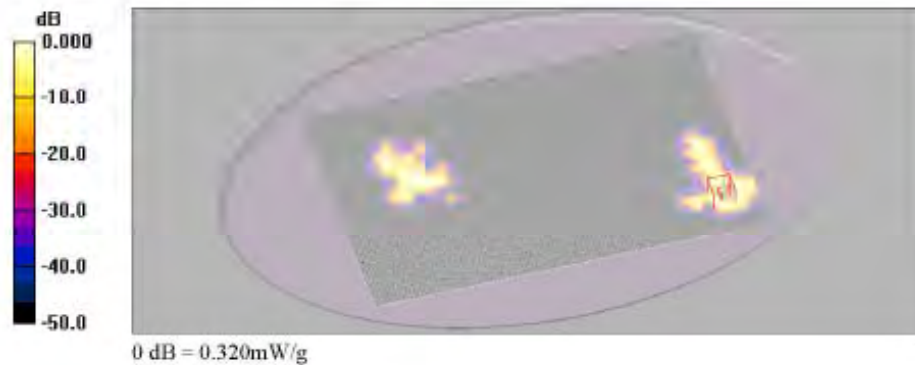
Communication System: WLAN(11a_U-NII Upper); Frequency: 5745 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 5745 \text{ MHz}$; $\sigma = 5.83 \text{ mho/m}$; $\epsilon_r = 47.6$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3791; ConvF(3.79, 3.79, 3.79); Calibrated: 2012-05-23
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn567; Calibrated: 2012-01-20
- Phantom: ELI 4.0_12_05_30; Type: QDOVA001BA; Serial: 1169
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

WLAN_11nHT20_CH149_Rear_MIMO ANT/Area Scan (261x391x1): Measurement
 grid: $dx=10\text{mm}$, $dy=10\text{mm}$
 Maximum value of SAR (interpolated) = 0.338 mW/g

WLAN_11nHT20_CH149_Rear_MIMO ANT/Zoom Scan (7x7x12)/Cube 0:
 Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=2\text{mm}$
 Reference Value = 1.15 V/m; Power Drift = 0.056 dB
 Peak SAR (extrapolated) = 0.711 W/kg
SAR(1 g) = 0.170 mW/g; SAR(10 g) = 0.047 mW/g
 Maximum value of SAR (measured) = 0.320 mW/g



Appendix B

Uncertainty Analysis (2.45GHz)

a	b	c	d	e = f(d,k)	g	i = cxg/e
Uncertainty Component	Section in P1528	Tol (%)	Prob . Dist.	Div.	Ci (1g)	1g ui (%)
Probe calibration	E.2.1	6.0	N	1	1	6.0
Axial isotropy	E.2.2	0.5	R	1.73	0.71	0.20
hemispherical isotropy	E.2.2	2.6	R	1.73	0.71	1.06
Boundary effect	E.2.3	0.8	R	1.73	1	0.46
Linearity	E.2.4	0.6	R	1.73	1	0.35
System detection limit	E.2.5	0.25	R	1.73	1	0.14
Readout electronics	E.2.6	0.3	N	1	1	0.30
Response time	E.2.7	0	R	1.73	1	0.00
Integration time	E.2.8	2.6	R	1.73	1	1.50
RF ambient Condition –Noise	E.6.1	3	R	1.73	1	1.73
RF ambient Condition – reflections	E.6.1	3	R	1.73	1	1.73
Probe positioning– mechanical tolerance	E.6.2	1.5	R	1.73	1	0.87
Probe positioning– with respect to phantom	E.6.3	2.9	R	1.73	1	1.67
Max. SAR evaluation	E.5.2	1	R	1.73	1	0.58
Test sample positioning	E.4.2	5.84	N	1	1	5.84
Device holder uncertainty	E.4.1	3.6	N	1	1	3.60
Output power variation–SAR drift measurement	6.62	5	R	1.73	1	2.89
Phantom uncertainty (shape and thickness tolerances)	E.3.1	4	R	1.73	1	2.31
Liquid conductivity – deviation from target values	E.3.2	5	R	1.73	0.64	1.85
Liquid conductivity – measurement uncertainty	E.3.2	0.7	N	1	0.64	0.45
Liquid permittivity – deviation from target values	E.3.3	5	R	1.73	0.6	1.73
Liquid permittivity – measurement uncertainty	E.3.3	0.56	N	1	0.6	0.34
Combined standard uncertainty				RSS		10.83
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		21.65

Uncertainty Analysis (5GHz)

a	b	c	d	e = f(d,k)	g	i = cxg/e
Uncertainty Component	Section in P1528	Tol (%)	Prob . Dist.	Div.	Ci (1g)	1g ui (%)
Probe calibration	E.2.1	6.55	N	1	1	6.55
Axial isotropy	E.2.2	0.5	R	1.73	0.71	0.20
hemispherical isotropy	E.2.2	2.6	R	1.73	0.71	1.06
Boundary effect	E.2.3	0.8	R	1.73	1	0.46
Linearity	E.2.4	0.6	R	1.73	1	0.35
System detection limit	E.2.5	0.25	R	1.73	1	0.14
Readout electronics	E.2.6	0.3	N	1	1	0.30
Response time	E.2.7	0	R	1.73	1	0.00
Integration time	E.2.8	2.6	R	1.73	1	1.50
RF ambient Condition –Noise	E.6.1	3	R	1.73	1	1.73
RF ambient Condition – reflections	E.6.1	3	R	1.73	1	1.73
Probe positioning– mechanical tolerance	E.6.2	1.5	R	1.73	1	0.87
Probe positioning– with respect to phantom	E.6.3	2.9	R	1.73	1	1.67
Max. SAR evaluation	E.5.2	1	R	1.73	1	0.58
Test sample positioning	E.4.2	2.3	N	1	1	5.84
Device holder uncertainty	E.4.1	3.6	N	1	1	3.60
Output power variation–SAR drift measurement	6.62	5	R	1.73	1	2.89
Phantom uncertainty (shape and thickness tolerances)	E.3.1	4	R	1.73	1	2.31
Liquid conductivity – deviation from target values	E.3.2	5	R	1.73	0.64	1.85
Liquid conductivity – measurement uncertainty	E.3.2	2.68	N	1	0.64	0.45
Liquid permittivity – deviation from target values	E.3.3	10	R	1.73	0.6	1.73
Liquid permittivity – measurement uncertainty	E.3.3	1.20	N	1	0.6	0.34
Combined standard uncertainty				RSS		11.14
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		22.28

Appendix C

Calibration Certificate

- PROBE (ET3DV6, EX3DV4)

- DAE 3

- 2450 MHz / 5 GHz DIPOLE

- PROBE Calibration Certificate (ET3DV6)

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



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

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

Accreditation No.: **SCS 108**

Client **SGS (Dymstec)**

Certificate No: **ET3-1782_Apr12**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1782**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4
 Calibration procedure for dosimetric E-field probes**

Calibration date: **April 27, 2012**

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

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

Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EA419B	GB41283674	29-Mar-12 (No. 217-01508)	Apr-12
Power sensor E4412A	MY41490007	29-Mar-12 (No. 217-01508)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (2c)	27-Mar-12 (No. 217-01531)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	10-Jan-12 (No. DAE4-660_Jan12)	Jan-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642UB1700	4-Aug-09 (in house check Apr-11)	in house check: Apr-12
Network Analyzer HP 8753E	US37300585	18-Oct-01 (in house check Oct-11)	in house check: Oct-12

Calibrated by:	Name Jeton Kastali	Function Laboratory Technician	Signature
Approved by:	Katja Pokovic	Technical Manager	
			Issued: April 27, 2012
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

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



S Schweizerischer Kalibrierdienst
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S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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., $\theta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

- 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
- 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:

- NORM_{x,y,z}**: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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.
- DCP_{x,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
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 $f \leq 800$ 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 NORM_{x,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.

ET3DV6 – SN:1782

April 27, 2012

Probe ET3DV6

SN:1782

Manufactured: April 15, 2003
Calibrated: April 27, 2012

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

ET3DV6- SN:1782

April 27, 2012

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1782

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm $(\mu V/(V/m)^2)^A$	2.01	1.66	1.88	$\pm 10.1 \%$
DCP (mV) ^B	96.2	96.7	96.7	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^C (k=2)
0	CW	0.00	X	0.00	0.00	1.00	154.8	$\pm 1.9 \%$
			Y	0.00	0.00	1.00	165.8	
			Z	0.00	0.00	1.00	151.1	

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

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

ET3DV6-SN:1782

April 27, 2012

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1782

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^c	Relative Permittivity ^d	Conductivity (S/m) ^e	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	7.17	7.17	7.17	0.23	2.35	± 13.4 %
835	41.5	0.90	6.40	6.40	6.40	0.32	3.00	± 12.0 %
1750	40.1	1.37	5.39	5.39	5.39	0.80	1.66	± 12.0 %
1900	40.0	1.40	5.12	5.12	5.12	0.80	1.98	± 12.0 %
2450	39.2	1.60	4.48	4.48	4.48	0.80	1.97	± 12.0 %

^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^d At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ET3DV6-SN:1782

April 27, 2012

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1782

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^c	Relative Permittivity ^d	Conductivity (S/m) ^e	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.57	7.57	7.57	0.16	2.29	± 13.4 %
835	55.2	0.97	6.22	6.22	6.22	0.24	3.00	± 12.0 %
1750	53.4	1.49	4.79	4.79	4.79	0.76	2.24	± 12.0 %
1900	53.3	1.52	4.59	4.59	4.59	0.75	2.18	± 12.0 %
2450	52.7	1.95	4.11	4.11	4.11	0.76	2.25	± 12.0 %

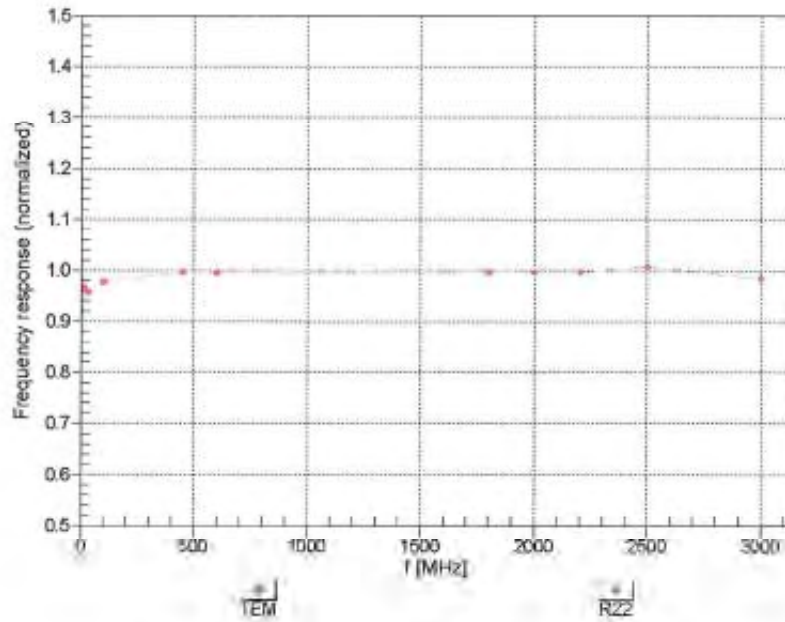
^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^d At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ET3DV6-SN:1782

April 27, 2012

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



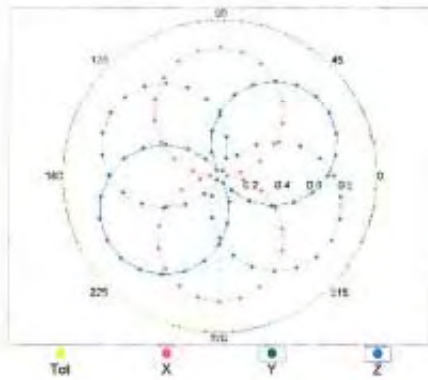
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

ET3DV6-SN:1782

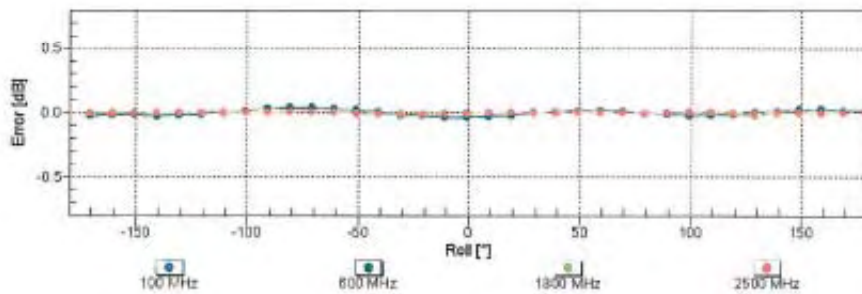
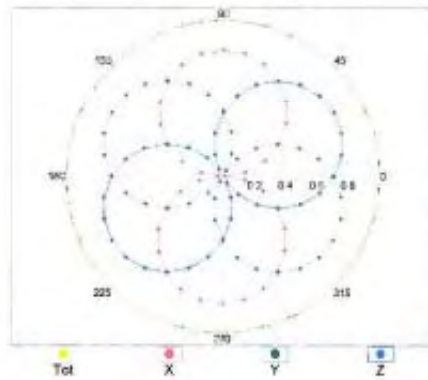
April 27, 2012

Receiving Pattern (ϕ), $\theta = 0^\circ$

f=600 MHz,TEM



f=1800 MHz,R22

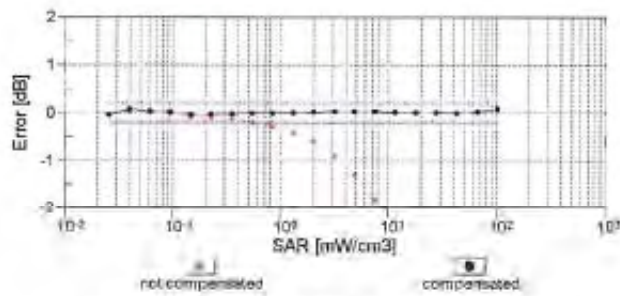
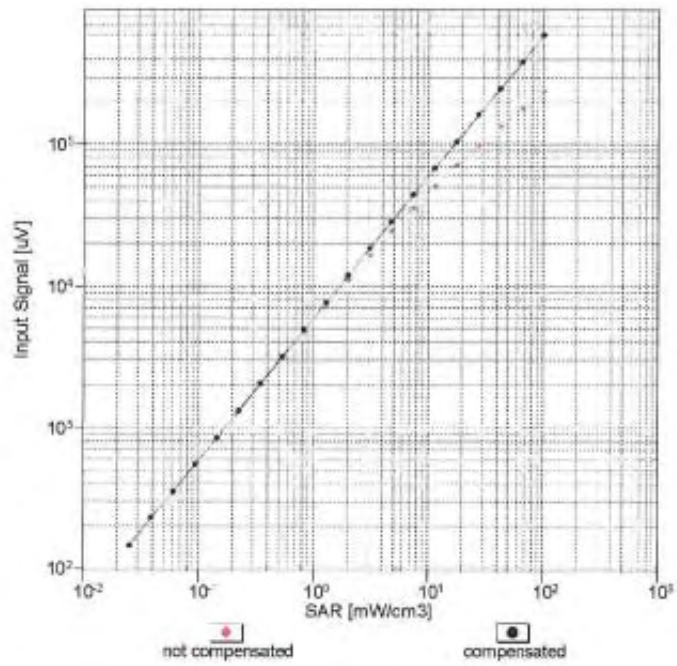


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

ET3DV6-SN:1782

April 27, 2012

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

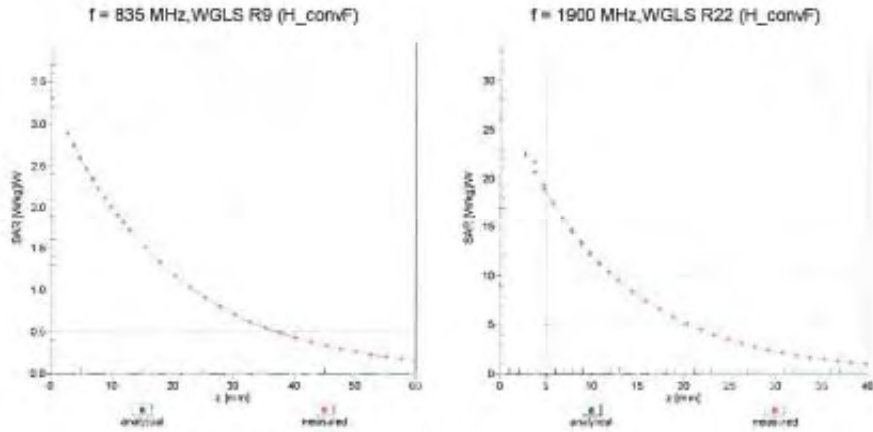


Uncertainty of Linearity Assessment: $\pm 0,6\%$ ($k=2$)

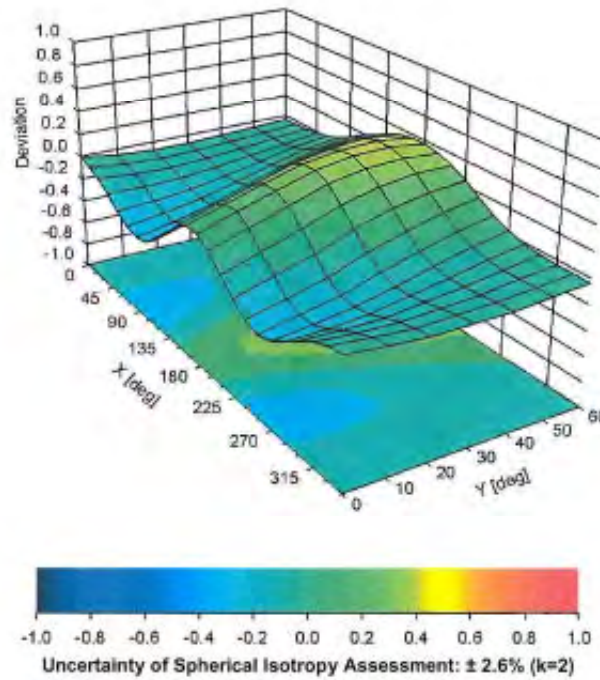
ET3DV6-SN:1782

April 27, 2012

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, θ), f = 900 MHz



ET3DV6-SN:1782

April 27, 2012

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1782

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	49.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

- PROBE Calibration Certificate (EX3DV4)

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



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

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Accreditation No.: **SCS 108**

Client **SGS (Dymstec)**

Certificate No: **EX3-3791_May12**

CALIBRATION CERTIFICATE

Object: **EX3DV4 - SN:3791**

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: **May 23, 2012**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4410B	GB41283674	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor Edt12A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 690	10-Jan-12 (No. DAE4-690_Jan12)	Jan-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642001700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

Dated by: **Erhard Leuthe** (Name), **Erhard Leuthe** (Signature), **Laboratory Technician** (Function)
 Approved by: **Katja Pokovic** (Name), **Katja Pokovic** (Signature), **Technical Manager** (Function)

Issued: May 24, 2012

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

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



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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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., $\theta = 0$ 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:

- **NORM_{x,y,z}**: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- **NORM(f)_{x,y,z} = NORM_{x,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.
- **DCP_{x,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
- **A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 $f \leq 800$ 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 NORM_{x,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.

EX3DV4 – SN:3791

May 23, 2012

Probe EX3DV4

SN:3791

Manufactured: February 18, 2011
Calibrated: May 23, 2012

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

EX3DV4- SN:3791

May 23, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3791

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.51	0.56	0.55	$\pm 10.1 \%$
DCP (mV) ^B	102.7	105.2	99.4	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^C (k=2)
0	CW	0.00	X	0.00	0.00	1.00	160.0	$\pm 3.5 \%$
			Y	0.00	0.00	1.00	129.1	
			Z	0.00	0.00	1.00	127.9	

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 E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4- SN:3791

May 23, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3791

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)
2600	39.0	1.96	6.37	6.37	6.37	0.33	1.00	± 12.0 %
3700	37.7	3.12	5.92	5.92	5.92	0.54	1.01	± 13.1 %
5200	36.0	4.66	4.80	4.80	4.80	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.53	4.53	4.53	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.50	4.50	4.50	0.38	1.80	± 13.1 %
5600	35.5	5.07	4.12	4.12	4.12	0.45	1.80	± 13.1 %
5800	35.3	5.27	4.31	4.31	4.31	0.40	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:3791

May 23, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3791

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)
2600	52.5	2.16	6.37	6.37	6.37	0.79	0.50	± 12.0 %
3700	51.0	3.55	5.72	5.72	5.72	0.33	1.38	± 13.1 %
5200	49.0	5.30	4.00	4.00	4.00	0.50	1.90	± 13.1 %
5300	48.9	5.42	3.70	3.70	3.70	0.60	1.90	± 13.1 %
5500	48.6	5.65	3.64	3.64	3.64	0.55	1.90	± 13.1 %
5600	48.5	5.77	3.31	3.31	3.31	0.660	1.90	± 13.1 %
5800	48.2	6.00	3.79	3.79	3.79	0.60	1.90	± 13.1 %

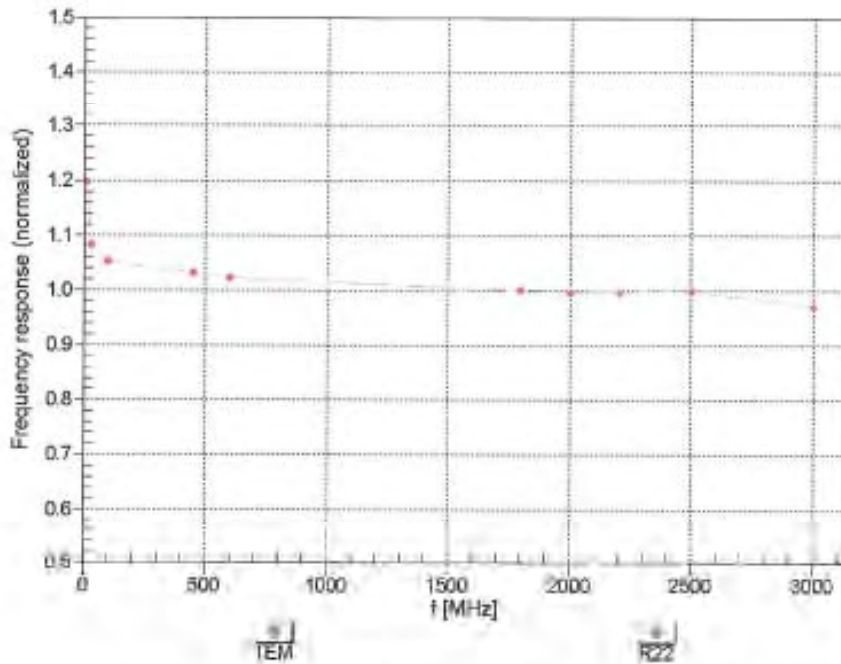
^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^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:3791

May 23, 2012

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



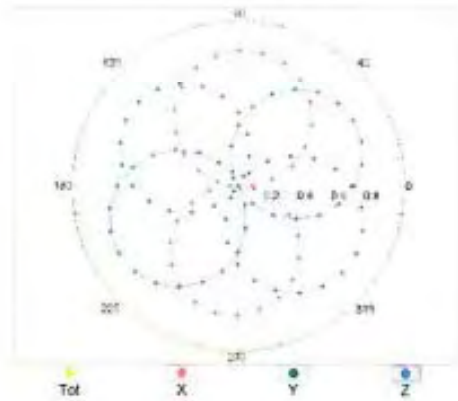
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

EX3DV4- SN:3791

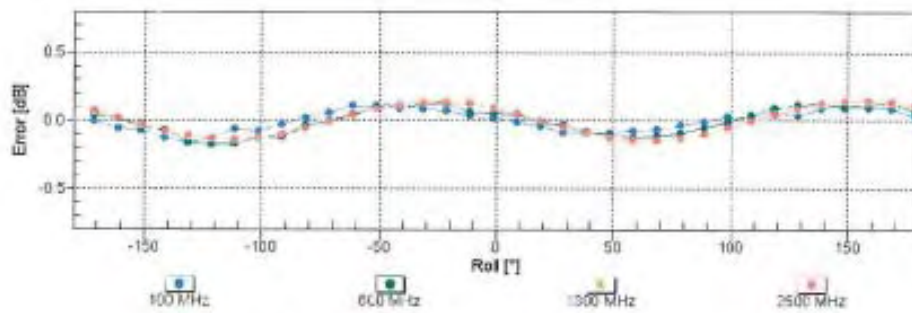
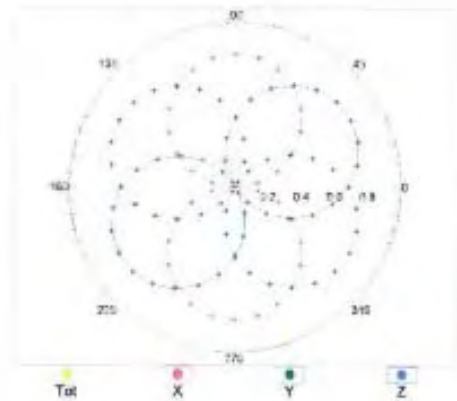
May 23, 2012

Receiving Pattern (ϕ), $\theta = 0^\circ$

f=600 MHz,TEM



f=1800 MHz,R22

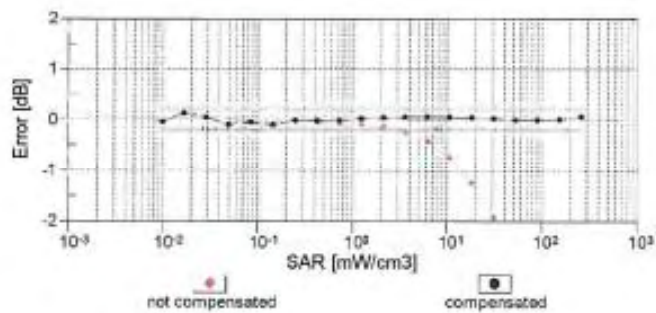
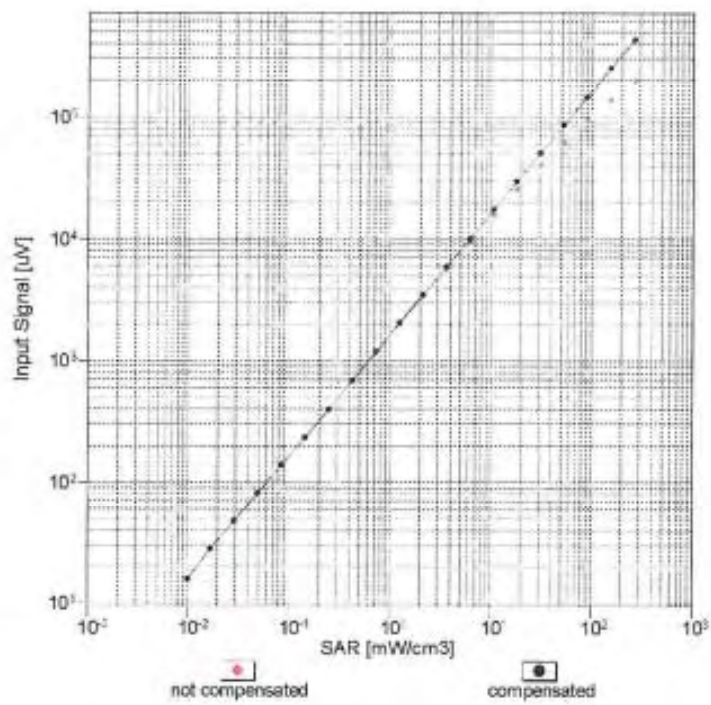


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

EX3DV4- SN:3791

May 23, 2012

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

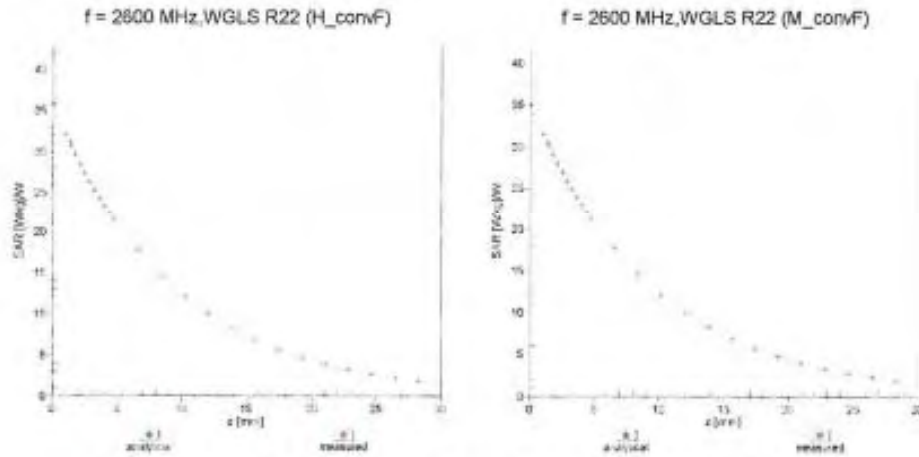


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

EX3DV4- SN:3791

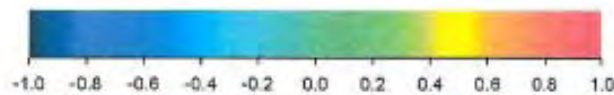
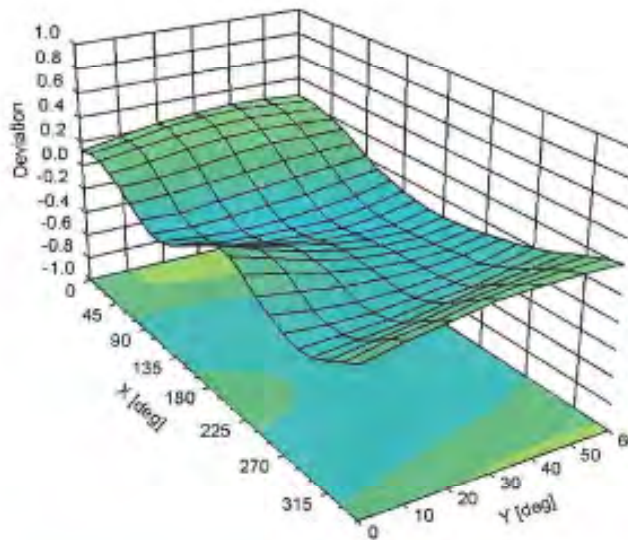
May 23, 2012

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ , θ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)

EX3DV4- SN:3791

May 23, 2012

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3791

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	68.6
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

-DAE 3 Calibration Certificate

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



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

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

Accreditation No.: **SCS 108**

Client **SGS (Dymstec)**

Certificate No: **DAE3-567_Jan12**

CALIBRATION CERTIFICATE

Object: **DAE3 - SD 000 D03 AA - SN: 567**

Calibration procedure(s): **QA CAL-06.v24
 Calibration procedure for the data acquisition electronics (DAE)**

Calibration date: **January 20, 2012**

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

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

Calibration Equipment used (M&E critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Kathley Multimeter Type 2001	SN: 0810278	28-Sep-11 (No: 11450)	Sep-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Calibrator Box V2.1	SE LWS 063 AA 1001	05-Jan-12 (in house check)	In house check: Jan-13

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

Issued: January 20, 2012

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 100**

Glossary

DAE data acquisition electronics
Connector angle information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- **DC Voltage Measurement:** Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- **Connector angle:** The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty
 - **DC Voltage Measurement Linearity:** Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
 - **Common mode sensitivity:** Influence of a positive or negative common mode voltage on the differential measurement.
 - **Channel separation:** Influence of a voltage on the neighbor channels not subject to an input voltage.
 - **AD Converter Values with inputs shorted:** Values on the internal AD converter corresponding to zero input voltage
 - **Input Offset Measurement:** Output voltage and statistical results over a large number of zero voltage measurements.
 - **Input Offset Current:** Typical value for information: Maximum channel input offset current, not considering the input resistance.
 - **Input resistance:** Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
 - **Low Battery Alarm Voltage:** Typical value for information. Below this voltage, a battery alarm signal is generated.
 - **Power consumption:** Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1 μ V full range = -100 ... +300 mV
 Low Range: 1LSB = 61nV full range = -1 ... +9mV

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

Calibration Factors	X	Y	Z
High Range	404.783 \pm 0.1% (k=2)	404.811 \pm 0.1% (k=2)	404.899 \pm 0.1% (k=2)
Low Range	3.95035 \pm 0.7% (k=2)	3.97119 \pm 0.7% (k=2)	3.95014 \pm 0.7% (k=2)

Connector Angle

Connector Angle to be used in GASY system	7.5° \pm 1°
---	---------------

Appendix
1. DC Voltage Linearity

High Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	19998.62	3.53	0.00
Channel X + Input	20005.03	4.17	0.02
Channel X - Input	-19998.67	-3.44	-0.02
Channel Y + Input	19997.37	2.30	0.00
Channel Y + Input	19989.48	-1.11	-0.01
Channel Y - Input	-19998.80	1.52	-0.01
Channel Z + Input	19994.27	-0.65	-0.00
Channel Z + Input	20001.19	0.52	0.00
Channel Z - Input	-19995.78	-4.48	-0.02

Low Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	1999.73	-1.35	-0.07
Channel X + Input	200.29	-1.35	-0.67
Channel X - Input	-197.22	0.97	-0.49
Channel Y + Input	1999.97	-1.02	-0.05
Channel Y + Input	200.82	-0.73	-0.36
Channel Y - Input	-198.58	-0.24	0.12
Channel Z + Input	2000.13	-0.92	-0.05
Channel Z + Input	200.68	-0.79	-0.39
Channel Z - Input	-198.20	-0.95	0.48

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	6.01	1.84
	-200	-13.58	-1.58
Channel Y	200	-1.13	-2.69
	-200	1.56	1.24
Channel Z	200	4.36	4.11
	-200	-5.62	-6.33

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-2.44	-2.08
Channel Y	200	7.42	-	-1.51
Channel Z	200	5.84	8.05	-

4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	18326	15742
Channel Y	18181	15582
Channel Z	18953	16228

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec, Measuring time: 3 sec
 Input: 10mV

	Average (µV)	min. Offset (µV)	max. Offset (µV)	Std. Deviation (µV)
Channel X	0.24	-1.71	1.46	0.53
Channel Y	-0.13	-2.46	1.09	0.48
Channel Z	-0.85	-3.00	0.31	0.42

6. Input Offset Current

Nominal input circuitry offset current on all channels: <256A

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

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

9. Power Consumption (Typical values for information)

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

- 2450 MHz Dipole Calibration Certificate

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Accreditation No. : **SCS 108**

Client **SGS (Dymstec)**

Certificate No: **D2450V2-734_May12**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 734**

Calibration procedure(s) **QA CAL-05.v8
 Calibration procedure for dipole validation kits above 700 MHz**

Calibration date: **May 17, 2012**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 2)^\circ\text{C}$ and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	28537480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8461A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20K)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 08327	27-Mar-12 (No. 217-01530)	Apr-13
Reference Probe ESSDV3	SN: 3205	30-Dec-11 (No. ESS-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8461A	MY41092317	18-Oct-02 (in house check Oct-11)	in house check Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	in house check Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	in house check Oct-12

Calibrated by: **Claudio Leubler** (Name) **Laboratory Technician** (Function)

Signature

Approved by: **Kajka Pokovic** (Name) **Technical Manager** (Function)

Issued: May 17, 2012

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- d) DASy4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz \pm 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 \pm 0.2) °C	40.3 \pm 6 %	1.85 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.3 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	52.8 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.19 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.7 mW / g \pm 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 \pm 0.2) °C	52.3 \pm 6 %	1.99 mho/m \pm 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.7 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	50.2 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.95 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.6 mW / g \pm 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.3 Ω + 3.6 $j\Omega$
Return Loss	- 26.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.9 Ω + 5.1 $j\Omega$
Return Loss	- 25.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.153 ns
----------------------------------	----------

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 07, 2003

DASY5 Validation Report for Head TSL

Date: 17.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 734

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.85$ mho/m; $\epsilon_r = 40.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: {00}
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

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

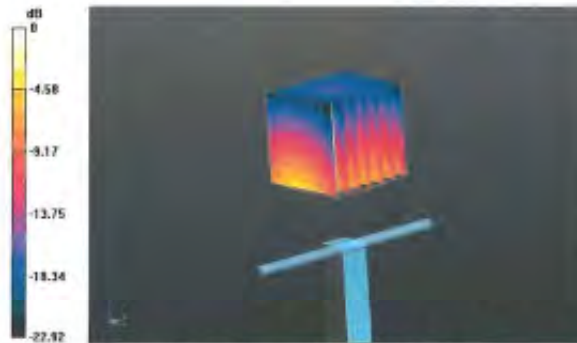
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.190 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 27.316 mW/g

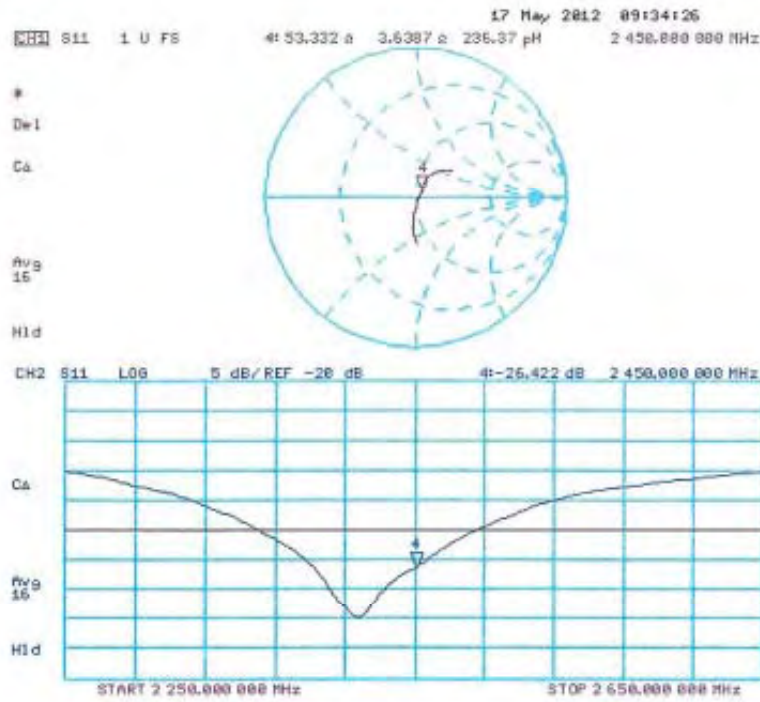
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 6.19 mW/g

Maximum value of SAR (measured) = 16.9 mW/g



0 dB = 16.9 mW/g = 24.56 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 15.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 734

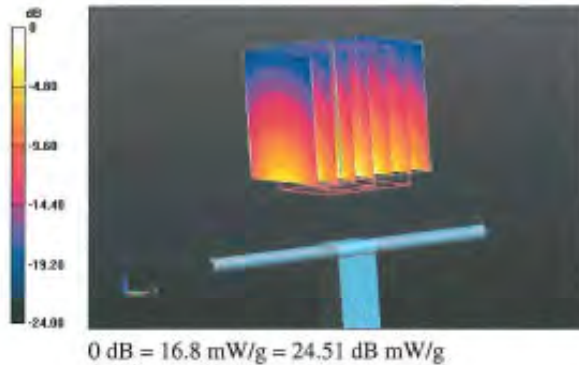
Communication System: CW; Frequency: 2450 MHz
 Medium parameters used: $f = 2450$ MHz; $\sigma = 1.99$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

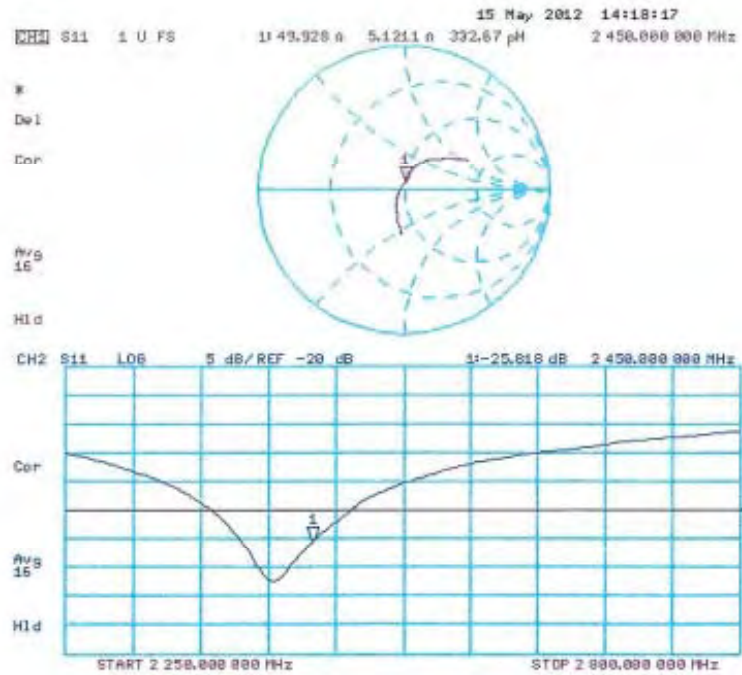
- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

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

Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm
 Reference Value = 95.201 V/m, Power Drift = 0.02 dB
 Peak SAR (extrapolated) = 25.791 mW/g
SAR(1 g) = 12.7 mW/g; SAR(10 g) = 5.95 mW/g
 Maximum value of SAR (measured) = 16.8 mW/g



Impedance Measurement Plot for Body TSL



-5 GHz Dipole Calibration Certificate (5.2 GHz, 5.8 GHz)

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Accreditation No.: **SCS 108**

Client **SGS (Dymstec)**

Certificate No: **D5GHz-1106_Jun11**

CALIBRATION CERTIFICATE

Object: **D5GHzV2 - SN: 1106**

Calibration procedure(s): **QA CAL-22.v1
 Calibration procedure for dipole validation kits between 3-6 GHz**

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&E critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	0837400704	08-Oct-10 (No. 217-01288)	Oct-11
Power sensor HP 8481A	US37292763	08-Oct-10 (No. 217-01288)	Oct-11
Reference 20 dB Attenuator	SN: 3088 (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: 3803	04-Mar-11 (No. EX3-3803_Mar11)	Mar-12
DAE4	SN: 601	8-Jun-11 (No. DAE4-601_Jun11)	Jun-12
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-09 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 94206	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: June 21, 2011

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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 = 4.0 mm, dz = 1.4 mm	
Frequency	5200 MHz \pm 1 MHz 5800 MHz \pm 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	35.8 \pm 6 %	4.50 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.23 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	82.2 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.34 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.3 mW / g \pm 16.5 % (k=2)

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	34.8 \pm 6 %	5.08 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5800 MHz:

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.08 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	80.5 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.30 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	22.9 mW / g \pm 16.5 % (k=2)

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	49.0 ± 6 %	5.41 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °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	7.58 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	75.8 mW / g ± 18.1 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.12 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.2 mW / g ± 17.6 % (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	47.6 ± 6 %	6.21 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °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	7.66 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	76.5 mW / g ± 18.1 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	Condition	
SAR measured	100 mW input power	2.12 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.2 mW / g ± 17.6 % (k=2)

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	52.9 Ω - 9.8 j Ω
Return Loss	- 20.1 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	52.7 Ω - 6.9 j Ω
Return Loss	- 22.8 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.6 Ω - 9.3 j Ω
Return Loss	- 20.6 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	55.5 Ω + 0.7 j Ω
Return Loss	- 25.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.189 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 20.06.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHz; Serial: D5GHzV2 - SN: 1106

Communication System: CW; Frequency: 5200 MHz, Frequency: 5800 MHz

Medium: HSL 502 A

Medium parameters used: $f = 5200$ MHz; $\sigma = 4.5$ mho/m; $\epsilon_r = 35.8$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5800$ MHz; $\sigma = 5.08$ mho/m; $\epsilon_r = 34.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.41, 5.41, 5.41), ConvF(4.81, 4.81, 4.81); Calibrated: 04.03.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 08.06.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 66,231 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 30.485 W/kg

SAR(1 g) = 8.23 mW/g; SAR(10 g) = 2.34 mW/g

Maximum value of SAR (measured) = 18,450 mW/g

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan,

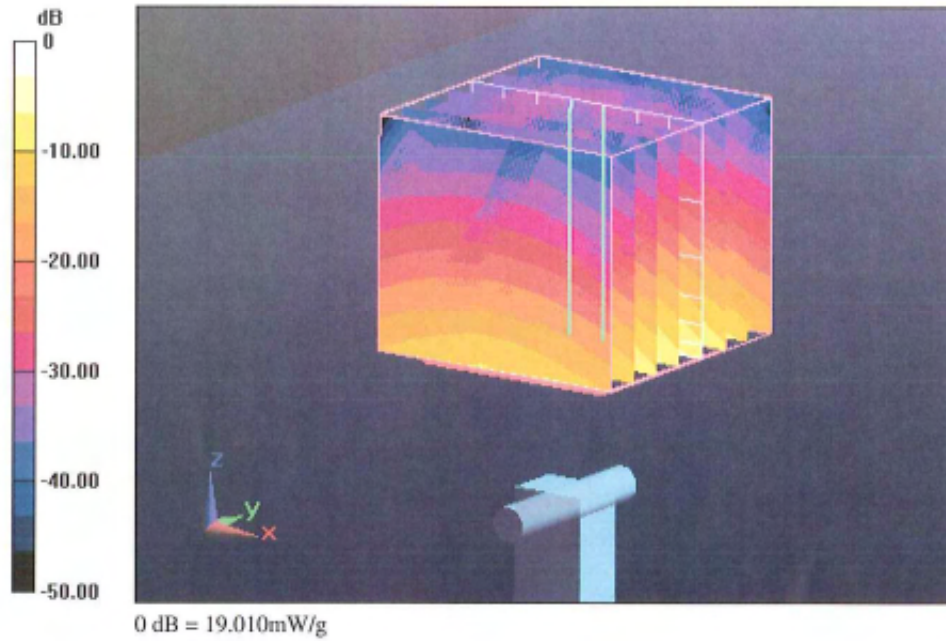
dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 62,792 V/m; Power Drift = 0.03 dB

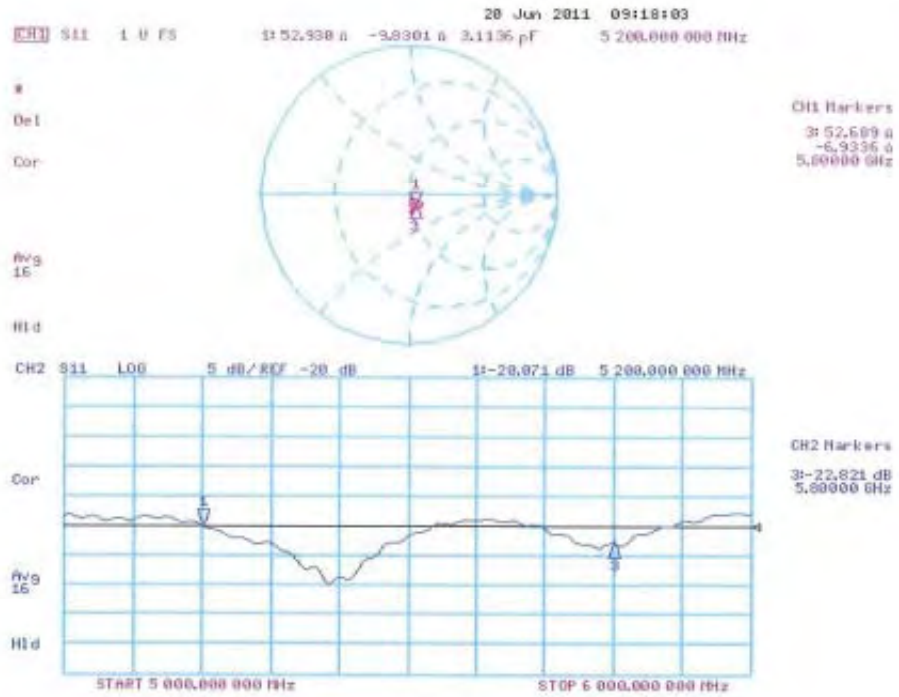
Peak SAR (extrapolated) = 33.712 W/kg

SAR(1 g) = 8.09 mW/g; SAR(10 g) = 2.3 mW/g

Maximum value of SAR (measured) = 19,009 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 21.06.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHz; Serial: D5GHzV2 - SN: 1106

Communication System: CW; Frequency: 5200 MHz, Frequency: 5800 MHz

Medium: MSL 501

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.41$ mho/m; $\epsilon_r = 49$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5800$ MHz; $\sigma = 6.21$ mho/m; $\epsilon_r = 47.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91), ConvF(4.38, 4.38, 4.38); Calibrated: 04.03.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 S8601; Calibrated: 08.06.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3654)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan,

dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 59.327 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 29.350 W/kg

SAR(1 g) = 7.58 mW/g; SAR(10 g) = 2.12 mW/g

Maximum value of SAR (measured) = 17.624 mW/g

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan,

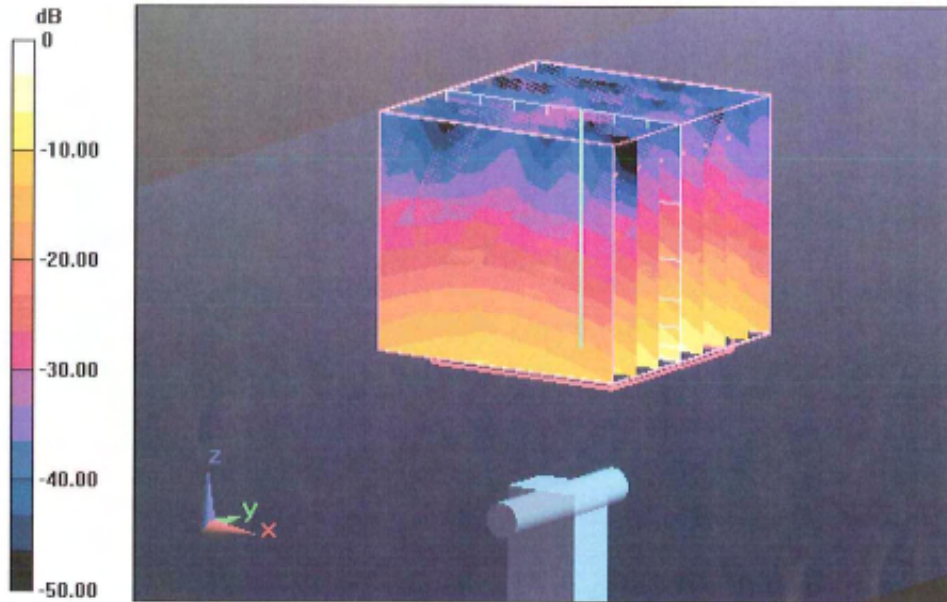
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 56.058 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 35.029 W/kg

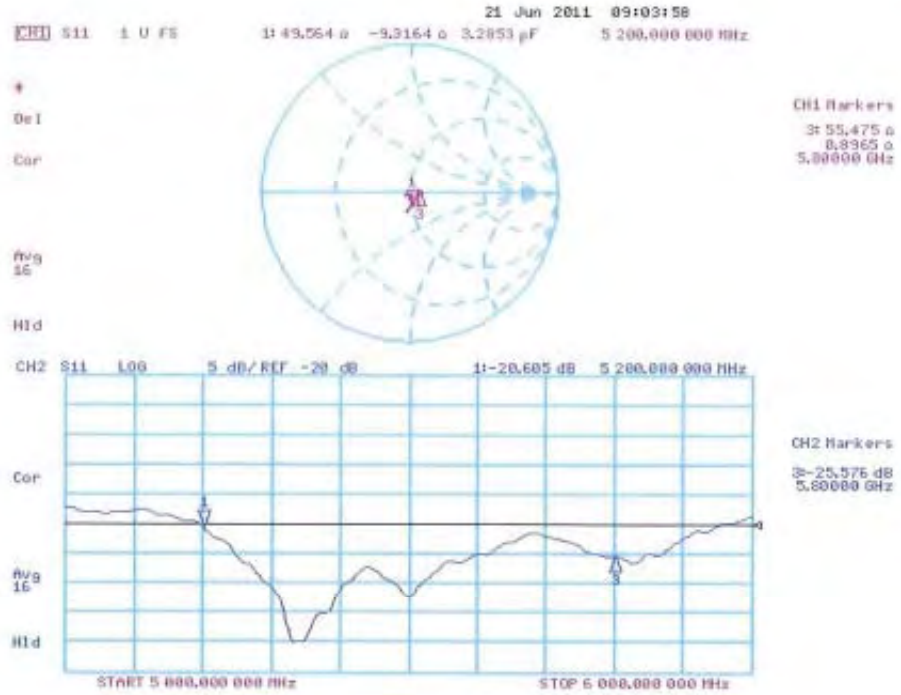
SAR(1 g) = 7.66 mW/g; SAR(10 g) = 2.12 mW/g

Maximum value of SAR (measured) = 18.810 mW/g



0 dB = 18.810mW/g

Impedance Measurement Plot for Body TSL



-5 GHz Dipole Calibration Certificate (5.5 GHz)

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



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

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

Accreditation No.: **SCS 106**

Client **SGS (Dymstec)**

Certificate No: **D5GHzV2-1106_Nov11**

CALIBRATION CERTIFICATE

Object: **D5GHzV2 - SN: 1106**

Calibration procedure(s): **QA CAL-22.v1
 Calibration procedure for dipole validation kits between 3-6 GHz**

Calibration date: **November 15, 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&PE critical for calibration)

Primary Standards	ID #	Cal Date / Certificate No.	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 0401A	DS37292783	06-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (25g)	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 EX2DV4	SN: 3503	04-Mar-11 (No. EX3-3503_Mar11)	Mar-12
DAE1	SN: 601	04-Jul-11 (No. DAE1-601-Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8401A	MY41082317	18-Oct-08 (in house check Oct-11)	in house check: Oct-12
RF generator R&S SMT-00	190005	04-Aug-09 (in house check Oct-11)	in house check: Oct-12
Network Analyzer HP 8753E	US37386585 S4206	18-Oct-01 (in house check Oct-11)	in house check: Oct-12

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

Issued: November 17, 2011

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

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



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

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

Accreditation No.: **SCS 108**

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 = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5500 MHz \pm 1 MHz	

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	34.2 \pm 6 %	4.75 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	----	---

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.86 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	87.9 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.9 mW / g \pm 16.5 % (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 \pm 0.2) °C	47.2 \pm 6 %	5.87 mho/m \pm 6 %
Body TSL temperature change during test	< 0.5 °C	----	---

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.21 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	81.7 mW / g \pm 18.1 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.27 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	22.6 mW / g \pm 17.6 % (k=2)

Appendix

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	50.7 Ω - 3.2 j Ω
Return Loss	- 29.6 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	50.8 Ω - 1.9 j Ω
Return Loss	- 33.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the leadpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 15.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1106

Communication System: CW; Frequency: 5500 MHz
 Medium parameters used: $f = 5500$ MHz; $\sigma = 4.75$ mho/m; $\epsilon_r = 34.2$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

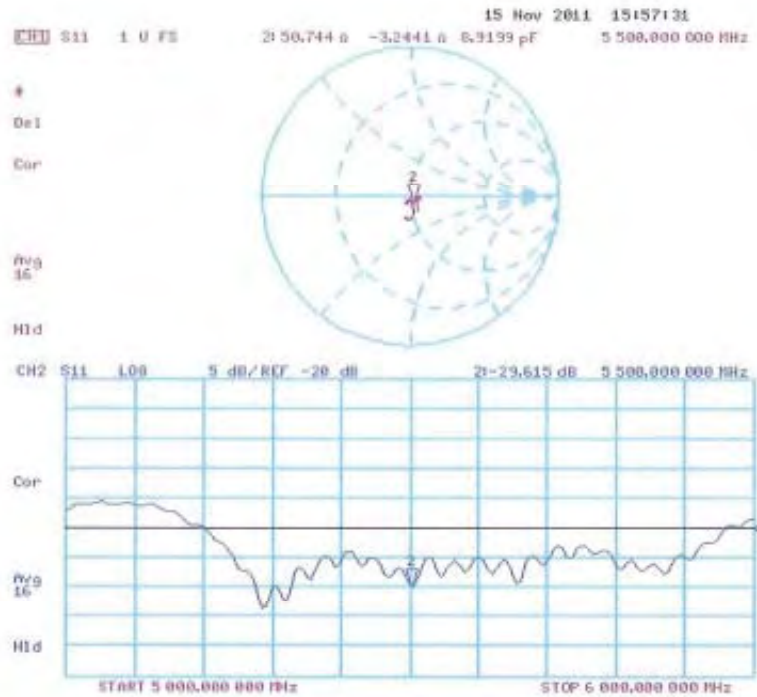
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91); Calibrated: 04.03.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3034)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
 Reference Value = 66.617 V/m; Power Drift = 0.06 dB
 Peak SAR (extrapolated) = 35.293 W/kg
SAR(1 g) = 8.88 mW/g; SAR(10 g) = 2.52 mW/g
 Maximum value of SAR (measured) = 21.227 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1106

Communication System: CW; Frequency: 5500 MHz
 Medium parameters used: $f = 5500$ MHz; $\sigma = 5.87$ mho/m; $\epsilon_r = 47.2$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

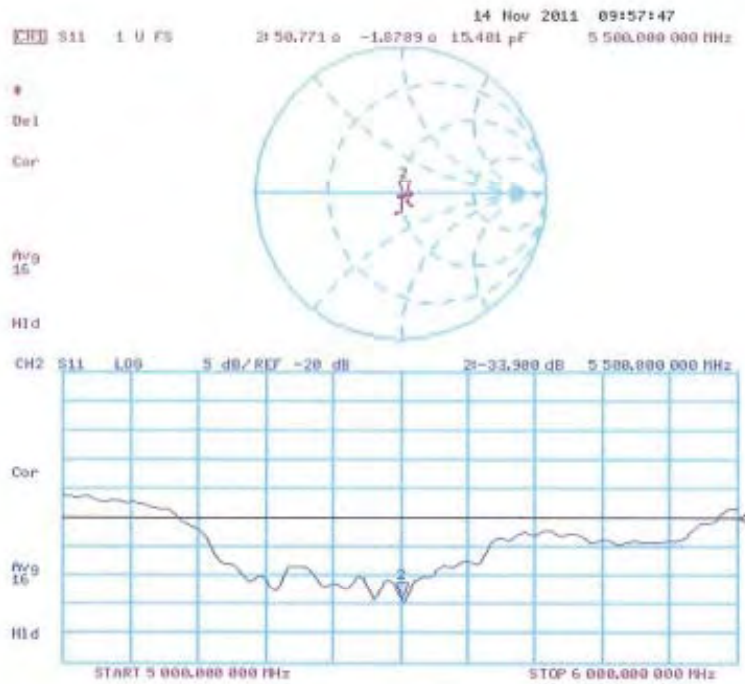
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvP(4.43, 4.43, 4.43); Calibrated: 04.03.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
 Reference Value = 59.363 V/m; Power Drift = -0.0064 dB
 Peak SAR (extrapolated) = 35.196 W/kg
SAR(1 g) = 8.21 mW/g; SAR(10 g) = 2.27 mW/g
 Maximum value of SAR (measured) = 19.467 mW/g



Impedance Measurement Plot for Body TSL



-THE END-