

# SAR TEST REPORT

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

<b>Equipment Under Test</b>	Notebook
<b>Model Name of Host</b>	MA50
<b>Marketing name of Host</b>	Aspire M3, Aspire M3 series, Aspire M3-581T, Aspire M3-581TG
<b>Module No.</b>	BCM943228
<b>Brand Name</b>	Acer
<b>Company Name</b>	Acer Incorporated
<b>Company Address</b>	8F., NO.88, Sec. 1, Xintai 5th Rd. Xizhi, New Taipei City 22181, Taiwan (R.O.C)
<b>Standards</b>	FCC OET 65 supplement C, IEEE /ANSI C95.1 , C95.3, IEEE 1528
<b>FCC ID</b>	QDS-BRCM1058
<b>Date of Receipt</b>	Feb. 14, 2012
<b>Date of Test(s)</b>	May 02, 2012 ~ Aug 09, 2012
<b>Date of Issue</b>	Aug. 09, 2012

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

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**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.

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**Signed for on the behalf of SGS**

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**Supervisor**

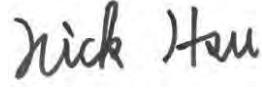
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**Ricky Huang**

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**Date : Aug. 09, 2012**

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**Supervisor**

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**Nick Hsu**

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**Date : Aug. 09, 2012**

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## Version

Report Number	Revision	Date	Memo
EN/2012/20010	00	2012/05/17	Initial creation of test report.
EN/2012/20010	01	2012/07/25	1 <sup>st</sup> modification
EN/2012/20010	02	2012/08/09	2 <sup>nd</sup> modification

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

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## 1. General Information

### 1.1 Testing Laboratory

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134, Wu Kung Road, Wuku industrial zone	
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### 1.2 Details of Applicant

Company Name	Acer Incorporated
Company Address	8F., NO.88, Sec. 1, Xintai 5th Rd. Xizhi, New Taipei City 22181, Taiwan (R.O.C)
Contact Person	RU Jan
Telephone	+886-2-2696-3131 # 3289
E-mail	<a href="mailto:RU_Jan@acer.com.tw">RU_Jan@acer.com.tw</a>

### 1.3 Description of EUT

EUT Name	Notebook	
Model Name of HOST	MA50	
Brand Name	Acer	
Marketing Name	Aspire M3, Aspire M3 series, Aspire M3-581T, Aspire M3-581TG	
FCC ID	QDS-BRCM1058	
Mode of Operation	<input checked="" type="checkbox"/> WLAN802.11 a/b/g/n ( <input checked="" type="checkbox"/> 20M <input checked="" type="checkbox"/> 40M) band	
Duty Cycle	WLAN802.11 a/b/g/n(20M/40M)	1

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TX Frequency Range (MHz)	WLAN802.11 b/g/n(20M)	2412	—	2462
	WLAN802.11 n (40M)	2422	—	2452
	WLAN802.11 a 5.2G	5180	—	5320
	WLAN802.11 n (20M) 5.2G	5180	—	5320
	WLAN802.11 n (40M) 5.2G	5190	—	5310
	WLAN802.11 a 5.5G	5500	—	5700
	WLAN802.11 n (20M) 5.5G	5500	—	5700
	WLAN802.11 n (40M) 5.5G	5510	—	5670
	WLAN802.11 a 5.8G	5745	—	5825
	WLAN802.11 n (20M) 5.8G	5745	—	5825
	WLAN802.11 n (40M) 5.8G	5755	—	5795
	WLAN802.11 b/g/n(20M)	1	—	11
Channel Number (ARFCN) Max. SAR Measured(1 g) (Unit: mW/g)	WLAN802.11 n (40M)	3	—	9
	WLAN802.11 a 5.2G	36	—	64
	WLAN802.11 n (20M) 5.2G	36	—	64
	WLAN802.11 n (40M) 5.2G	38	—	62
	WLAN802.11 a 5.5G	100	—	140
	WLAN802.11 n (20M) 5.5G	100	—	140
	WLAN802.11 n (40M) 5.5G	102	—	134
	WLAN802.11 a 5.8G	149	—	165
	WLAN802.11 n (20M) 5.8G	149	—	165
	WLAN802.11 n (40M) 5.8G	151	—	159
	Main antenna	WLAN 802.11 a 5.5G	0.749	<input checked="" type="checkbox"/> Laptop 124 Channel
	Aux antenna	WLAN 802.11 n (40M) 5.5G	0.979	<input checked="" type="checkbox"/> Laptop 134 Channel

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**#. WLAN802.11 a/b/g/n (20M/40M) conducted power table (Main antenna)**

(When the maximum transmitter and antenna output power are  $\leq 60/f(\text{GHz})$  (mW))

SAR evaluation is typically not required for FCC or TCB approval)

802.11b		Average Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								
		1	2	5.5	11	18	24	36	48	54
1	2412	18.87	18.64	18.43	18.1					
6	2437	17.47	17.18	17.14	16.82					
11	2462	17.17	17.02	17.09	17.08					
802.11g		Average Power Output (dBm)								
CH	Frequency (MHz)	Data Rate								
		6	9	12	18	24	36	48	54	
1	2412	11.79	11.76	11.39	11.14	11.08	11.75	11.66	11.57	
6	2437	11.89	11.64	11.49	11.25	11.23	11.87	11.61	11.74	
11	2462	11.87	11.79	11.68	11.55	11.42	11.7	11.53	11.34	
802.11n(20M)		Average Power Output (dBm)								
CH	Frequency (MHz)	Data Rate								
		6.5	13	19.5	26	39	52	58.5	65	
1	2412	7.41	6.86	6.76	7	6.61	7.25	7.08	7.06	
6	2437	11.06	10.52	10.76	10.25	11.03	10.85	10.63	10.56	
11	2462	5.78	5.56	5.41	5.29	5.71	5.74	5.51	5.43	
802.11n(40M)		Average Power Output (dBm)								
CH	Frequency (MHz)	Data Rate								
		13.5	27	40.5	54	81	108	121.5	135	
3	2422	5.62	4.91	4.48	5.6	5.12	4.25	5.84	5.45	
6	2437	7.16	5.56	6.12	6.69	6.62	5.75	7.03	6.97	
9	2452	4.04	3.64	3.11	3.91	3.57	3.41	3.93	3.87	

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802.11a 5.2G/5.5G		Average Power Output(dBm)							
CH	Frequency (MHz)	Data Rate							
		6	9	12	18	24	36	48	54
5180	36	9.47	9.35	9.26	9.04	9.44	9.02	8.78	8.64
5200	40	9.44	9.36	9.21	9	8.87	9.22	8.74	8.67
5220	44	9.64	9.6	9.41	9.23	9.11	9.33	9	8.89
5240	48	10.58	10.55	10.27	10.17	10.01	10.5	10.11	9.99
5260	52	13.53	13.41	13.33	13.08	12.87	13.51	13.22	13.13
5280	56	12.66	12.57	12.52	12.23	11.91	12.56	12.27	12.11
5300	60	12.79	12.63	12.5	12.18	12.11	12.7	12.23	11.94
5320	64	11.58	11.48	11.39	11.1	11.08	11.46	11.09	10.99
5500	100	13.59	13.49	13.41	13.16	13.1	13.45	13.15	13.06
5520	104	13.74	13.66	13.55	13.48	13.27	13.61	13.56	13.34
5540	108	14.1	13.99	13.94	13.68	13.49	14.0	13.91	13.86
5560	112	13.34	13.29	13.21	12.98	12.56	13.2	12.94	12.77
5580	116	13.35	13.31	13.15	12.95	12.74	13.33	12.98	12.88
5600	120	13.44	13.08	13.03	12.8	12.64	13.14	12.8	12.72
5620	124	14.23	13.94	13.83	13.65	13.5	14.02	13.69	13.56
5640	128	14.21	13.91	13.81	13.46	13.28	13.99	13.62	13.53
5660	132	13.84	13.78	13.6	13.42	13.12	13.82	13.5	13.38
5680	136	13.63	13.57	13.52	13.34	13.11	13.61	13.31	13.19
5700	140	13.52	13.47	13.42	13.25	13.02	13.5	13.43	13.11
5745	149	10.97	10.87	10.72	10.53	10.32	10.85	10.53	10.4
5765	153	11.12	10.87	10.81	10.64	10.42	11.1	10.72	10.62
5785	157	11.37	11.23	11.12	10.85	10.65	11.38	11.25	11.07
5805	161	11.44	11.3	11.16	10.93	10.72	10.38	11.25	11.07
5825	165	11.46	11.33	11.18	10.99	10.8	10.42	11.4	11.17

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802.11n(20M) 5.2G/5.5G		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate							
		6.5	13	19.5	26	39	52	58.5	65
5180	36	5.82	5.71	5.52	5.32	5.79	5.77	5.71	5.57
5240	48	5.19	5.03	4.88	4.64	5.12	5.01	4.96	4.81
5260	52	9.68	9.59	9.33	9.2	9.67	9.35	9.22	9.14
5320	64	10.73	10.48	10.29	10.09	10.71	10.17	10.08	9.94
5500	100	12.76	12.44	12.21	12	12.63	12.44	12.36	12.16
5580	116	13.41	13.21	13.08	12.99	13.37	12.87	12.75	13.49
5600	120	13.37	13.17	12.9	12.7	13.27	12.77	12.66	13.42
5700	140	9.71	9.46	9.23	9.01	9.67	9.37	9.21	9.05
5745	149	9.73	9.37	9.24	8.98	9.53	9.26	9.04	8.91
5785	157	9.37	8.9	8.65	8.49	8.84	8.62	8.35	8.31
5825	165	10.49	10.19	9.93	9.69	10.17	9.85	9.73	9.7

802.11n(40M) 5.2G/5.5g		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate							
		13.5	27	40.5	54	81	108	121.5	135
5190	38	6.61	6.52	6.6	6.52	5.93	6.59	6.51	6.45
5230	46	6.92	6.73	6.88	6.78	6.18	6.9	6.8	6.75
5270	54	13.03	12.76	12.4	13.02	12.7	13	12.77	12.67
5310	62	8.15	7.83	7.45	8.05	7.77	7.41	7.91	7.77
5510	102	9.67	9.21	9.62	9.46	9.61	9.55	9.34	9.58
5590	118	13.97	13.61	13.9	13.82	13.32	13.91	13.67	13.51
5670	134	13.76	13.2	13.68	13.39	13.05	13.43	13.23	13.17
5755	151	9.43	9.08	8.85	9.4	9.01	9.42	9.17	9.38
5795	159	9.91	9.55	9.04	9.83	9.2	9.86	9.64	9.5

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**#. WLAN802.11 a/g/n (20M/40M) conducted power table (Aux antenna  
\_802.11b mode is not supported on the aux antenna) :**

(When the maximum transmitter and antenna output power are  $\leq 60/f(\text{GHz})$  (mW)

SAR evaluation is typically not required for FCC or TCB approval)

802.11g		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate							
		6	9	12	18	24	36	48	54
1	2412	12.47	12.42	12.36	12.11	11.97	11.71	12.36	12.19
6	2437	12.37	12.15	12.06	11.97	11.79	11.43	11.96	11.83
11	2462	12.06	12.04	11.92	11.74	11.59	11.36	11.97	11.72

802.11n(20M)		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate							
		6.5	13	19.5	26	39	52	58.5	65
1	2412	7.48	7.29	7.09	7.05	7.25	7.35	7.31	7.25
6	2437	11.66	11.43	11.23	11.05	11.57	11.3	11.23	11.14
11	2462	6.96	6.45	6.37	6.23	5.98	6.94	6.89	6.43

802.11n(40M)		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate							
		13.5	27	40.5	54	81	108	121.5	135
3	2422	6.76	6.18	5.77	6.74	6.31	5.46	6.7	6.55
6	2437	8.05	7.59	7.12	7.3	7.21	6.8	7.6	7.48
9	2452	5.04	4.5	4.08	3.72	4.63	4.31	4.87	4.83

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802.11 a 5.2G/5.5G		Average Power Output(dBm)							
CH	Frequency (MHz)	Data Rate							
		6	9	12	18	24	36	48	54
5180	36	9.87	9.66	9.57	9.44	9.05	9.84	9.64	9.28
5200	40	9.91	9.87	9.82	9.6	9.5	10.08	9.66	9.55
5220	44	10.08	9.91	9.82	9.74	9.48	9.99	9.86	9.78
5240	48	10.36	10.21	10.1	9.87	10.29	10.21	9.95	9.81
5260	52	14.4	14.4	14.21	14	13.75	14.39	14.14	14.08
5280	56	13.32	13.19	13.15	12.97	12.79	13.28	13.06	13.03
5300	60	12.31	12.28	12.19	11.91	11.69	12.36	12.12	12.02
5320	64	11.24	11.1	11.09	10.87	10.69	11.21	10.96	10.81
5500	100	13.49	13.41	13.31	13.11	12.87	13.5	13.32	13.21
5520	104	13.69	13.62	13.59	13.3	13.12	13.68	13.34	13.27
5540	108	13.89	13.83	13.71	13.53	13.25	13.88	13.52	13.41
5560	112	13.84	13.74	13.57	13.42	13.23	13.81	13.53	13.39
5580	116	13.71	13.62	13.51	13.44	13.14	13.69	13.37	13.29
5600	120	13.51	13.44	13.42	13.27	13.16	13.49	13.36	13.28
5620	124	14.25	14.19	14.06	13.94	13.77	14.21	14.13	14.08
5640	128	13.14	13.05	12.98	12.86	12.66	13.1	12.99	12.93
5660	132	14.09	14.01	13.9	13.68	13.21	14.06	13.66	13.51
5680	136	14.22	14.13	14.01	13.89	13.42	14.19	14.05	13.88
5700	140	13.29	13.21	13.16	12.9	12.67	13.27	13.01	12.91
5745	149	11.49	11.38	11.3	11.19	11.05	10.96	11.32	11.26
5765	153	10.76	10.53	10.51	10.23	10.02	10.51	10.17	10.13
5785	157	11.53	11.44	11.38	11.24	11.1	11.01	11.48	11.32
5805	161	10.89	10.82	10.64	10.43	10.25	9.82	10.27	10.23
5825	165	10.54	10.49	13.31	13.24	9.82	1045	10	9.93

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802.11n(20M) 5.2G/5.5G		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate							
		6.5	13	19.5	26	39	52	58.5	65
5180	36	6.04	5.24	4.97	4.75	5.5	5.16	4.97	4.92
5240	48	4.56	4.36	4.33	4.17	4.52	4.44	4.12	3.99
5260	52	9.63	9.35	8.93	8.8	9.31	8.98	8.91	8.81
5320	64	11.18	11.04	10.94	10.69	11.12	10.89	10.73	10.61
5500	100	12.36	12.16	11.93	11.73	12.32	11.89	11.61	11.42
5580	116	12.68	12.47	12.31	12.12	12.58	12.08	11.95	11.87
5600	120	12.59	12.44	12.29	12.1	12.71	12.47	12.33	12.11
5700	140	10.34	10.17	10.05	9.83	10.3	10.04	9.94	9.81
5745	149	10.52	10.41	10.17	9.92	10.49	10.13	10.11	9.87
5785	157	9.72	9.6	9.42	9.01	9.69	9.33	9.21	8.85
5825	165	10.39	10.21	10.1	9.83	10.17	10.03	9.91	9.75

802.11n(40M) 5.2G/5.5G		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate							
		13.5	27	40.5	54	81	108	121.5	135
5190	38	4.78	4.51	4.19	3.89	4.5	4.23	4.11	3.86
5230	46	5.21	5.02	4.76	4.42	5.16	5	4.65	4.53
5270	54	13.89	13.57	13.21	13.9	13.29	12.9	12.73	12.63
5310	62	7.59	7.41	7.19	6.86	7.49	7.31	7.23	6.95
5510	102	9.09	8.69	8.35	9.01	8.6	8.18	8.74	8.64
5590	118	14.12	13.84	13.49	14.06	13.62	13.03	14.11	14.02
5670	134	14.66	14.55	14.17	13.76	14.26	14.01	13.8	13.65
5755	151	10.96	9.88	10.31	10.09	9.81	10.06	9.83	10.29
5795	159	11.05	10.93	10.71	11.15	10.61	11.16	10.9	10.79

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## 1.4 Test Environment

Ambient Temperature:  $22 \pm 2^\circ \text{C}$

Tissue Simulating Liquid:  $22 \pm 2^\circ \text{C}$

## 1.5 Operation Description

Use chipset specific software to control the EUT, and makes it transmit in maximum power. Measurements are performed respectively on the lowest, middle and highest channels of the operating band(s).

The EUT is set to maximum power level during all tests, and at the beginning of each test the battery is fully charged.

We will test it with 1 configurations:

Configuration 1: Laptop mode. (WLAN antenna to body distance is 5.7mm)

- # According to KDB 248227 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq 100 \text{ MHz}$ , testing for the other channels is not required.
- # According to KDB 248227 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq 100 \text{ MHz}$ , testing for the other channels is not required.
- # According to KDB 248227 the 1-g SAR for the highest output channel is less than 0.4 W/kg, where the transmission band corresponding to all channels is  $\leq 200 \text{ MHz}$ , testing for the other channels is not required.
- # Due to the maximum average output power of lowest data rate is higher than the other data rates, thus only lowest data rate to do SAR testing.

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- # The sum of 1-g for simultaneous transmitting WLAN802.11n(40M) main antenna and WLAN 802.11n(40M) aux antenna pair is  $0.581+0.979 = 1.56$  W/kg  $< 1.6$  W/kg. According to KDB648474/KDB447498/KDB248227/KDB941225 Simultaneous SAR evaluation is not required.
- # When the maximum transmitter and antenna output power are  $\leq 60/f(\text{GHz})$  (mW) SAR evaluation is typically not required for FCC or TCB approval

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## 1.6 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY 5 professional system). A Model EX3DV4 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  $\sigma$  and  $\rho$  are the conductivity and mass density of the tissue-simulant.

The DASY5 system for performing compliance tests consists of the following items:

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

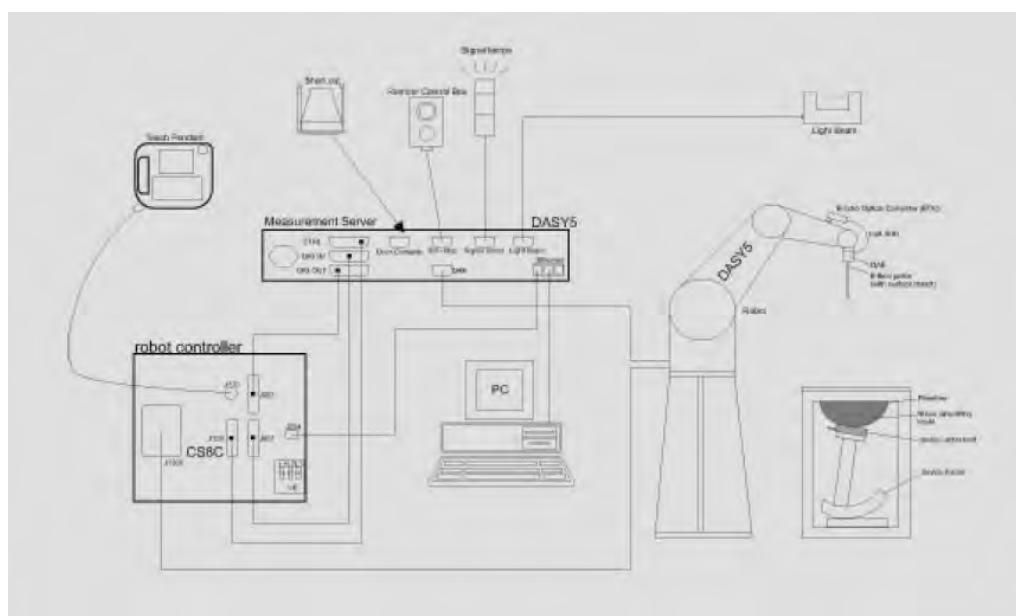


Fig.a The block diagram of SAR system

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- 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.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

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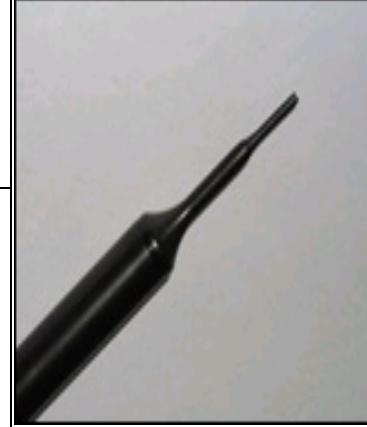
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## 1.7 System Components

### EX3DV4 E-Field Probe

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 2450/5200/5500/5800 MHz Additional CF for other liquids and frequencies upon request	
Frequency	10 MHz to > 6 GHz, Linearity: $\pm 0.6$ dB (30 MHz to 4 GHz)	
Directivity	$\pm 0.3$ dB in HSL (rotation around probe axis) $\pm 0.5$ dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 $\mu$ W/g to > 100 mW/g Linearity: $\pm 0.6$ dB (noise: typically < 1 $\mu$ W/g)	
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

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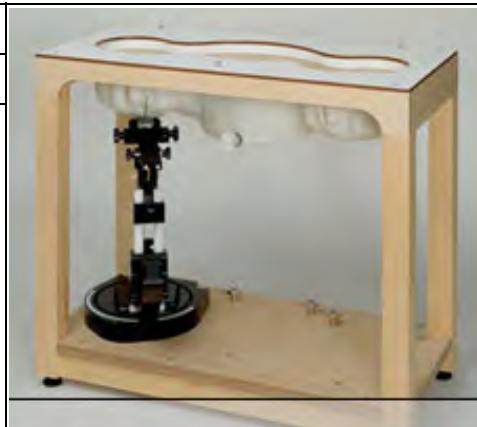
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## SAM PHANTOM V4.0C

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



## DEVICE HOLDER

Construction	<p>The device holder (Supporter) for Notebook is made by POM (polyoxymethylene resin), which is non-metal and non-conductive. The height can be adjusted to fit varies kind of notebooks.</p>	
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Device Holder

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## 1.8 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 5% from the target SAR values. These tests were done at 2450/5200/5500/5800 MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1 (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range 22.1°C, the relative humidity was in the range 62% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

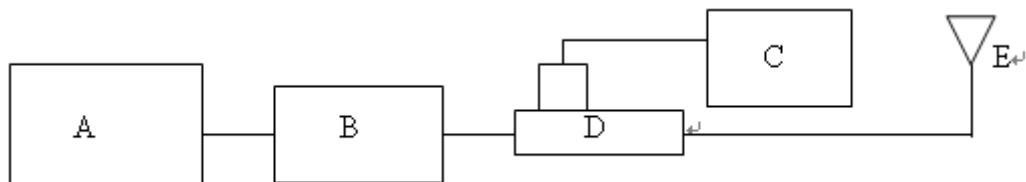
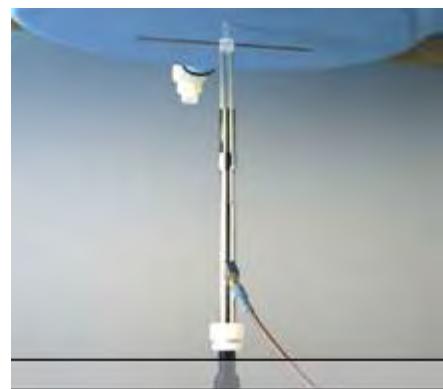


Fig.b The block diagram of system verification

- A. Generator
- B. Amplifier
- C. Power sensor
- D. Dual directional coupling
- E. Reference dipole antenna



Photograph of the dipole Antenna

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Validation Kit	S/N	Frequency (MHz)	Target SAR (1g) (Pin=250mW) (mW/g)	Measured SAR (1g)(mW/g)	Measured Date
D2450V2	869	2450	13	12.7	May 02, 2012
D5GHzV2	1023	5200	7.22	8.01	May 05, 2012
D5GHzV2	1023	5500	7.81	8.41	May 06, 2012
D5GHzV2	1023	5800	7.3	7.79	May 02, 2012
D2450V2	727	2450	12.7	13	Aug 09, 2012

Table 1. Results of system validation

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## 1.9 Tissue Simulant Fluid for the Frequency Band

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

All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The depth of the tissue simulant in the flat section of the phantom was  $15\text{cm}\pm5\text{mm}$  during all tests. (Fig .2)

Frequency (MHz)	Dielectric Parameters		Recommended Limits	Measured	Measurement date		
2450	$\rho$	Verification		49.02-54.18	May 02, 2012		
		Test CH 1_WLAN					
	$\sigma$ (S/m)	Verification		1.89-2.09			
		Test CH 1_WLAN					
	Simulated Tissue Temp.(°C)		20-24	21.7			
2450	$\rho$	Verification		49.78-55.02	Aug 09, 2012		
		Test CH 6_WLAN					
	$\sigma$ (S/m)	Verification		1.88-2.08			
		Test CH 6_WLAN					
	Simulated Tissue Temp.(°C)		20-24	21.7			
5200	$\rho$	Verification		46.74-51.66	May 05, 2012		
		Test CH 36_WLAN					
		Test CH 38_WLAN					
		Test CH 46_WLAN					
		Test CH 48_WLAN					
		Test CH 52_WLAN					
		Test CH 54_WLAN					
		Test CH 62_WLAN					
		Test CH 64_WLAN					

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5200	$\sigma$ (S/m)	Verification	5.19-5.73	5.477	May 05, 2012
		Test CH 36_WLAN		5.446	
		Test CH 38_WLAN		5.461	
		Test CH 46_WLAN		5.525	
		Test CH 48_WLAN		5.536	
		Test CH 52_WLAN		5.557	
		Test CH 54_WLAN		5.574	
		Test CH 62_WLAN		5.631	
		Test CH 64_WLAN		5.648	
		Simulated Tissue Temp.(°C)		20-24	
5500	$\rho$	Verification	46.27-51.14	49.036	May 06, 2012
		Test CH 102_WLAN		49.016	
		Test CH 104_WLAN		48.989	
		Test CH 116_WLAN		48.88	
		Test CH 118_WLAN		48.847	
		Test CH 124_WLAN		48.79	
		Test CH 134_WLAN		48.676	
		Test CH 136_WLAN		48.666	
	$\sigma$ (S/m)	Verification	5.57-6.15	5.702	
		Test CH 102_WLAN		5.723	
		Test CH 104_WLAN		5.733	
		Test CH 116_WLAN		5.825	
		Test CH 118_WLAN		5.834	
		Test CH 124_WLAN		5.874	
		Test CH 134_WLAN		5.954	
		Test CH 136_WLAN		5.967	
Simulated Tissue Temp.(°C)		20-24	21.7		

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5800	$\rho$	Verification	45.79-50.61	48.049	May 02, 2012
		Test CH 149_WLAN		48.108	
		Test CH 157_WLAN		48.057	
		Test CH 159_WLAN		48.036	
		Test CH 165_WLAN		47.964	
	$\sigma$ (S/m)	Verification	5.97-6.59	6.198	
		Test CH 149_WLAN		6.12	
		Test CH 157_WLAN		6.177	
		Test CH 159_WLAN		6.192	
		Test CH 165_WLAN		6.235	
Simulated Tissue Temp.(°C)		20-24		21.7	

Table 2. Dielectric Parameters of Tissue Simulant Fluid

The composition of the Body tissue simulating liquid:

Frequency (MHz)	Mode	Ingredients					Total amount
		DGMBE	Water	Salt	Preventol D-7	Cellulose	
2450M	Body	301.7ml	698.3ml	—	—	—	1.0L(Kg)

Simulating Liquids for 5 GHz, Manufactured by SPEAG:

Ingredients	Water	Esters, Emulsifiers, Inhibitors	Sodium and Salt
(% by weight)	60-80	20-40	0-1.5

Table 3. Recipes for tissue simulating liquid

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## 1.10 Evaluation Procedures

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

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

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

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

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

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

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

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## 1.11 Test Standards and Limits

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

- (1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube).
- (2) Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.
- (3) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any

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

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

Table 4. RF exposure limits

Notes:

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

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## 2. Summary of Results

### WLAN802.11 b /n

Band	EUT Position	Antenna	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
				CH 1	CH 6	CH 11	
				2412 MHz	2437 MHz	2462 MHz	
WLAN 802.11 b	Body Worn	Main	Laptop mode	0.453	—	—	1.6
WLAN 802.11 n(20M)	Body Worn	Main+Aux	Laptop mode	—	0.224	—	1.6

Test distance is 0mm;

- # Using KDB248227-SAR is not required for 802.11 g/HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.
- # According to KDB447498 the 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq$  100 MHz, testing for the other channels is not required.
- # WLAN 802.11b mode is not supported on the aux antenna.

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### WLAN802.11 a / n (20M) 5.2G

Band	EUT Position	Antenna	Test Configuration	Averaged SAR over 1g (W/kg)				SAR Limit 1g (W/kg)
				CH 36	CH 48	CH 52	CH 64	
				5180 MHz	5240 MHz	5260 MHz	5320 MHz	
WLAN a 5.2G	Body Worn	Main	Laptop mode	0.218	0.308	0.685	0.441	1.6
		Aux	Laptop mode	0.278	0.252	0.589	0.335	1.6
WLAN n (20M) 5.2G	Body Worn	Main	Laptop mode	—	—	—	0.365	1.6
		Aux	Laptop mode	—	—	—	0.299	1.6

### WLAN802.11 n (40M) 5.2G

Band	EUT Position	Antenna	Test Configuration	Averaged SAR over 1g (W/kg)				SAR Limit 1g (W/kg)
				CH 38	CH 46	CH 54	CH 62	
				5190 MHz	5230 MHz	5270 MHz	5310 MHz	
WLAN n (40M) 5.2G	Body Worn	Main	Laptop mode	0.128	0.146	0.580	0.199	1.6
		Aux	Laptop mode	0.082	0.074	0.522	0.121	1.6

### WLAN802.11 a 5.5G

Band	EUT Position	Antenna	Test Configuration	Averaged SAR over 1g (W/kg)				SAR Limit 1g (W/kg)
				CH 104	CH 116	CH 124	CH 136	
				5520 MHz	5580 MHz	5620 MHz	5680 MHz	
WLAN a 5.5G	Body Worn	Main	Laptop mode	0.649	0.575	0.749	0.670	1.6
		Aux	Laptop mode	0.536	0.531	0.732	0.757	1.6

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**WLAN802.11 n (20M) 5.5G**

Band	EUT Position	Antenna	Test Configuration	Averaged SAR over 1g (W/kg)				SAR Limit 1g (W/kg)
				CH 100	CH 116	CH 120	CH 140	
				5500 MHz	5580 MHz	5600 MHz	5700 MHz	
WLAN n(20M) 5.5G	Body Worn	Main	Laptop mode	—	0.687	—	—	1.6
		Aux	Laptop mode	—	0.466	—	—	1.6

**WLAN802.11 n (40M) 5.5G**

Band	EUT Position	Antenna	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
				CH 102	CH 118	CH 134	
				5510 MHz	5590 MHz	5670 MHz	
WLAN n (40M) 5.5G	Body Worn	Main	Laptop mode	0.217	0.685	0.581	1.6
		Aux	Laptop mode	0.197	0.637	0.979	1.6

**WLAN802.11 a / n (20M) 5.8G**

Band	EUT Position	Antenna	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
				CH 149	CH 157	CH 165	
				5745 MHz	5785 MHz	5825 MHz	
WLAN a 5.8G	Body Worn	Main	Laptop mode	—	—	0.154	1.6
		Aux	Laptop mode	—	0.268	—	1.6
WLAN n (20M) 5.8G	Body Worn	Main	Laptop mode	—	—	0.136	1.6
		Aux	Laptop mode	0.241	—	—	1.6

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**WLAN802.11 n (40M) 5.8G**

Band	EUT Position	Antenna	Test Configuration	Averaged SAR over 1g (W/kg)		SAR Limit 1g (W/kg)
				CH 151	CH 159	
				5755 MHz	5795 MHz	
WLAN n (40M) 5.8G	Body Worn	Main	Laptop mode	—	0.096	1.6
		Aux	Laptop mode	—	0.270	1.6

- # According to KDB447498 the 1-g SAR for the highest output channel is less than 0.4 W/kg, where the transmission band corresponding to all channels is  $\leq$  200 MHz, testing for the other channels is not required.

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### 3. Instruments List

Manufacturer	Device	Type	Serial number	Date of last calibration	Date of next calibration
Schmid & Partner Engineering AG	Dosimetric E-Field Probe	EX3DV4	3831	Jan.04.2012	Jan.03.2013
Schmid & Partner Engineering AG	2450/5200/5500/5800 MHz System Validation Dipole	D2450V2	869	Jul.15.2011	Jul.14.2012
		D5GHzV2	1023	Jan.19.2012	Jan.18.2013
		D2450V2	727	Apr.25.2012	Apr.24.2013
Schmid & Partner Engineering AG	Data acquisition Electronics	DAE4	1260	Aug.22.2011	Aug.21.2012
Schmid & Partner Engineering AG	Software	DASY 52 V52.8	N/A	Calibration not required	Calibration not required
Schmid & Partner Engineering AG	Phantom	SAM	N/A	Calibration not required	Calibration not required
HP	Network Analyzer	8753D	3410A05547	Mar.15.2012	Mar.14.2013
Agilent	Dielectric Probe Kit	85070E	MY44300554	Calibration not required	Calibration not required
Agilent	Dual-directional coupler	772D	MY46151242	Jul.07.2011	Jul.06.2012
		777D	50114	Aug.18.2011	Aug.17.2012
Agilent	RF Signal Generator	N5181A	MY50141235	Jan.06.2012	Jan.06.2013
Agilent	Power meter	E4417A	MY51410006	Oct.24.2011	Oct.23.2012

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## 4. Measurements

Date: 2012/5/2

### Laptop mode\_WLAN802.11 b\_CH1\_Main antenna

Communication System: WLAN(2.45G); Communication System Band: WLAN802.11 b\_CE;  
Frequency: 2412 MHz;  
Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.979$  mho/m;  $\epsilon_r = 51.764$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(6.82, 6.82, 6.82); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.541 mW/g

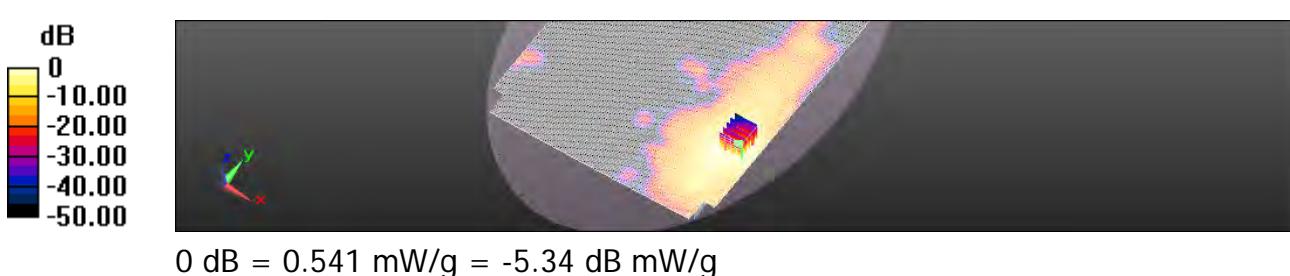
**Configuration/BODY/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:  
 $dx=8$  mm,  $dy=8$  mm,  $dz=5$  mm

Reference Value = 1.295 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.986 mW/g

**SAR(1 g) = 0.453 mW/g; SAR(10 g) = 0.213 mW/g**

Maximum value of SAR (measured) = 0.567 mW/g



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Date: 2012/8/9

## Laptop mode\_WLAN802.11 n(20M)\_CH6\_MIMO( Main + Aux )

Communication System: WLAN(2.45G); Communication System Band: WLAN802.11 n(20M)\_FCC; Frequency: 2437 MHz;

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.97$  mho/m;  $\epsilon_r = 50.796$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(6.82, 6.82, 6.82); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.373 mW/g

**Configuration/BODY/Zoom Scan (5x5x7)/Cube 0:** Measurement grid:

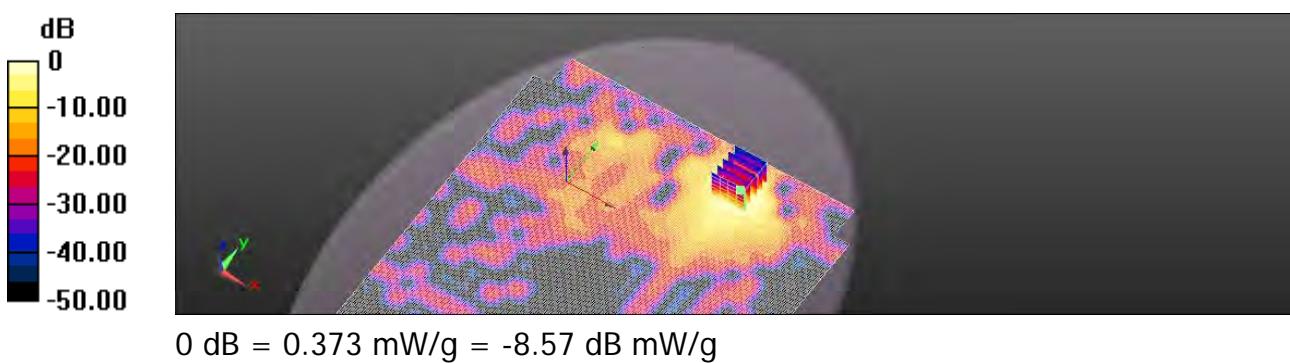
$dx=8$  mm,  $dy=8$  mm,  $dz=5$  mm

Reference Value = 1.368 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.470 mW/g

**SAR(1 g) = 0.224 mW/g; SAR(10 g) = 0.111 mW/g**

Maximum value of SAR (measured) = 0.344 mW/g



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## Laptop mode\_WLAN802.11 a 5.2G\_CH36\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;

Frequency: 5180 MHz;

Medium parameters used:  $f = 5180$  MHz;  $\sigma = 5.446$  mho/m;  $\epsilon_r = 49.256$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(4.12, 4.12, 4.12); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.379 mW/g

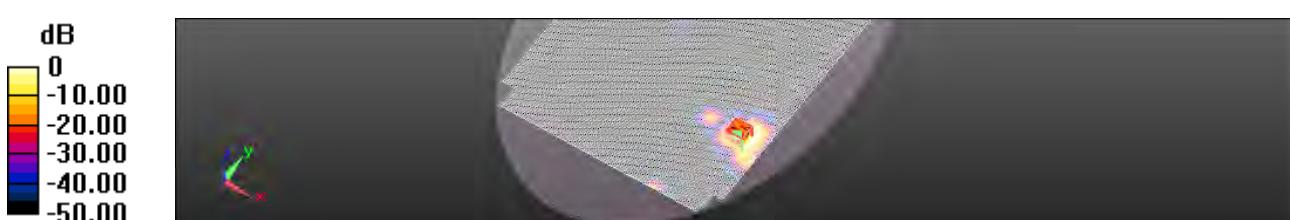
**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:  $dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.024 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.743 mW/g

**SAR(1 g) = 0.218 mW/g; SAR(10 g) = 0.061 mW/g**

Maximum value of SAR (measured) = 0.433 mW/g



0 dB = 0.379 mW/g = -8.42 dB mW/g

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Date: 2012/5/5

## Laptop mode\_WLAN802.11 a 5.2G\_CH48\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;

Frequency: 5240 MHz;

Medium parameters used:  $f = 5240$  MHz;  $\sigma = 5.536$  mho/m;  $\epsilon_r = 49.123$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(4.12, 4.12, 4.12); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.658 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

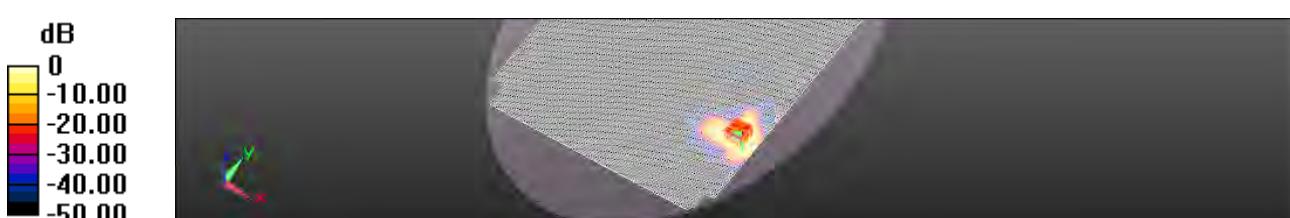
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.670 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 1.035 mW/g

**SAR(1 g) = 0.308 mW/g; SAR(10 g) = 0.095 mW/g**

Maximum value of SAR (measured) = 0.598 mW/g



0 dB = 0.658 mW/g = -3.63 dB mW/g

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## Laptop mode\_WLAN802.11 a 5.2G\_CH52\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5260 MHz;

Medium parameters used:  $f = 5260$  MHz;  $\sigma = 5.557$  mho/m;  $\epsilon_r = 49.081$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.92, 3.92, 3.92); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.36 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

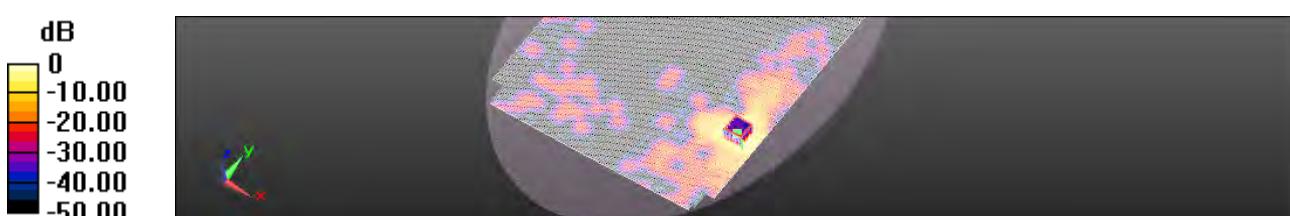
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.273 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 2.411 mW/g

**SAR(1 g) = 0.685 mW/g; SAR(10 g) = 0.218 mW/g**

Maximum value of SAR (measured) = 1.34 mW/g



0 dB = 1.36 mW/g = 2.65 dB mW/g

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## Laptop mode\_WLAN802.11 a 5.2G\_CH64\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5320 MHz;

Medium parameters used:  $f = 5320$  MHz;  $\sigma = 5.648$  mho/m;  $\epsilon_r = 48.931$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.92, 3.92, 3.92); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.874 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

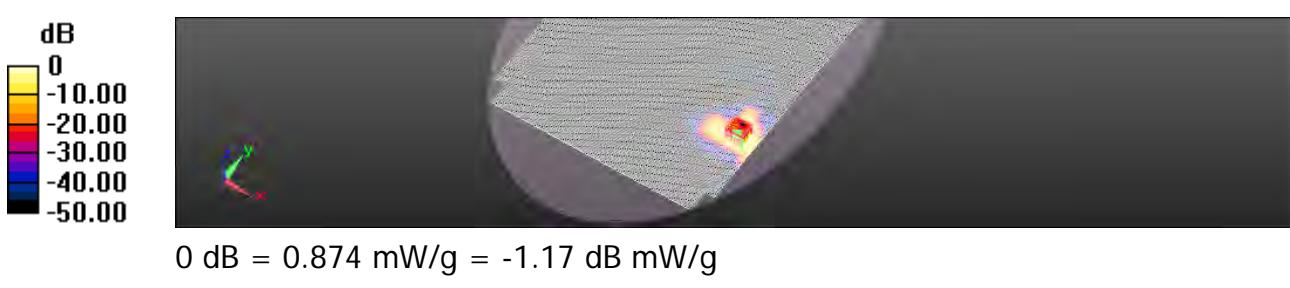
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.115 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.550 mW/g

**SAR(1 g) = 0.441 mW/g; SAR(10 g) = 0.132 mW/g**

Maximum value of SAR (measured) = 0.884 mW/g



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## Laptop mode\_WLAN802.11 a 5.2G\_CH36\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5180 MHz;

Medium parameters used:  $f = 5180$  MHz;  $\sigma = 5.446$  mho/m;  $\epsilon_r = 49.256$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(4.12, 4.12, 4.12); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.426 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.011 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.019 mW/g

**SAR(1 g) = 0.278 mW/g; SAR(10 g) = 0.087 mW/g**

Maximum value of SAR (measured) = 0.538 mW/g



0 dB = 0.426 mW/g = -7.41 dB mW/g

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## Laptop mode\_WLAN802.11 a 5.2G\_CH48\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5240 MHz;

Medium parameters used:  $f = 5240$  MHz;  $\sigma = 5.536$  mho/m;  $\epsilon_r = 49.123$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(4.12, 4.12, 4.12); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.407 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

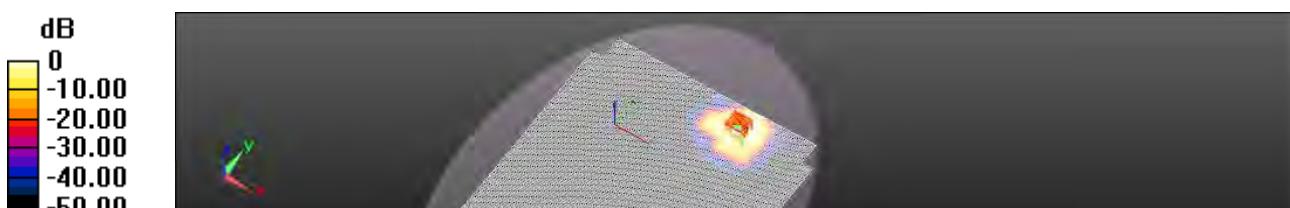
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.492 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.975 mW/g

**SAR(1 g) = 0.252 mW/g; SAR(10 g) = 0.085 mW/g**

Maximum value of SAR (measured) = 0.504 mW/g



0 dB = 0.407 mW/g = -7.80 dB mW/g

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## Laptop mode\_WLAN802.11 a 5.2G\_CH52\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;

Frequency: 5260 MHz;

Medium parameters used:  $f = 5260$  MHz;  $\sigma = 5.557$  mho/m;  $\epsilon_r = 49.081$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.92, 3.92, 3.92); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.942 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

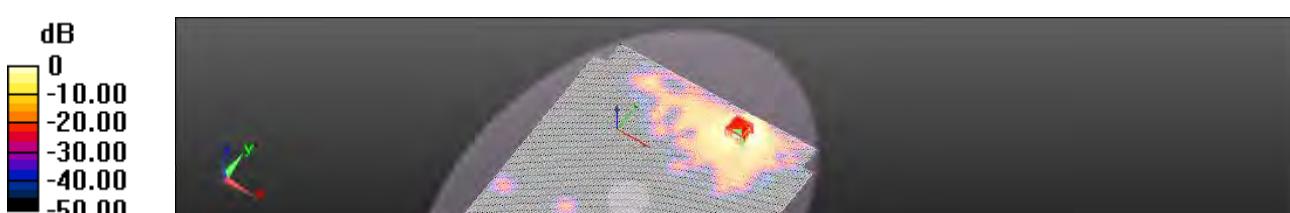
dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 1.771 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 2.180 mW/g

**SAR(1 g) = 0.589 mW/g; SAR(10 g) = 0.197 mW/g**

Maximum value of SAR (measured) = 1.16 mW/g



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## Laptop mode\_WLAN802.11 a 5.2G\_CH64\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5320 MHz;

Medium parameters used:  $f = 5320$  MHz;  $\sigma = 5.648$  mho/m;  $\epsilon_r = 48.931$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.92, 3.92, 3.92); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.608 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

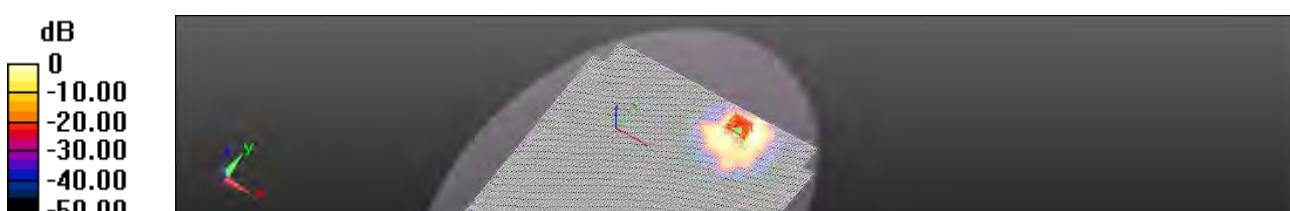
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.087 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.271 mW/g

**SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.117 mW/g**

Maximum value of SAR (measured) = 0.662 mW/g



0 dB = 0.608 mW/g = -4.32 dB mW/g

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## Laptop mode\_WLAN802.11 n(20M) 5.2G\_CH64\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(20M)\_FCC; Frequency: 5320 MHz;

Medium parameters used:  $f = 5320$  MHz;  $\sigma = 5.648$  mho/m;  $\epsilon_r = 48.931$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.92, 3.92, 3.92); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.558 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

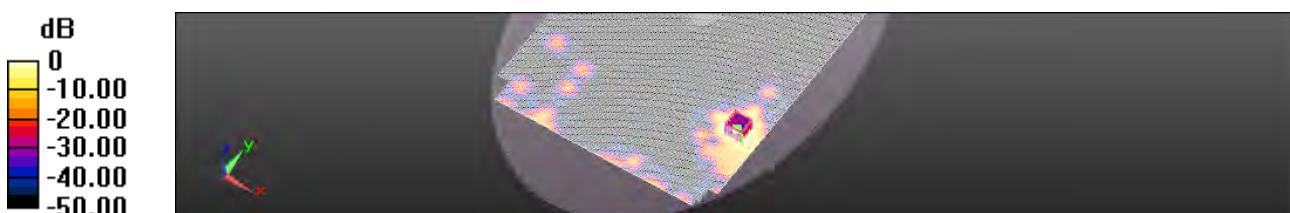
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.417 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.301 mW/g

**SAR(1 g) = 0.365 mW/g; SAR(10 g) = 0.112 mW/g**

Maximum value of SAR (measured) = 0.717 mW/g



0 dB = 0.558 mW/g = -5.07 dB mW/g

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## Laptop mode\_WLAN802.11 n(20M) 5.2G\_CH64\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(20M)\_FCC; Frequency: 5320 MHz;

Medium parameters used:  $f = 5320$  MHz;  $\sigma = 5.648$  mho/m;  $\epsilon_r = 48.931$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.92, 3.92, 3.92); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.484 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

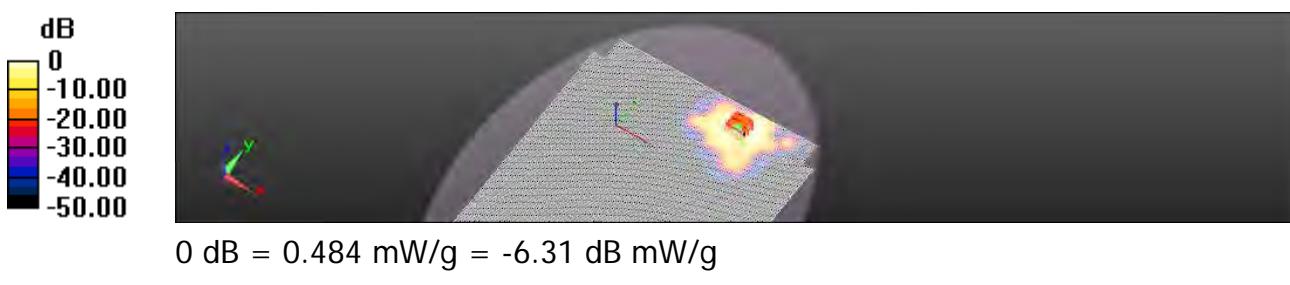
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 4.923 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 1.122 mW/g

**SAR(1 g) = 0.299 mW/g; SAR(10 g) = 0.102 mW/g**

Maximum value of SAR (measured) = 0.596 mW/g



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Date: 2012/5/5

## Laptop mode\_WLAN802.11 n(40M) 5.2G\_CH38\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5190 MHz;

Medium parameters used:  $f = 5190$  MHz;  $\sigma = 5.461$  mho/m;  $\epsilon_r = 49.231$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(4.12, 4.12, 4.12); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.439 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.485 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 0.476 mW/g

**SAR(1 g) = 0.128 mW/g; SAR(10 g) = 0.032 mW/g**

Maximum value of SAR (measured) = 0.262 mW/g



0 dB = 0.439 mW/g = -7.15 dB mW/g

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Date: 2012/5/5

## Laptop mode\_WLAN802.11 n(40M) 5.2G\_CH46\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5230 MHz;

Medium parameters used:  $f = 5230$  MHz;  $\sigma = 5.525$  mho/m;  $\epsilon_r = 49.117$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(4.12, 4.12, 4.12); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.336 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

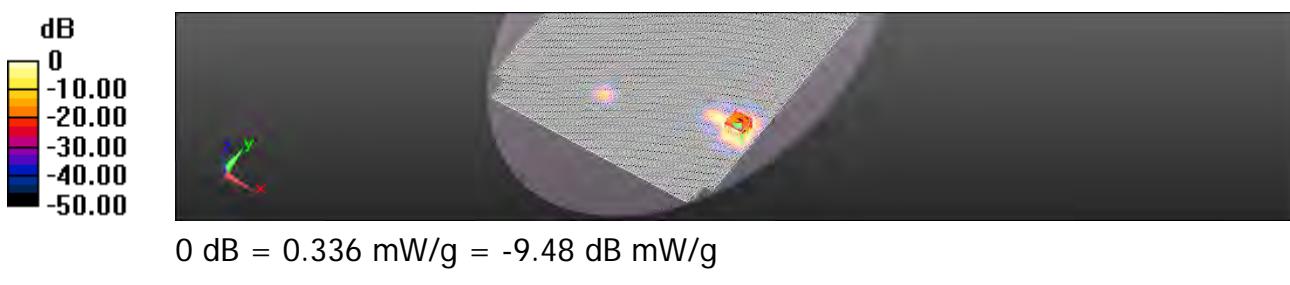
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.616 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.536 mW/g

**SAR(1 g) = 0.146 mW/g; SAR(10 g) = 0.041 mW/g**

Maximum value of SAR (measured) = 0.287 mW/g



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Date: 2012/5/5

## Laptop mode\_WLAN802.11 n(40M) 5.2G\_CH54\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5270 MHz;

Medium parameters used:  $f = 5270$  MHz;  $\sigma = 5.574$  mho/m;  $\epsilon_r = 49.046$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.92, 3.92, 3.92); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.06 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

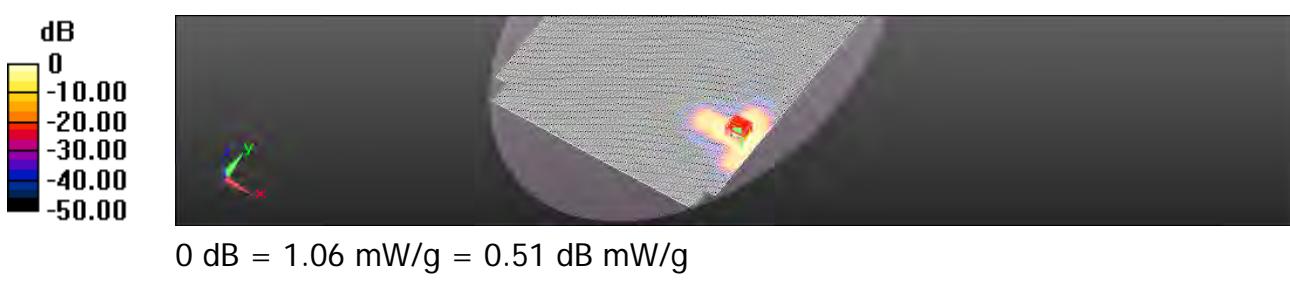
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.409 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 2.041 mW/g

**SAR(1 g) = 0.580 mW/g; SAR(10 g) = 0.175 mW/g**

Maximum value of SAR (measured) = 1.15 mW/g



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## Laptop mode\_WLAN802.11 n(40M) 5.2G\_CH62\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5310 MHz;

Medium parameters used:  $f = 5310$  MHz;  $\sigma = 5.631$  mho/m;  $\epsilon_r = 48.967$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.92, 3.92, 3.92); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.420 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 1.370 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.744 mW/g

**SAR(1 g) = 0.199 mW/g; SAR(10 g) = 0.057 mW/g**

Maximum value of SAR (measured) = 0.396 mW/g



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## Laptop mode\_WLAN802.11 n(40M) 5.2G\_CH38\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5190 MHz;

Medium parameters used:  $f = 5190$  MHz;  $\sigma = 5.461$  mho/m;  $\epsilon_r = 49.231$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(4.12, 4.12, 4.12); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.297 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

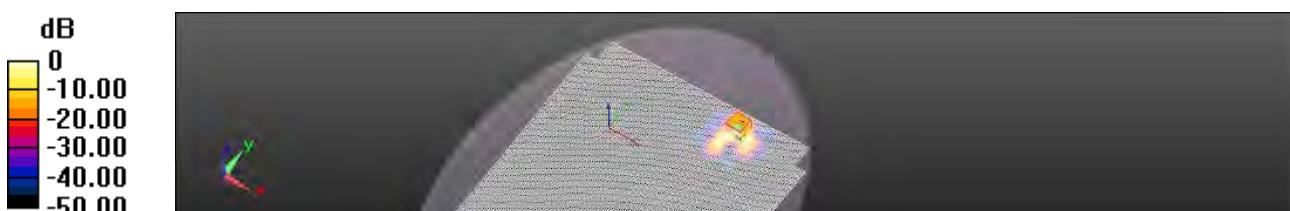
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.587 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.282 mW/g

**SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.028 mW/g**

Maximum value of SAR (measured) = 0.162 mW/g



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## Laptop mode\_WLAN802.11 n(40M) 5.2G\_CH46\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5230 MHz;

Medium parameters used:  $f = 5230$  MHz;  $\sigma = 5.525$  mho/m;  $\epsilon_r = 49.117$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(4.12, 4.12, 4.12); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.116 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

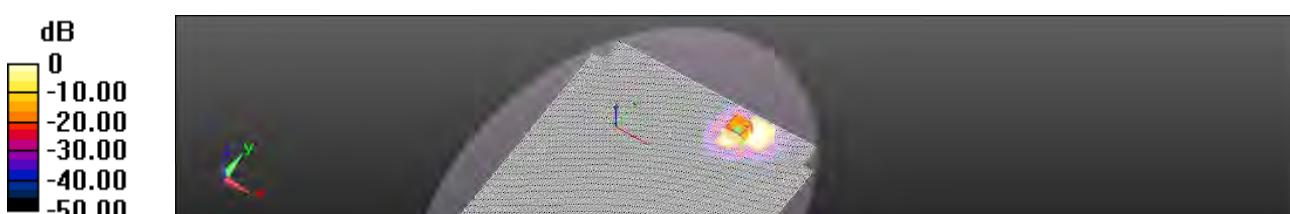
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.359 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.328 mW/g

**SAR(1 g) = 0.074 mW/g; SAR(10 g) = 0.026 mW/g**

Maximum value of SAR (measured) = 0.160 mW/g



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## Laptop mode\_WLAN802.11 n(40M) 5.2G\_CH54\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5270 MHz;

Medium parameters used:  $f = 5270$  MHz;  $\sigma = 5.574$  mho/m;  $\epsilon_r = 49.046$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.92, 3.92, 3.92); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.932 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.523 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 1.958 mW/g

**SAR(1 g) = 0.522 mW/g; SAR(10 g) = 0.177 mW/g**

Maximum value of SAR (measured) = 1.03 mW/g



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## Laptop mode\_WLAN802.11 n(40M) 5.2G\_CH62\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5310 MHz;

Medium parameters used:  $f = 5310$  MHz;  $\sigma = 5.631$  mho/m;  $\epsilon_r = 48.967$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.92, 3.92, 3.92); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.237 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

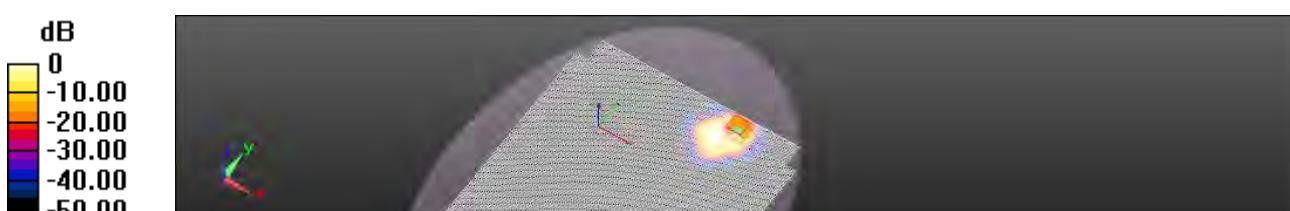
dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 1.193 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.434 mW/g

**SAR(1 g) = 0.121 mW/g; SAR(10 g) = 0.032 mW/g**

Maximum value of SAR (measured) = 0.259 mW/g



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Date: 2012/5/6

## Laptop mode\_WLAN802.11 a 5.5G\_CH104\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5520 MHz;

Medium parameters used:  $f = 5520$  MHz;  $\sigma = 5.733$  mho/m;  $\epsilon_r = 48.989$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.19 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.286 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 2.198 mW/g

**SAR(1 g) = 0.649 mW/g; SAR(10 g) = 0.205 mW/g**

Maximum value of SAR (measured) = 1.30 mW/g



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Date: 2012/5/6

## Laptop mode\_WLAN802.11 a 5.5G\_CH116\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5580 MHz;

Medium parameters used:  $f = 5580$  MHz;  $\sigma = 5.825$  mho/m;  $\epsilon_r = 48.88$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.07 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

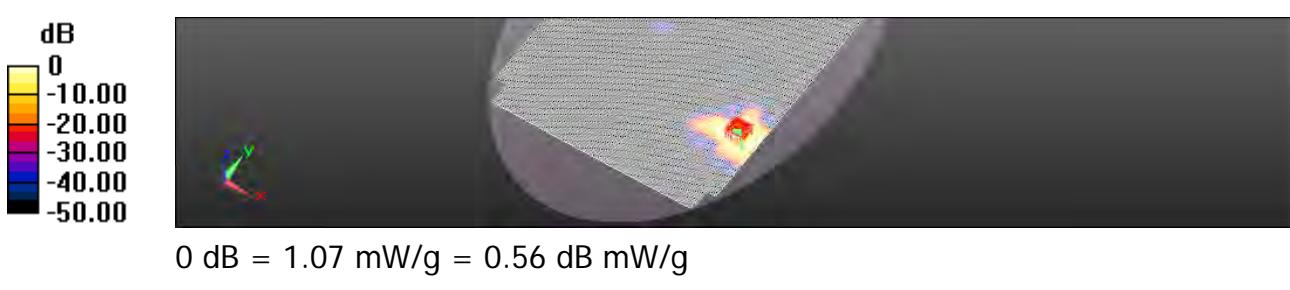
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.459 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 1.924 mW/g

**SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.184 mW/g**

Maximum value of SAR (measured) = 1.17 mW/g



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Date: 2012/5/6

## Laptop mode\_WLAN802.11 a 5.5G\_CH124\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5620 MHz;

Medium parameters used:  $f = 5620$  MHz;  $\sigma = 5.874$  mho/m;  $\epsilon_r = 48.79$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.44 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

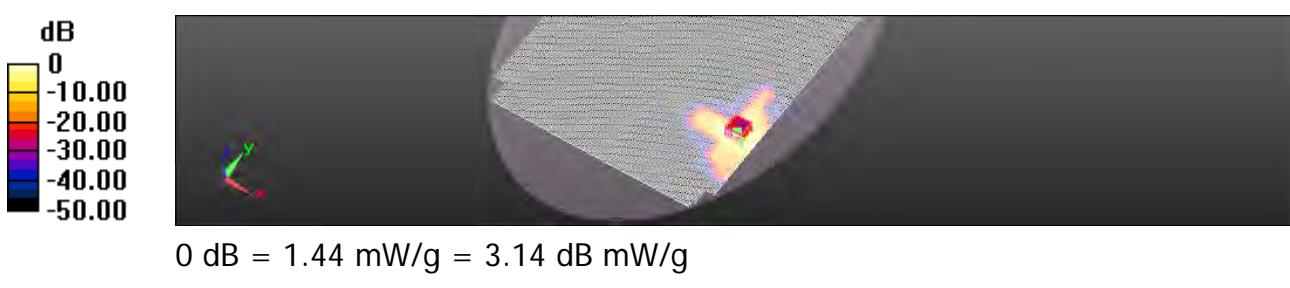
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.365 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 2.468 mW/g

**SAR(1 g) = 0.749 mW/g; SAR(10 g) = 0.242 mW/g**

Maximum value of SAR (measured) = 1.49 mW/g



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Date: 2012/5/6

## Laptop mode\_WLAN802.11 a 5.5G\_CH136\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;

Frequency: 5680 MHz;

Medium parameters used:  $f = 5680$  MHz;  $\sigma = 5.967$  mho/m;  $\epsilon_r = 48.666$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.29 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

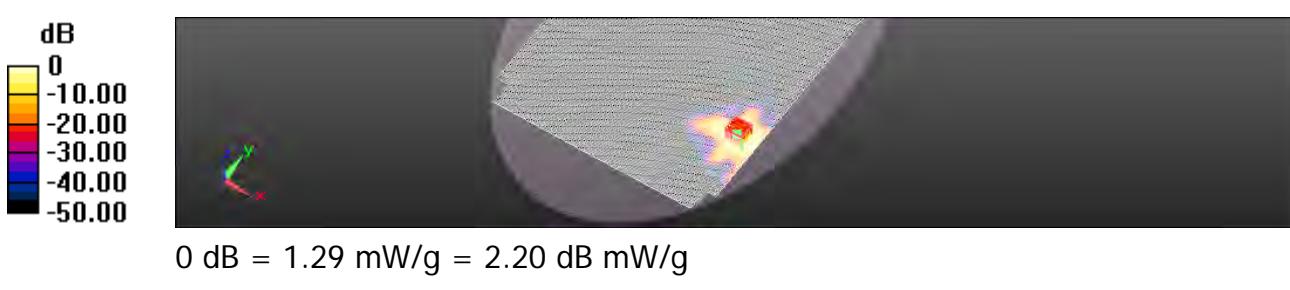
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.540 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 2.309 mW/g

**SAR(1 g) = 0.670 mW/g; SAR(10 g) = 0.223 mW/g**

Maximum value of SAR (measured) = 1.35 mW/g



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Date: 2012/5/6

## Laptop mode\_WLAN802.11 a 5.5G\_CH104\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5520 MHz;

Medium parameters used:  $f = 5520$  MHz;  $\sigma = 5.733$  mho/m;  $\epsilon_r = 48.989$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.966 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

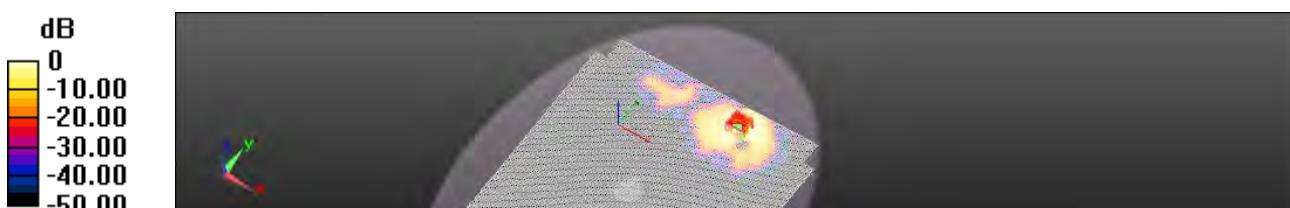
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 0.988 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 1.995 mW/g

**SAR(1 g) = 0.536 mW/g; SAR(10 g) = 0.185 mW/g**

Maximum value of SAR (measured) = 1.07 mW/g



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Date: 2012/5/6

## Laptop mode\_WLAN802.11 a 5.5G\_CH116\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5580 MHz;

Medium parameters used:  $f = 5580$  MHz;  $\sigma = 5.825$  mho/m;  $\epsilon_r = 48.88$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.907 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.541 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.905 mW/g

**SAR(1 g) = 0.531 mW/g; SAR(10 g) = 0.185 mW/g**

Maximum value of SAR (measured) = 1.06 mW/g



0 dB = 0.907 mW/g = -0.85 dB mW/g

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Date: 2012/5/6

## Laptop mode\_WLAN802.11 a 5.5G\_CH124\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5620 MHz;

Medium parameters used:  $f = 5620$  MHz;  $\sigma = 5.874$  mho/m;  $\epsilon_r = 48.79$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.25 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

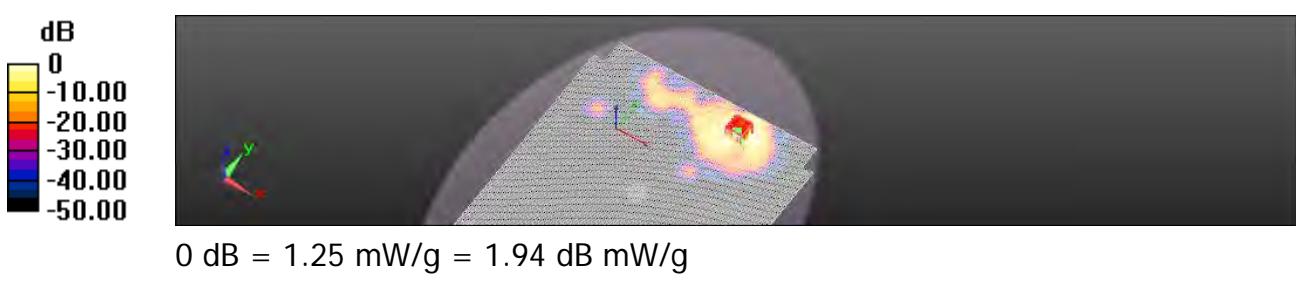
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.684 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 2.585 mW/g

**SAR(1 g) = 0.732 mW/g; SAR(10 g) = 0.250 mW/g**

Maximum value of SAR (measured) = 1.42 mW/g



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## Laptop mode\_WLAN802.11 a 5.5G\_CH136\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5680 MHz;

Medium parameters used:  $f = 5680$  MHz;  $\sigma = 5.967$  mho/m;  $\epsilon_r = 48.666$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.36 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

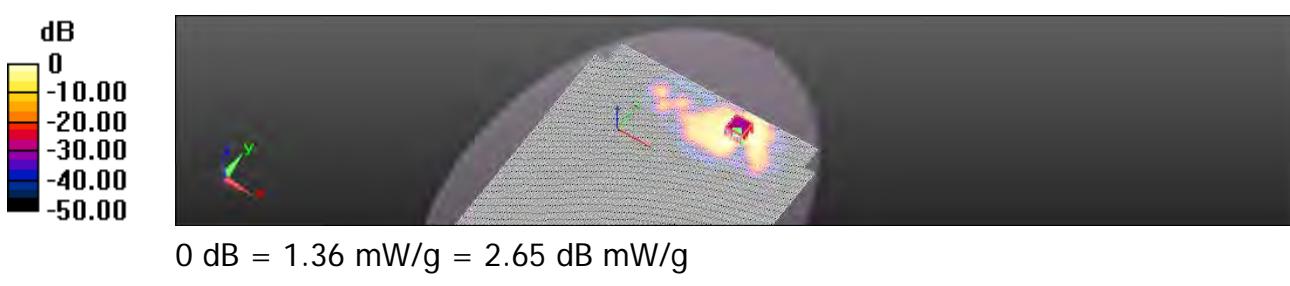
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 0.982 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 2.806 mW/g

**SAR(1 g) = 0.757 mW/g; SAR(10 g) = 0.263 mW/g**

Maximum value of SAR (measured) = 1.47 mW/g



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Date: 2012/5/6

## Laptop mode\_WLAN802.11 n(20M) 5.5G\_CH116\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(20M)\_FCC; Frequency: 5580 MHz;

Medium parameters used:  $f = 5580$  MHz;  $\sigma = 5.825$  mho/m;  $\epsilon_r = 48.88$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.867 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

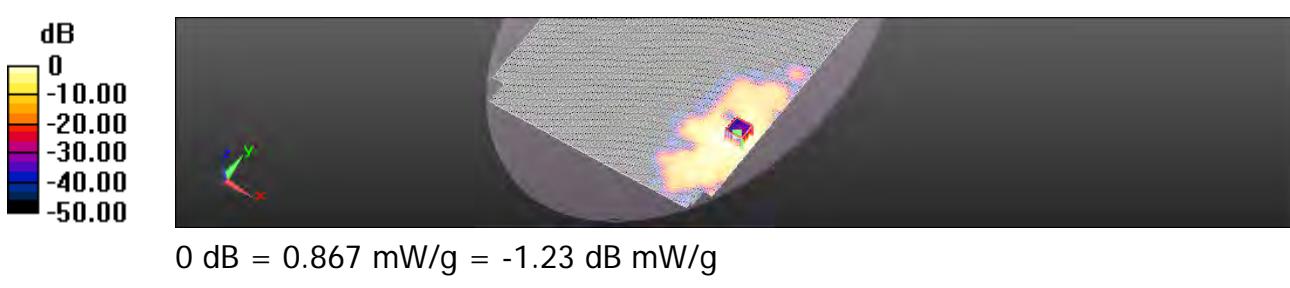
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.934 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.129 mW/g

**SAR(1 g) = 0.687 mW/g; SAR(10 g) = 0.320 mW/g**

Maximum value of SAR (measured) = 0.995 mW/g



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## Laptop mode\_WLAN802.11 n(20M) 5.5G\_CH116\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(20M)\_FCC; Frequency: 5580 MHz;

Medium parameters used:  $f = 5580$  MHz;  $\sigma = 5.825$  mho/m;  $\epsilon_r = 48.88$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.736 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

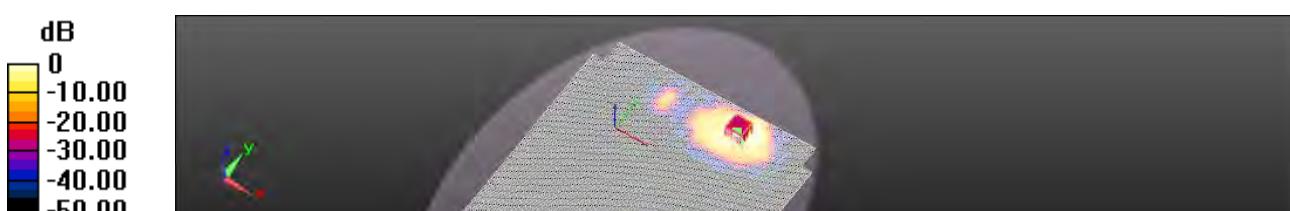
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.459 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.685 mW/g

**SAR(1 g) = 0.466 mW/g; SAR(10 g) = 0.157 mW/g**

Maximum value of SAR (measured) = 0.893 mW/g



0 dB = 0.736 mW/g = -2.66 dB mW/g

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## Laptop mode\_WLAN802.11 n(40M) 5.5G\_CH102\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5510 MHz;

Medium parameters used:  $f = 5510$  MHz;  $\sigma = 5.723$  mho/m;  $\epsilon_r = 49.016$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.404 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

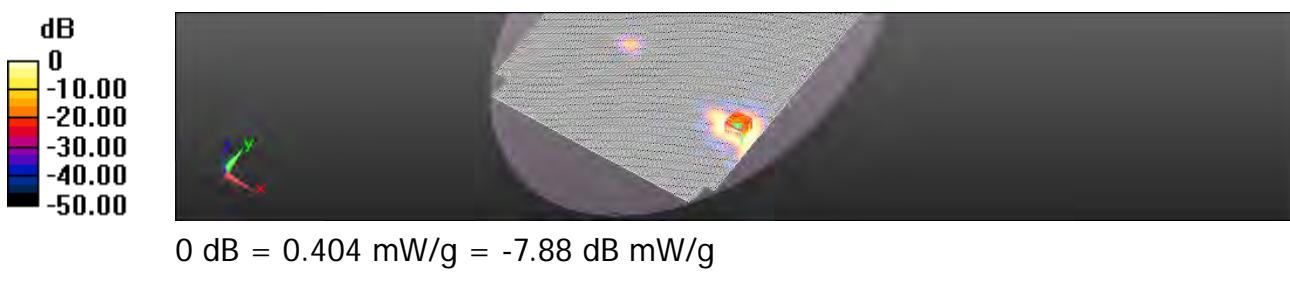
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.573 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.762 mW/g

**SAR(1 g) = 0.217 mW/g; SAR(10 g) = 0.064 mW/g**

Maximum value of SAR (measured) = 0.450 mW/g



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## Laptop mode\_WLAN802.11 n(40M) 5.5G\_CH118\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5590 MHz;

Medium parameters used:  $f = 5590$  MHz;  $\sigma = 5.834$  mho/m;  $\epsilon_r = 48.847$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.43 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

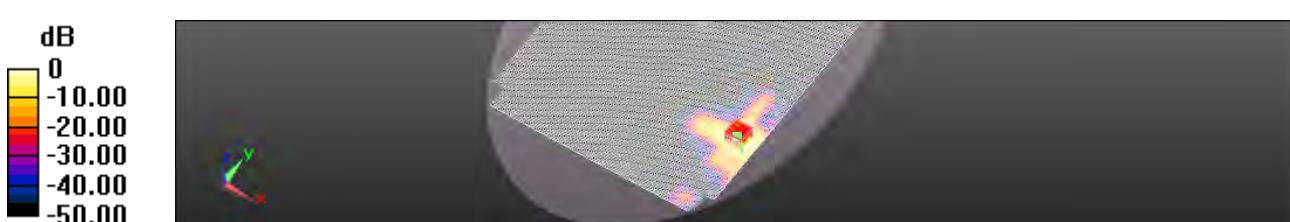
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.573 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 2.295 mW/g

**SAR(1 g) = 0.685 mW/g; SAR(10 g) = 0.218 mW/g**

Maximum value of SAR (measured) = 1.37 mW/g



0 dB = 1.43 mW/g = 3.11 dB mW/g

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## Laptop mode\_WLAN802.11 n(40M) 5.5G\_CH134\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5670 MHz;

Medium parameters used:  $f = 5670$  MHz;  $\sigma = 5.954$  mho/m;  $\epsilon_r = 48.676$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.986 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

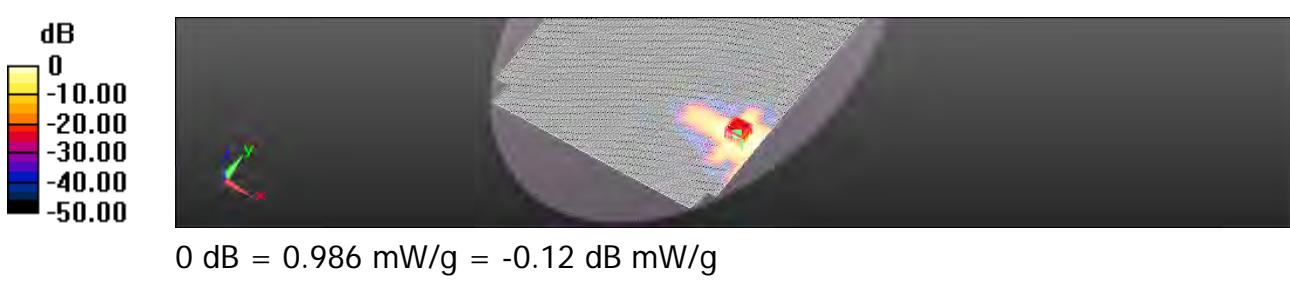
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.592 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.937 mW/g

**SAR(1 g) = 0.581 mW/g; SAR(10 g) = 0.193 mW/g**

Maximum value of SAR (measured) = 1.13 mW/g



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## Laptop mode\_WLAN802.11 n(40M) 5.5G\_CH102\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5510 MHz;

Medium parameters used:  $f = 5510$  MHz;  $\sigma = 5.723$  mho/m;  $\epsilon_r = 49.016$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.492 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

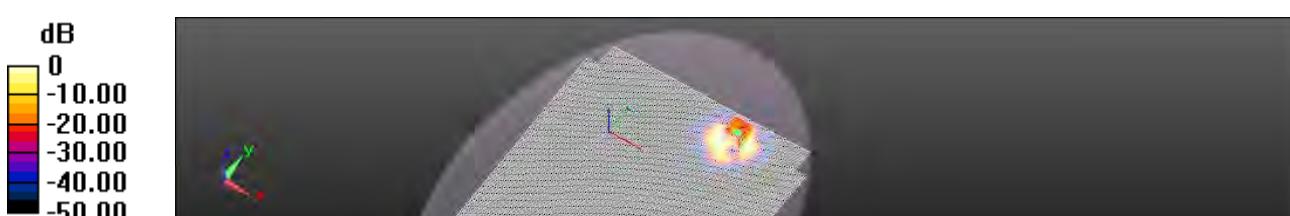
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.367 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.718 mW/g

**SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.066 mW/g**

Maximum value of SAR (measured) = 0.385 mW/g



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## Laptop mode\_WLAN802.11 n(40M) 5.5G\_CH118\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5590 MHz;

Medium parameters used:  $f = 5590$  MHz;  $\sigma = 5.834$  mho/m;  $\epsilon_r = 48.847$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.06 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

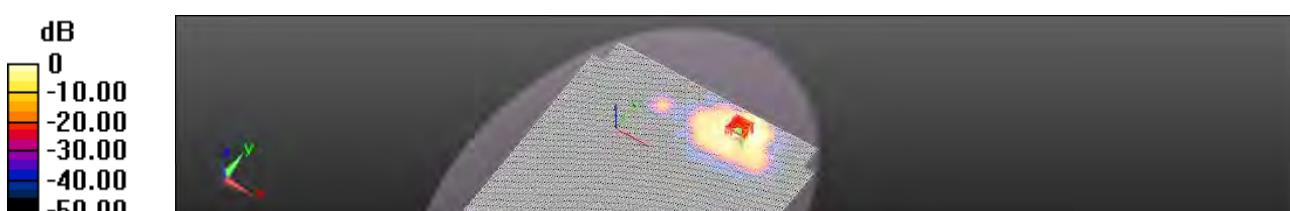
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.974 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 2.266 mW/g

**SAR(1 g) = 0.637 mW/g; SAR(10 g) = 0.218 mW/g**

Maximum value of SAR (measured) = 1.25 mW/g



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## Laptop mode\_WLAN802.11 n(40M) 5.5G\_CH134\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5670 MHz;

Medium parameters used:  $f = 5670$  MHz;  $\sigma = 5.954$  mho/m;  $\epsilon_r = 48.676$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 1.74 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

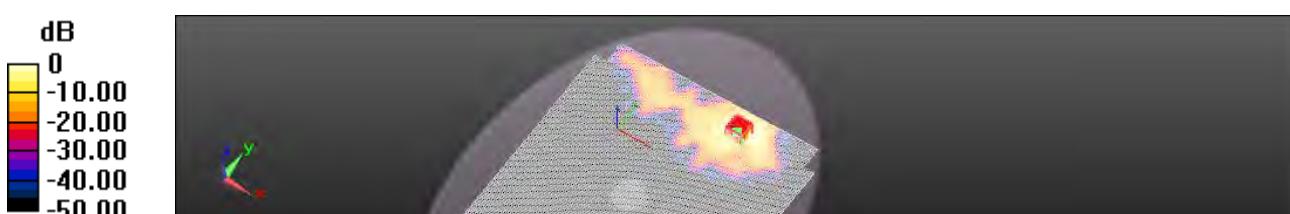
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.586 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 3.540 mW/g

**SAR(1 g) = 0.979 mW/g; SAR(10 g) = 0.328 mW/g**

Maximum value of SAR (measured) = 1.91 mW/g



0 dB = 1.74 mW/g = 4.84 dB mW/g

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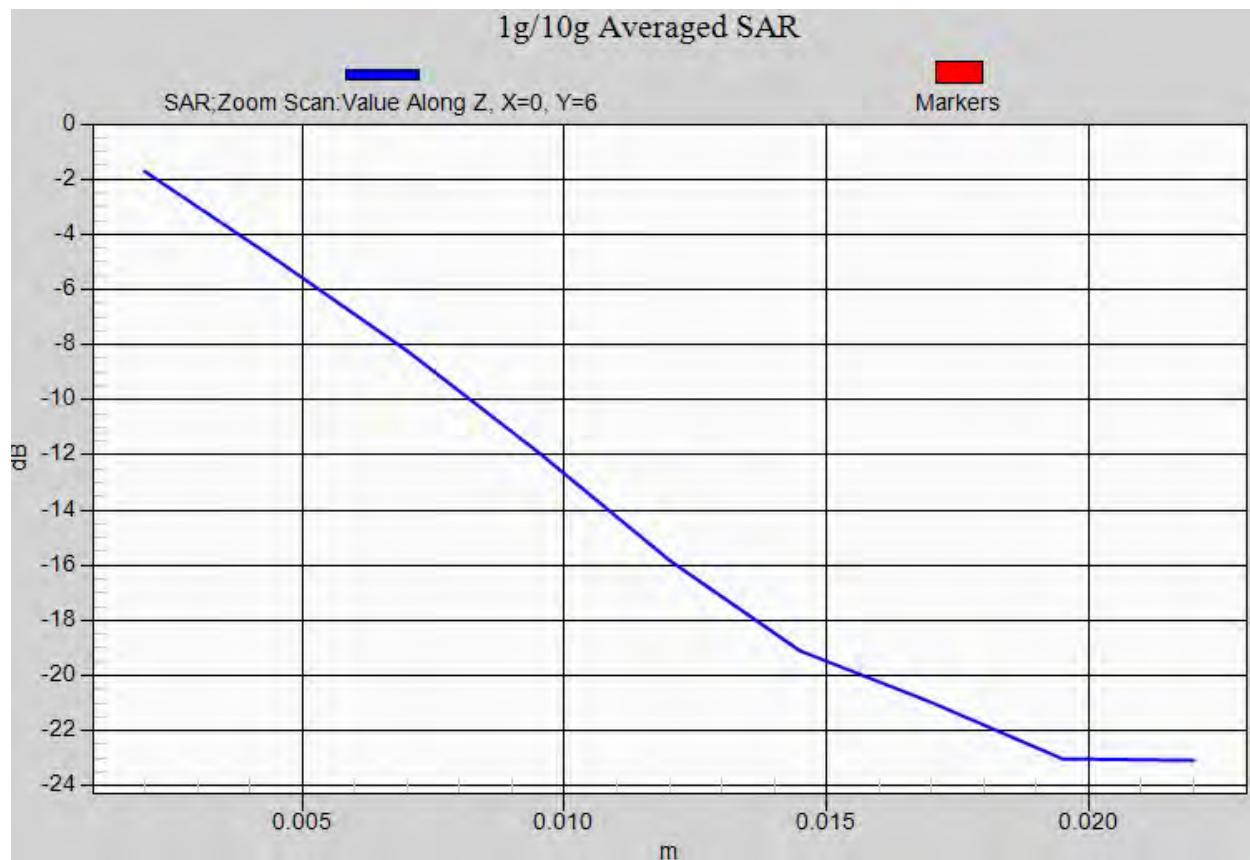
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Date: 2012/5/2

## Laptop mode\_WLAN802.11 a 5.8G\_CH165\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;

Frequency: 5825 MHz;

Medium parameters used:  $f = 5825$  MHz;  $\sigma = 6.235$  mho/m;  $\epsilon_r = 47.964$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.77, 3.77, 3.77); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.346 mW/g

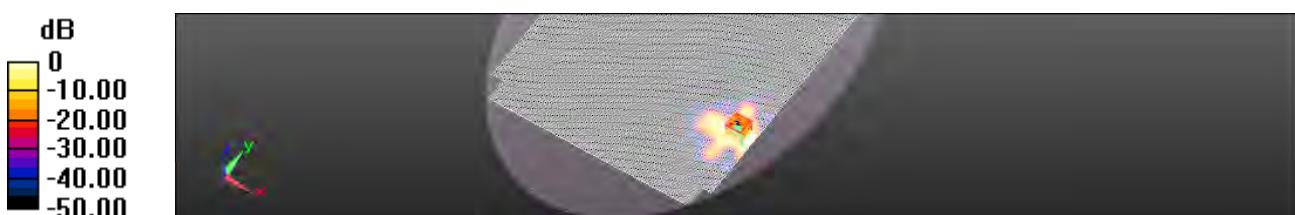
**Configuration/BODY/Zoom Scan:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 1.403 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.638 mW/g

**SAR(1 g) = 0.154 mW/g; SAR(10 g) = 0.059 mW/g**

Maximum value of SAR (measured) = 0.350 mW/g



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## Laptop mode\_WLAN802.11 a 5.8G\_CH157\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 a\_FCC;  
Frequency: 5785 MHz;

Medium parameters used:  $f = 5785$  MHz;  $\sigma = 6.177$  mho/m;  $\epsilon_r = 48.057$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.77, 3.77, 3.77); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.564 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

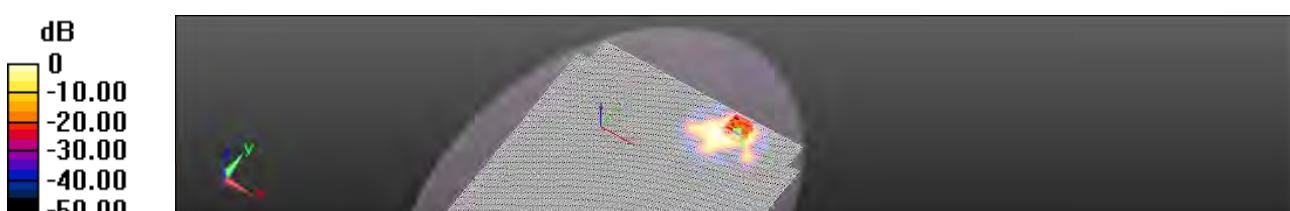
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.124 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.045 mW/g

**SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.074 mW/g**

Maximum value of SAR (measured) = 0.533 mW/g



0 dB = 0.564 mW/g = -4.98 dB mW/g

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Date: 2012/5/2

## Laptop mode\_WLAN802.11 n(20M) 5.8G\_CH165\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(20M)\_FCC; Frequency: 5825 MHz;

Medium parameters used:  $f = 5825$  MHz;  $\sigma = 6.235$  mho/m;  $\epsilon_r = 47.964$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.77, 3.77, 3.77); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.490 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

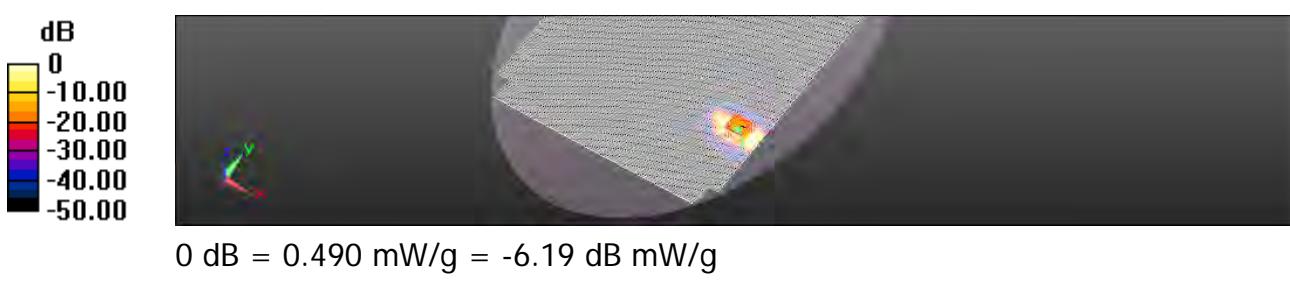
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 2.300 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.493 mW/g

**SAR(1 g) = 0.136 mW/g; SAR(10 g) = 0.048 mW/g**

Maximum value of SAR (measured) = 0.278 mW/g



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## Laptop mode\_WLAN802.11 n(20M) 5.8G\_CH149\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(20M)\_FCC; Frequency: 5745 MHz;

Medium parameters used:  $f = 5745$  MHz;  $\sigma = 6.12$  mho/m;  $\epsilon_r = 48.108$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.77, 3.77, 3.77); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.430 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

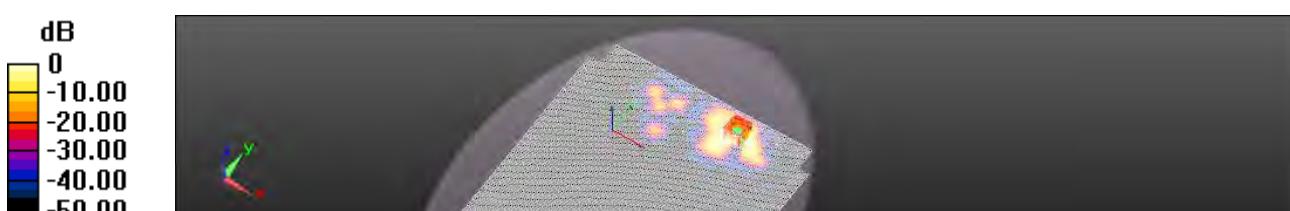
$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.714 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 0.945 mW/g

**SAR(1 g) = 0.241 mW/g; SAR(10 g) = 0.080 mW/g**

Maximum value of SAR (measured) = 0.480 mW/g



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Date: 2012/5/2

## Laptop mode\_WLAN802.11 n(40M) 5.8G\_CH159\_Main antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5795 MHz;

Medium parameters used:  $f = 5795$  MHz;  $\sigma = 6.192$  mho/m;  $\epsilon_r = 48.036$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.77, 3.77, 3.77); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.364 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 1.597 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.722 mW/g

**SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.032 mW/g**

Maximum value of SAR (measured) = 0.243 mW/g



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## Laptop mode\_WLAN802.11 n(40M) 5.8G\_CH159\_Aux antenna

Communication System: WLAN(5G); Communication System Band: WLAN802.11 n(40)\_FCC;  
Frequency: 5795 MHz;

Medium parameters used:  $f = 5795$  MHz;  $\sigma = 6.192$  mho/m;  $\epsilon_r = 48.036$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.77, 3.77, 3.77); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/BODY/Area Scan (201x281x1):** Measurement grid:  $dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 0.545 mW/g

**Configuration/BODY/Zoom Scan (7x7x9)/Cube 0:** Measurement grid:

$dx=4$  mm,  $dy=4$  mm,  $dz=2.5$  mm

Reference Value = 0.810 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.050 mW/g

**SAR(1 g) = 0.270 mW/g; SAR(10 g) = 0.087 mW/g**

Maximum value of SAR (measured) = 0.529 mW/g



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## 5. SAR System Performance Verification

Date: 2012/5/2

**DUT: Dipole 2450 MHz;**

Communication System: CW; Communication System Band: D2450 (2450.0 MHz);

Frequency: 2450 MHz;

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 2.015$  mho/m;  $\epsilon_r = 51.584$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(6.82, 6.82, 6.82); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

**Configuration/Pin=250mW/Area Scan (41x61x1):** Measurement grid:

$dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 15.1 mW/g

**Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement

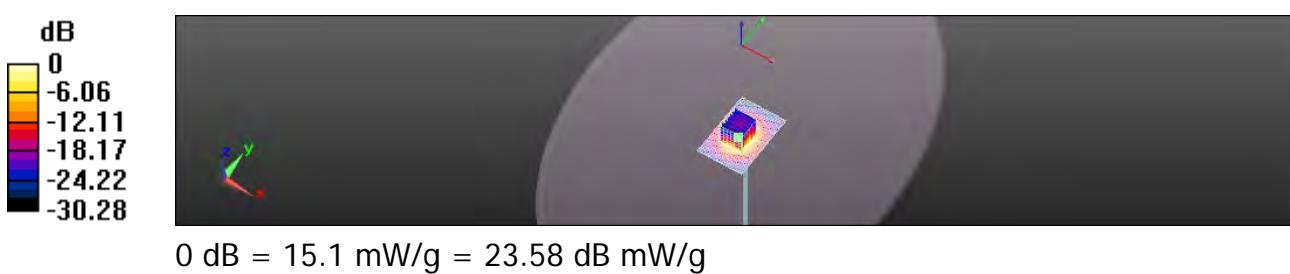
grid:  $dx=5$  mm,  $dy=5$  mm,  $dz=5$  mm

Reference Value = 86.224 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 26.883 mW/g

**SAR(1 g) = 12.7 mW/g; SAR(10 g) = 5.82 mW/g**

Maximum value of SAR (measured) = 15.7 mW/g



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Date: 2012/5/5

### DUT: Dipole D5GHz; (5.2G)

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5200 MHz;

Medium parameters used:  $f = 5200$  MHz;  $\sigma = 5.477$  mho/m;  $\epsilon_r = 49.214$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(4.12, 4.12, 4.12); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

### Configuration/Pin=100mW/Area Scan :

Maximum value of SAR (interpolated) = 17.0 mW/g

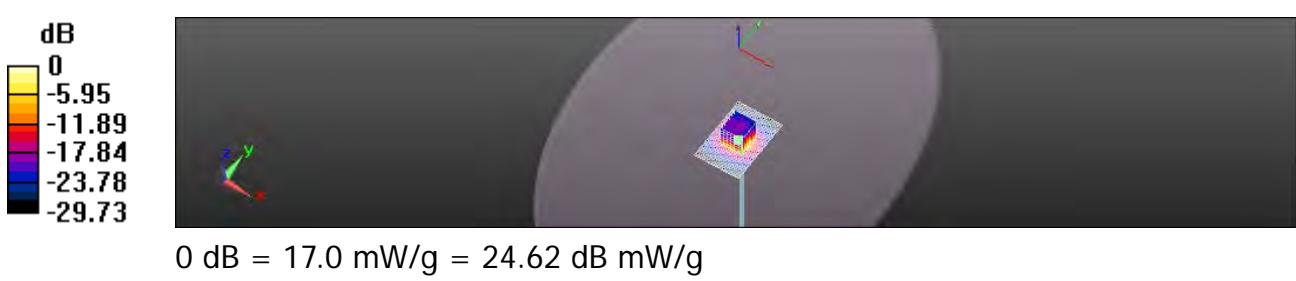
### Configuration/Pin=100mW/Zoom Scan :

Reference Value = 43.043 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 33.066 mW/g

**SAR(1 g) = 8.01 mW/g; SAR(10 g) = 2.22 mW/g**

Maximum value of SAR (measured) = 17.1 mW/g



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Date: 2012/5/6

### DUT: Dipole D5GHz; (5.5G)

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5500 MHz;

Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.702$  mho/m;  $\epsilon_r = 49.036$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.3, 3.3, 3.3); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

### Configuration/Pin=100mW/Area Scan :

Maximum value of SAR (interpolated) = 17.8 mW/g

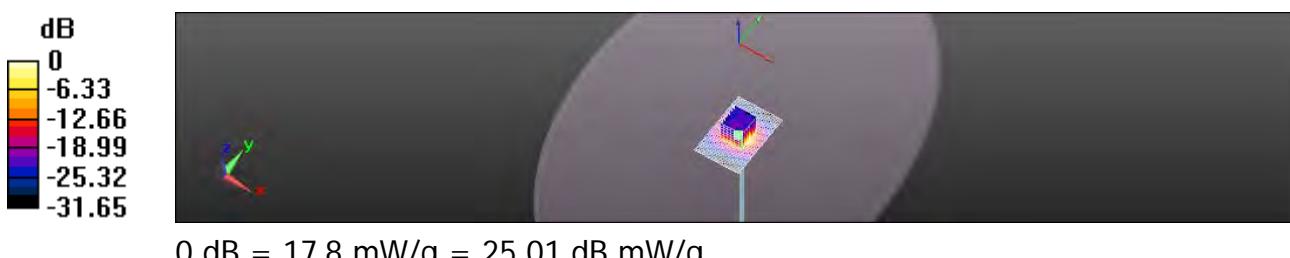
### Configuration/Pin=100mW/Zoom Scan :

Reference Value = 42.747 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 37.153 mW/g

**SAR(1 g) = 8.41 mW/g; SAR(10 g) = 2.32 mW/g**

Maximum value of SAR (measured) = 17.7 mW/g



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Date: 2012/5/2

### DUT: Dipole D5GHz; (5.8G)

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5800 MHz;

Medium parameters used:  $f = 5800$  MHz;  $\sigma = 6.198$  mho/m;  $\epsilon_r = 48.049$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(3.77, 3.77, 3.77); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

### Configuration/Pin=100mW/Area Scan :

Maximum value of SAR (interpolated) = 15.9 mW/g

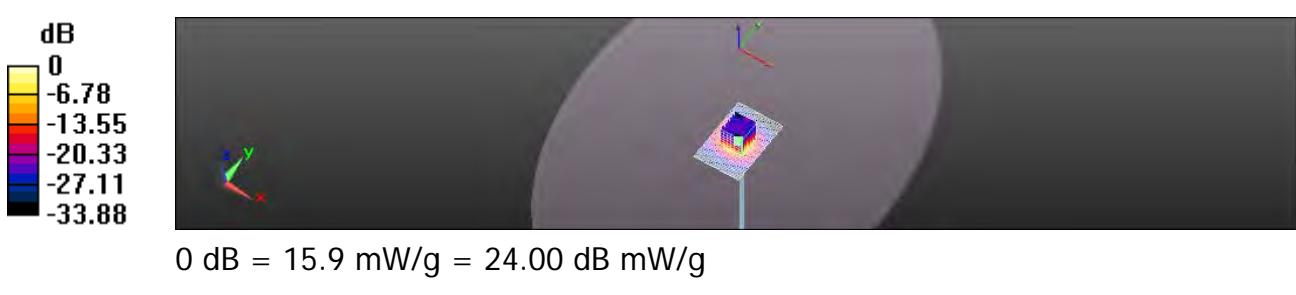
### Configuration/Pin=100mW/Zoom Scan :

Reference Value = 38.603 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 36.704 mW/g

**SAR(1 g) = 7.79 mW/g; SAR(10 g) = 2.13 mW/g**

Maximum value of SAR (measured) = 16.1 mW/g



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Date: 2012/8/9

### DUT: Dipole 2450 MHz;

Communication System: CW; Communication System Band: D2450 (2450.0 MHz);

Frequency: 2450 MHz;

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 2.015$  mho/m;  $\epsilon_r = 50.906$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3831; ConvF(6.82, 6.82, 6.82); Calibrated: 2012/1/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection),
- Electronics: DAE4 Sn1260; Calibrated: 2011/8/22
- Phantom: Body; Type: QDOVA002AA; Serial: TP:xxxx
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

### Configuration/Pin=250mW/Area Scan (41x61x1): Measurement grid:

$dx=15$  mm,  $dy=15$  mm

Maximum value of SAR (interpolated) = 16.8 mW/g

### Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement

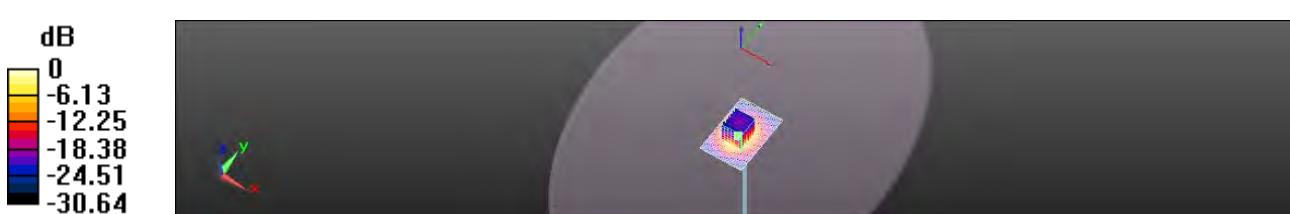
grid:  $dx=5$  mm,  $dy=5$  mm,  $dz=5$  mm

Reference Value = 91.438 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 27.214 mW/g

**SAR(1 g) = 13 mW/g; SAR(10 g) = 6.02 mW/g**

Maximum value of SAR (measured) = 16.2 mW/g



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## 6. DAE & Probe Calibration Certificate

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client

SGS (Auden)

Certificate No: DAE4-1260\_Aug11

### CALIBRATION CERTIFICATE

Object	DAE4-SD/000/D04 BJ - SN: 1260																								
Calibration procedure(s)	QA CAL-06.v23 Calibration procedure for the data acquisition electronics (DAE)																								
Calibration date:	August 22, 2011																								
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature <math>(22 \pm 3)^\circ\text{C}</math> and humidity <math>&lt; 70\%</math>.</p> <p>Calibration Equipment used (M&amp;TE critical for calibration)</p> <table border="1"> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Certificate No.)</th> <th>Scheduled Calibration</th> </tr> <tr> <td>Keithley Multimeter Type 2001</td> <td>SN: 0810278</td> <td>28-Sep-10 (No:10376)</td> <td>Sep-11</td> </tr> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> <tr> <td>Calibrator Box V1.1</td> <td>SE UMS 006 AB 1004</td> <td>08-Jun-11 (in house check)</td> <td>In house check: Jun-12</td> </tr> </table> <p>Calibrated by:</p> <table border="1"> <tr> <td>Eric Hainfeld</td> <td>Technician</td> <td></td> </tr> </table> <p>Approved by:</p> <table border="1"> <tr> <td>Fin Bomholt</td> <td>R&amp;D Director</td> <td></td> </tr> </table> <p>Issued: August 22, 2011</p> <p>This calibration certificate shall not be reproduced except in full without written approval of the laboratory.</p>				Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration	Keithley Multimeter Type 2001	SN: 0810278	28-Sep-10 (No:10376)	Sep-11	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	Calibrator Box V1.1	SE UMS 006 AB 1004	08-Jun-11 (in house check)	In house check: Jun-12	Eric Hainfeld	Technician		Fin Bomholt	R&D Director	
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Eric Hainfeld	Technician																								
Fin Bomholt	R&D Director																								

Certificate No: DAE4-1260\_Aug11

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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: EX3-3831\_Jan12

## CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3831

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: January 4, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check 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

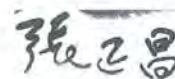
Calibrated by:	Name: Jeton Kastrati	Function: Laboratory Technician	Signature: 
Approved by:	Name: Katja Pokovic	Function: Technical Manager	Signature: 

Issued: January 5, 2012

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Certificate No: EX3-3831\_Jan12

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Accreditation No.: SCS 108

#### Glossary:

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\theta$	$\theta$ 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<sub>x,y,z</sub>*: Assessed for E-field polarization  $\theta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). *NORM<sub>x,y,z</sub>* are only intermediate values, i.e., the uncertainties of *NORM<sub>x,y,z</sub>* does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)x,y,z = NORM<sub>x,y,z</sub> \* frequency\_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR*: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; VR<sub>x,y,z</sub>; 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<sub>x,y,z</sub> \* 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  $\pm 50$  MHz to  $\pm 100$  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.

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EX3DV4 – SN:3831

January 4, 2012

# Probe EX3DV4

## SN:3831

Manufactured: September 6, 2011  
Calibrated: January 4, 2012

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

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Certificate No: EX3-3831\_Jan12

Page 3 of 11

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EX3DV4-SN:3831

January 4, 2012

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831****Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup>	0.44	0.41	0.43	$\pm 10.1\%$
DCP (mV) <sup>B</sup>	101.7	101.4	99.5	

**Modulation Calibration Parameters**

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc <sup>E</sup> (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	111.7	$\pm 3.0\%$
			Y	0.00	0.00	1.00	96.2	
			Z	0.00	0.00	1.00	106.7	

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

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

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EX3DV4- SN:3831

January 4, 2012

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>c</sup>	Relative Permittivity <sup>f</sup>	Conductivity (S/m) <sup>f</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	9.32	9.32	9.32	0.44	0.84	± 12.0 %
835	41.5	0.90	8.82	8.82	8.82	0.19	1.48	± 12.0 %
900	41.5	0.97	8.71	8.71	8.71	0.22	1.38	± 12.0 %
1750	40.1	1.37	8.03	8.03	8.03	0.39	0.81	± 12.0 %
1900	40.0	1.40	7.76	7.76	7.76	0.44	0.77	± 12.0 %
2000	40.0	1.40	7.65	7.65	7.65	0.61	0.63	± 12.0 %
2300	39.5	1.67	7.44	7.44	7.44	0.41	0.83	± 12.0 %
2450	39.2	1.80	6.84	6.84	6.84	0.49	0.73	± 12.0 %
2600	39.0	1.96	6.67	6.67	6.67	0.33	0.96	± 12.0 %
5200	36.0	4.66	4.64	4.64	4.64	0.42	1.80	± 13.1 %
5300	35.9	4.76	4.37	4.37	4.37	0.44	1.80	± 13.1 %
5600	35.5	5.07	4.10	4.10	4.10	0.48	1.80	± 13.1 %
5800	35.3	5.27	4.12	4.12	4.12	0.45	1.80	± 13.1 %

<sup>c</sup> 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.

<sup>f</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) 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 ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

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EX3DV4-SN:3831

January 4, 2012

**DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831****Calibration Parameter Determined in Body Tissue Simulating Media**

f (MHz) <sup>c</sup>	Relative Permittivity <sup>f</sup>	Conductivity (S/m) <sup>f</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	9.24	9.24	9.24	0.23	1.25	± 12.0 %
835	55.2	0.97	9.02	9.02	9.02	0.28	1.13	± 12.0 %
900	55.0	1.05	8.93	8.93	8.93	0.25	1.28	± 12.0 %
1750	53.4	1.49	7.67	7.67	7.67	0.38	0.87	± 12.0 %
1900	53.3	1.52	7.25	7.25	7.25	0.57	0.70	± 12.0 %
2000	53.3	1.52	7.31	7.31	7.31	0.27	1.09	± 12.0 %
2300	52.9	1.81	7.26	7.26	7.26	0.71	0.66	± 12.0 %
2450	52.7	1.95	6.82	6.82	6.82	0.74	0.62	± 12.0 %
2600	52.5	2.16	6.63	6.63	6.63	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.12	4.12	4.12	0.50	1.90	± 13.1 %
5300	48.9	5.42	3.92	3.92	3.92	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.30	3.30	3.30	0.65	1.90	± 13.1 %
5800	48.2	6.00	3.77	3.77	3.77	0.60	1.90	± 13.1 %

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

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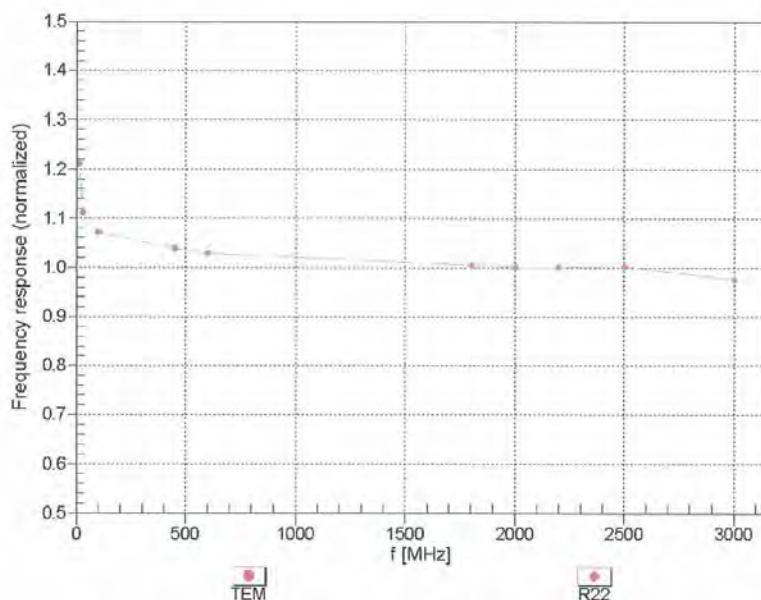
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January 4, 2012

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



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

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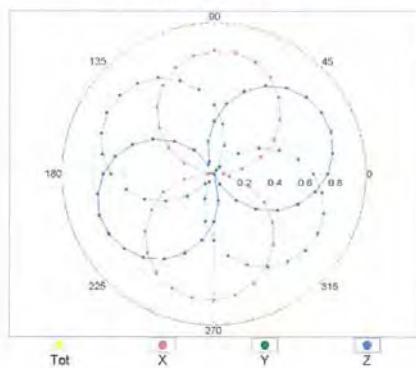
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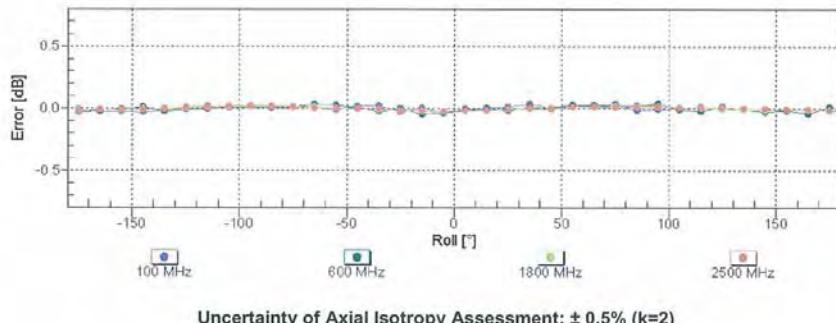
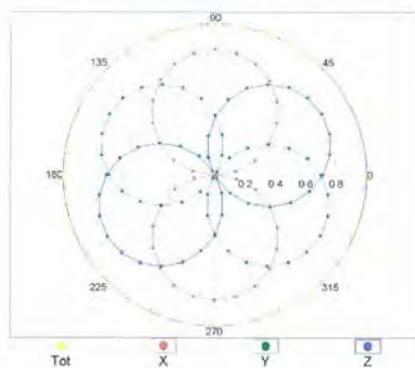
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**Receiving Pattern ( $\phi$ ),  $\theta = 0^\circ$** 

f=600 MHz, TEM



f=1800 MHz, R22

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

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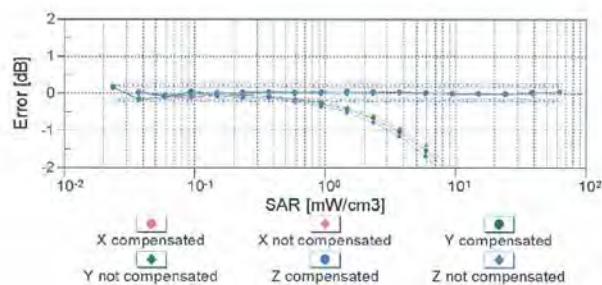
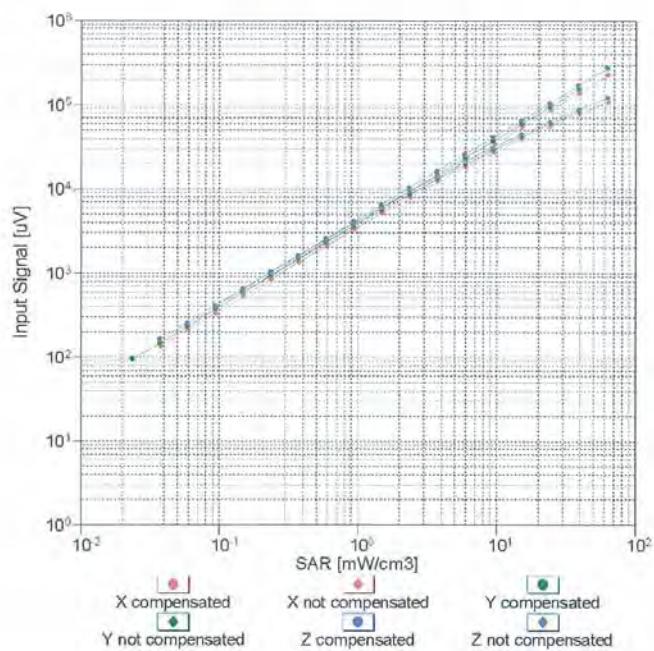
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EX3DV4- SN:3831

January 4, 2012

**Dynamic Range f(SAR<sub>head</sub>)**  
(TEM cell, f = 900 MHz)



Uncertainty of Linearity Assessment:  $\pm 0.6\%$  (k=2)

Certificate No: EX3-3831\_Jan12

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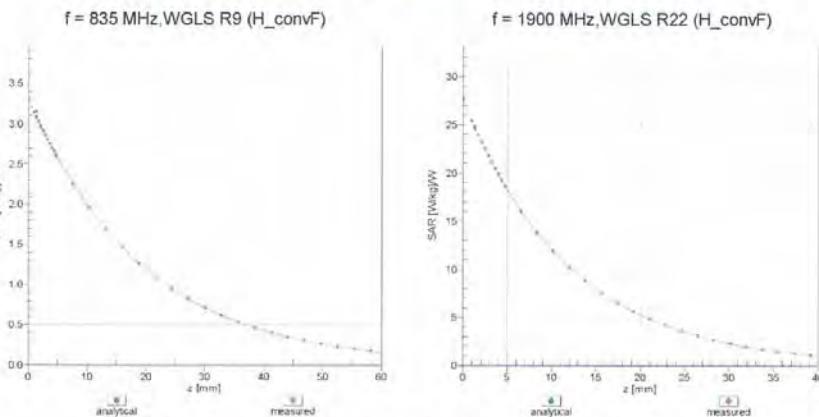
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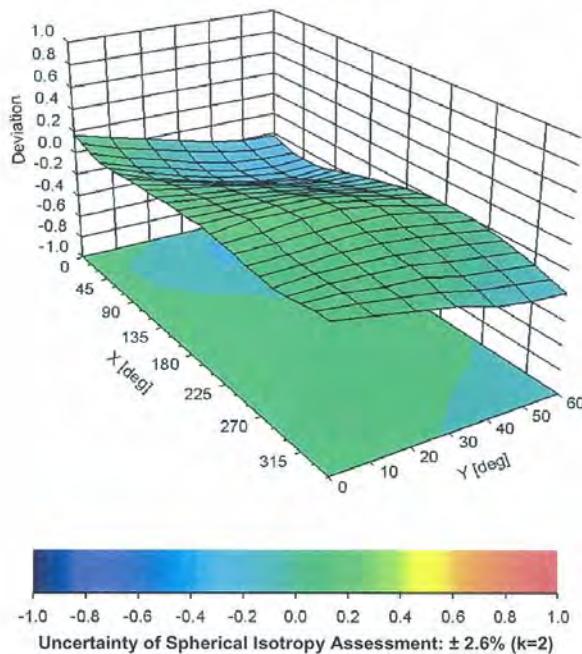
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## Conversion Factor Assessment



## Deviation from Isotropy in Liquid

Error ( $\phi, \theta$ ),  $f = 900$  MHz



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EX3DV4- SN:3831

January 4, 2012

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3831

### Other Probe Parameters

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

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## 7. Uncertainty Budget

Measurement Uncertainty evaluation template for DUT SAR test  
 IEEE 1528

A	c	D	e	f	g	$h=c * f / e$	$i=c * g / e$	k
Source of Uncertainty	Tolerance/ Uncertainty %	Probability Distribution	Div	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
<b>Measurement system</b>								
Probe calibration (Frequency below 2GHz)	6.0%	N	1	1	1	6.0%	6.0%	$\infty$
<i>Isotropy, Axial</i>	4.7%	R	$\sqrt{3}$	1	1	2.7%	2.7%	$\infty$
<i>Isotropy, Hemispherical</i>	9.6%	R	$\sqrt{3}$	1	1	5.5%	5.5%	$\infty$
Boundary Effect	1.0%	R	$\sqrt{3}$	1	1	0.6%	0.6%	$\infty$
Linearity	4.7%	R	$\sqrt{3}$	1	1	2.7%	2.7%	$\infty$
Detection Limits	1.0%	R	$\sqrt{3}$	1	1	0.6%	0.6%	$\infty$
Readout Electronics	0.3%	N	1	1	1	0.3%	0.3%	$\infty$
Response time	0.8%	R	$\sqrt{3}$	1	1	0.5%	0.5%	$\infty$
Integration Time	2.6%	R	$\sqrt{3}$	1	1	1.5%	1.5%	$\infty$
<i>Measurement drift (class A evaluation)</i>	1.8%	R	$\sqrt{3}$	1	1	1.0%	1.0%	$\infty$
RF ambient condition - noise	3.0%	R	$\sqrt{3}$	1	1	1.7%	1.7%	$\infty$
RF ambient conditions -reflections	3.0%	R	$\sqrt{3}$	1	1	1.7%	1.7%	$\infty$
Probe positioner Mechanical restrictions	0.4%	R	$\sqrt{3}$	1	1	0.2%	0.2%	$\infty$
Probe Positioning with respect to phantom	2.9%	R	$\sqrt{3}$	1	1	1.7%	1.7%	$\infty$
Post-processing	1.0%	R	$\sqrt{3}$	1	1	0.6%	0.6%	$\infty$
Max SAR Eval	1.0%	R	$\sqrt{3}$	1	1	0.6%	0.6%	$\infty$
<b>Test Sample related</b>								
Test sample	2.9%	N	1	1	1	2.9%	2.9%	M-1
Device Holder Uncertainty	3.6%	N	1	1	1	3.6%	3.6%	M-1
Drift of output power	5.0%	R	$\sqrt{3}$	1	1	2.9%	2.9%	$\infty$
<b>Phantom and Setup</b>								
Phantom Uncertainty	4.0%	R	$\sqrt{3}$	1	1	2.3%	2.3%	$\infty$
Liquid conductivity(meas.) Max at 1900 band	4.6%	N	1	0.64	0.43	2.9%	2.0%	M
Liquid permittivity(meas.) Max at 835 band	2.2%	N	1	0.6	0.49	1.3%	1.1%	M
Combined standard uncertainty		RSS				11.9%	11.6%	
Expan uncertainty (95% confidence interval), K=2						23.7%	23.3%	

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## 8. Phantom Description

Schmid & Partner Engineering AG  
Zeughausstrasse 43, 8004 Zurich, Switzerland  
Phone +41 1 245 9700, Fax +41 1 245 9779  
info@speag.com, http://www.speag.com

s p e a g

### Certificate of Conformity / First Article Inspection

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

#### Tests

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

Test	Requirement	Details	Units tested
Dimensions	Compliant with the geometry according to the CAD model	ITIS CAD File (*)	First article, Samples
Material thickness of shell	Compliant with the requirements according to the standards	2mm +/- 0.2mm in flat and specific areas of head section	First article, Samples, TP-1314 ff.
Material thickness at ERP	Compliant with the requirements according to the standards	8mm +/- 0.2mm at ERP	First article, All items
Material parameters	Dielectric parameters for required frequencies	300 MHz – 6 GHz: Relative permittivity < 5. Loss tangent < 0.05	Material samples
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions. Observe technical Note for material compatibility.	DEGMBe based simulating liquids	Pre-series, First article, Material samples
Sagging	Compliant with the requirements according to the standards. Sagging of the flat section when filled with tissue simulating liquid.	< 1% typical < 0.8% if filled with 155mm of HSL900 and without DUT below	Prototypes, Sample testing

#### Standards

[1] CENELEC EN 50361

[2] IEEE Std 1528-2003

[3] IEC 62209 Part 1

[4] FCC OET Bulletin 65, Supplement C, Edition 01-01

(\*) The ITIS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of the other documents.

#### Conformity

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

Date 07.07.2005

Signature / Stamp

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## 9. System Validation from Original Equipment Supplier

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



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 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 **Auden**

Certificate No: D2450V2-869\_Jul11

### CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 869**

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

Calibration date: **July 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&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

Calibrated by:	Name	Function	Signature
	Dilme Iliev	Laboratory Technician	

Approved by:	Name	Function	Signature
	Katja Pokovic	Technical Manager	

Issued: July 15, 2011

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Certificate No: D2450V2-869\_Jul11

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## DASY5 Validation Report for Body TSL

Date: 15.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 869**

Communication System: CW; Frequency: 2450 MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.99$  mho/m;  $\epsilon_r = 51.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

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: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

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

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

Reference Value = 95.707 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 26.507 W/kg

**SAR(1 g) = 13 mW/g; SAR(10 g) = 6.02 mW/g**

Maximum value of SAR (measured) = 16.958 mW/g



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: D5GHzV2-1023\_Jan12

## CALIBRATION CERTIFICATE

Object D5GHzV2 - SN: 1023

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

Calibration date: January 19, 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&amp;TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe EX3DV4	SN: 3503	30-Dec-11 (No. EX3-3503_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

Calibrated by:	Name	Function	Signature
	Dimce Iliev	Laboratory Technician	

Approved by:	Name	Function	Signature
	Katja Pokovic	Technical Manager	

Issued: January 20, 2012

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

Certificate No: D5GHzV2-1023\_Jan12

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**DASY5 Validation Report for Body TSL**

Date: 18.01.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1023**

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz  
Medium parameters used:  $f = 5200 \text{ MHz}$ ;  $\sigma = 5.46 \text{ mho/m}$ ;  $\epsilon_r = 49.2$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5500 \text{ MHz}$ ;  $\sigma = 5.86 \text{ mho/m}$ ;  $\epsilon_r = 48.7$ ;  $\rho = 1000 \text{ kg/m}^3$ , Medium parameters used:  $f = 5800 \text{ MHz}$ ;  $\sigma = 6.28 \text{ mho/m}$ ;  $\epsilon_r = 48.2$ ;  $\rho = 1000 \text{ kg/m}^3$

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(4.43, 4.43, 4.43), ConvF(4.38, 4.38, 4.38); Calibrated: 30.12.2011
- 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 52.8.0(692); SEMCAD X 14.6.4(4989)

**Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:**Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=1.4\text{mm}$ 

Reference Value = 56.490 V/m; Power Drift = -0.0024 dB

Peak SAR (extrapolated) = 28.2170

**SAR(1 g) = 7.22 mW/g; SAR(10 g) = 2.03 mW/g**

Maximum value of SAR (measured) = 16.833 mW/g

**Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:**Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=1.4\text{mm}$ 

Reference Value = 57.075 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 33.4060

**SAR(1 g) = 7.81 mW/g; SAR(10 g) = 2.17 mW/g**

Maximum value of SAR (measured) = 18.867 mW/g

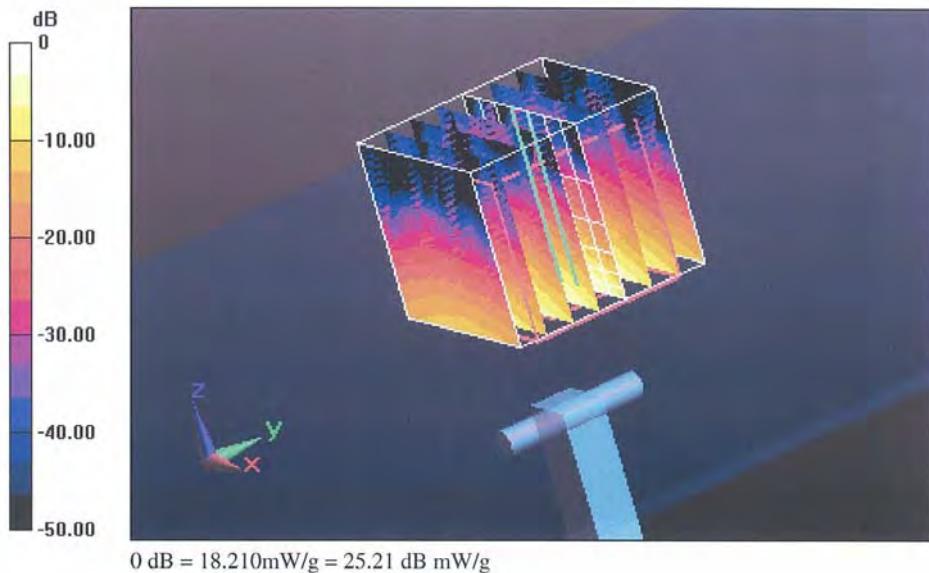
**Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0:**Measurement grid:  $dx=4\text{mm}$ ,  $dy=4\text{mm}$ ,  $dz=1.4\text{mm}$ 

Reference Value = 53.714 V/m; Power Drift = 0.0063 dB

Peak SAR (extrapolated) = 34.0450

**SAR(1 g) = 7.3 mW/g; SAR(10 g) = 2.02 mW/g**

Maximum value of SAR (measured) = 18.209 mW/g



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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: D2450V2-727\_Apr12

## CALIBRATION CERTIFICATE

Object D2450V2 - SN: 727

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

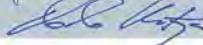
Calibration date: April 25, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: April 25, 2012

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Certificate No: D2450V2-727\_Apr12

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### DASY5 Validation Report for Body TSL

Date: 25.04.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 2450 MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 52.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY52 Configuration:

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

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

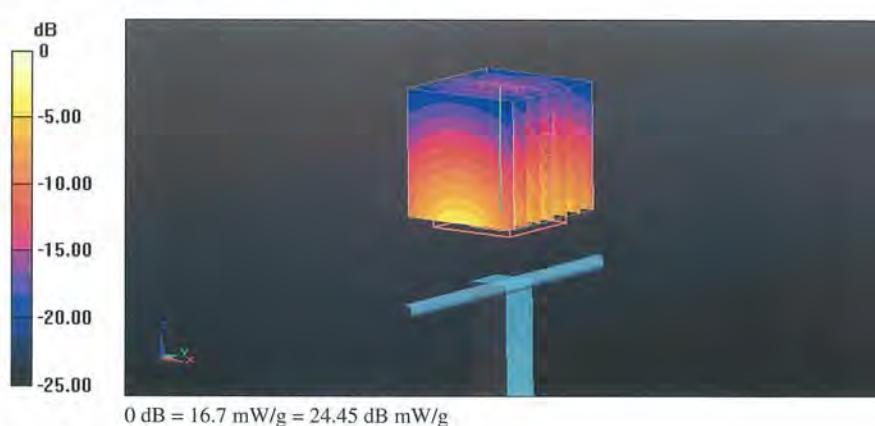
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.136 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 25.811 mW/g

SAR(1 g) = 12.7 mW/g; SAR(10 g) = 5.92 mW/g

Maximum value of SAR (measured) = 16.7 mW/g



### End of 1<sup>st</sup> part of report

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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