SAR TEST REPORT

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

Equipment Under Test	TF600TL
Marketing Name	TF600TL
Brand Name	ASUS
Model No.	TF600TL
Company Name	ASUSTeK Computer Inc.
Company Address	15, Li-Te Rd., Peitou, Taipei 112, Taiwan
Standards	FCC OET 65 supplement C,IEEE /ANSI C95.1 , C95.3, IEEE 1528
FCC ID	MSQTF600TL
FCC KDB Inquiry Tracking No.	898547
Date of Receipt	May 21, 2012
Date of Test(s)	Sep. 06, 2012 ~ Sep. 12, 2012
Date of Issue	Oct. 25, 2012

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

Remarks:

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

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

Signed for on the behalf of SGS

Engineer	**Supervisor**
Chris Tsung	Kelly Tsai
Chris Tsung	**Kelly Tsai**
Date: Oct. 25, 2012	**Date:** Oct. 25, 2012

Version

Report Number	Revision	Date	Memo
ES/2012/50006	00	2012/09/19	Initial creation of test report.
ES/2012/50006	01	2012/10/01	1st modification.
ES/2012/50006	02	2012/10/12	2nd modification.
ES/2012/50006	03	2012/10/16	3rd modification.
ES/2012/50006	04	2012/10/25	4th 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

SGS Taiwan Ltd. Electronics & Communication Laboratory	
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Taipei county, Taiwan, R.O.C.	
Tel	+886-2-2299-3279
Fax	+886-2-2298-0488
Internet	http://www.tw.sgs.com/
Testing Location	1F,No.8, Alley 15, Lane 120, Sec .1, NeiHu Road NeiHu District Taipei City 114, Taiwan

1.2 Details of Applicant

Company Name	ASUSTeK Computer Inc.
Company Address	15, Li-Te Rd., Peitou, Taipei 112, Taiwan
Contact Person	Claire Chen
Tel	(886) 2 2894 3447 Ext. 4253
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1.3 Description of EUT

EUT Name	TF600TL			
Marketing Name	TF600TL			
Brand Name	ASUS			
Model No.	TF600TL			
FCC ID	MSQTF600TL			
Mode of Operation	☒GPRS ☒EDGE ☒WCDMA ☒HSDPA ☒HSUPA ☒WLAN802.11 b/g/ n (20M) band			
DTM	Multi-class B			
Duty Cycle	GPRS (Multi-class 10)	1/4.1		
	EDGE (Multi-class 10)	1/4.1		
	WCDMA	1		
	LTE	1		
	WLAN802.11 b/g/n(20M)	1		
TX Frequency Range (MHz)	GPRS 850	824.2	—	848.8
	GPRS 1900	1850.2	—	1909.8
	WCDMA Band II	1852.4	—	1907.6
	WCDMA Band V	826.4	—	846.6
	LTE Band IV	1715	—	1750
	LTE Band XVII	709	—	711
	WLAN802.11 b/g/n(20M)	2412	—	2462
Channel Number (ARFCN)	GPRS 850	128	—	251
	GPRS 1900	512	—	810
	WCDMA Band II	9262	—	9538
	WCDMA Band V	4132	—	4233
	LTE Band IV	20000	—	20350
	LTE Band XVII	23780	—	23800
	WLAN802.11 b/g/n(20M)	1	—	11

Max. SAR Measured(1 g) (Unit: W/Kg)	Full power	GPRS 850	**0.698**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 190 Channel (test distance 10.5mm)
		GPRS 1900	**0.635**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 661 Channel (test distance 10.5mm)
		WCDMA Band II	**1.38**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 9538 Channel (test distance 10.5mm)
		WCDMA Band V	**0.727**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 4183 Channel (test distance 10.5mm)
		LTE Band IV	**0.584**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 20350 Channel (test distance 10.5mm) (1RB_RB start 49 _10MHz_QPSK)
		LTE Band XVII	**0.278**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 23790 Channel (test distance 10.5mm) (25RB_RB start 12 _10MHz_QPSK)
		WLAN802.11 b	**0.129**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 11 Channel

Max. SAR Measured(1 g) (Unit: W/Kg)	Reduced power	GPRS 850	**1.18**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 128 Channel (test distance 0mm)
		GPRS 1900	**0.91**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 810 Channel (test distance 0mm)
		WCDMA Band II	**1.07**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 9262 Channel (test distance 0mm)
		WCDMA Band V	**1.1**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 4132 Channel (test distance 0mm)
		LTE Band IV	**1.16**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 20350 Channel (test distance 0mm) (1RB_RB start 49 _10MHz_QPSK)
		LTE Band XVII	**0.917**	☒Lap held ☐Secondary Portrait ☐Secondary Landscape 23780 Channel (test distance 0mm) (1RB_RB start 49 _10MHz_QPSK)

#. GPRS / EDGE conducted power table:

Full power				
Burst average power				
GMSK / Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
GPRS 850	824.2	128	32.40	32.40
	836.6	190	32.60	32.50
	848.8	251	32.60	32.60
Source-based time average power				
GPRS 850	824.2	128	23.37	26.38
	836.6	190	23.57	26.48
	848.8	251	23.57	26.58
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Reduced power				
Burst average power				
GMSK / Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
GPRS 850	824.2	128	28.00	28.00
	836.6	190	27.90	27.90
	848.8	251	27.80	27.80
Source-based time average power				
GPRS 850	824.2	128	18.97	21.98
	836.6	190	18.87	21.88
	848.8	251	18.77	21.78
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Full power				
Burst average power				
8PSK/ Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
EDGE 850	824.2	128	25.30	24.70
	836.6	190	25.10	24.50
	848.8	251	24.90	24.20
Source-based time average power				
EDGE 850	824.2	128	16.27	18.68
	836.6	190	16.07	18.48
	848.8	251	15.87	18.18
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Reduced power				
Burst average power				
8PSK/ Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
EDGE 850	824.2	128	22.50	22.40
	836.6	190	22.40	22.30
	848.8	251	22.30	22.10
Source-based time average power				
EDGE 850	824.2	128	13.47	16.38
	836.6	190	13.37	16.28
	848.8	251	13.27	16.08
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Full power				
Burst average power				
GMSK / Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
GPRS 1900	1850.2	512	30.00	29.90
	1880	661	30.20	30.10
	1909.8	810	30.30	30.30
Source-based time average power				
GPRS 1900	1850.2	512	20.97	23.88
	1880	661	21.17	24.08
	1909.8	810	21.27	24.28
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Reduced power				
Burst average power				
GMSK / Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
GPRS 1900	1850.2	512	23.10	23.10
	1880	661	23.20	23.20
	1909.8	810	23.20	23.30
Source-based time average power				
GPRS 1900	1850.2	512	14.07	17.08
	1880	661	14.17	17.18
	1909.8	810	14.17	17.28
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Full power				
Burst average power				
8PSK / Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
EDGE 1900	1850.2	512	26.00	25.40
	1880	661	25.70	25.10
	1909.8	810	25.30	24.80
Source-based time average power				
EDGE 1900	1850.2	512	16.97	19.38
	1880	661	16.67	19.08
	1909.8	810	16.27	18.78
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Reduced power				
Burst average power				
8PSK / Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
EDGE 1900	1850.2	512	22.40	22.20
	1880	661	22.20	22.00
	1909.8	810	22.20	22.00
Source-based time average power				
EDGE 1900	1850.2	512	13.37	16.18
	1880	661	13.17	15.98
	1909.8	810	13.17	15.98
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

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

Band	Full power										
	CH	Rel99 AV(dBm)	HSDPA mode AV(dBm)				HSUPA mode AV(dBm)				
			SUB-1	SUB-2	SUB-3	SUB-4	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5
WCDMA Band II	9262	22.75	22.92	22.63	22.44	22.51	22.67	20.72	21.73	20.85	22.56
	9400	22.57	22.46	22.43	22.01	22.02	22.55	20.62	21.57	20.67	22.41
	9538	22.26	22.12	22.11	21.59	21.71	22.20	20.24	21.28	20.28	22.11
	Reduced power										
	CH	Rel99 AV(dBm)	HSDPA mode AV(dBm)				HSUPA mode AV(dBm)				
			SUB-1	SUB-2	SUB-3	SUB-4	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5
	9262	16.31	16.48	16.19	16	16.07	16.23	14.28	15.29	14.41	16.12
	9400	15.93	15.82	15.79	15.37	15.38	15.91	13.98	14.93	14.03	15.77
	9538	15.73	15.59	15.58	15.06	15.18	15.67	13.71	14.75	13.75	15.58

Band	Full power										
	CH	Rel99 AV(dBm)	HSDPA mode AV(dBm)				HSUPA mode AV(dBm)				
			SUB-1	SUB-2	SUB-3	SUB-4	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5
WCDMA Band V	4132	23.35	23.14	23.28	22.68	22.73	23.31	21.37	22.35	21.42	23.17
	4183	23.28	23.14	23.17	22.66	22.7	23.21	21.29	22.27	21.35	23.04
	4233	22.58	22.70	22.45	22.21	22.27	22.50	20.54	21.58	20.62	22.39
	Reduced power										
	CH	Rel99 AV(dBm)	HSDPA mode AV(dBm)				HSUPA mode AV(dBm)				
			SUB-1	SUB-2	SUB-3	SUB-4	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5
	4132	20.17	19.96	20.10	19.5	19.55	20.13	18.19	19.17	18.24	19.99
	4183	20.08	19.94	19.97	19.46	19.5	20.01	18.09	19.07	18.15	19.84
	4233	20.56	20.68	20.43	20.19	20.25	20.48	18.52	19.56	18.6	20.37

#. LTE Band 4 / Band 17 conducted power table:

LTE Band 4_Uplink frequency band : 1710 to 1755MHz							
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Full power (dBm)	Reduced power (dBm)
5	QPSK	19975	1712.5	1	24	22.59	18.10
				1	0	22.40	17.00
				12	6	22.37	16.90
				25	0	22.24	16.80
		20175	1732.5	1	24	22.16	17.30
				1	0	22.41	17.80
				12	6	21.82	17.00
				25	0	21.91	16.70
		20375	1752.5	1	24	22.04	18.20
				1	0	22.55	18.00
				12	6	22.49	17.50
				25	0	22.28	17.40
5	16 QAM	19975	1712.5	1	24	22.44	17.60
				1	0	21.75	16.70
				12	6	21.47	16.10
				25	0	21.35	15.80
		20175	1732.5	1	24	21.66	17.00
				1	0	21.89	17.50
				12	6	21.08	16.20
				25	0	21.01	15.80
		20375	1752.5	1	24	21.79	17.90
				1	0	22.39	17.50
				12	6	21.63	16.80
				25	0	21.51	16.30

LTE Band 4_Uplink frequency band : 1710 to 1755MHz							
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Full power (dBm)	Reduced power (dBm)
10	QPSK	20000	1715	1	49	22.40	17.90
				1	0	21.95	16.60
				25	12	22.59	17.10
				50	0	22.29	16.80
		20175	1732.5	1	49	21.81	16.90
				1	0	22.28	17.60
				25	12	22.22	17.10
				50	0	22.08	16.80
		20350	1750	1	49	21.91	17.90
				1	0	22.38	17.60
				25	12	22.70	17.60
				50	0	22.40	17.30
10	16 QAM	20000	1715	1	49	21.98	17.50
				1	0	21.57	16.30
				25	12	21.55	16.10
				50	0	21.39	15.80
		20175	1732.5	1	49	21.45	16.60
				1	0	21.82	17.10
				25	12	21.28	16.10
				50	0	21.09	15.80
		20350	1750	1	49	21.67	17.50
				1	0	22.08	17.10
				25	12	21.83	16.60
				50	0	21.59	16.30

LTE Band 4_Uplink frequency band : 1710 to 1755MHz							
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Full power (dBm)	Reduced power (dBm)
3	QPSK	19965	1711.5	1	14	22.66	17.80
				1	0	22.45	17.00
				8	4	22.43	16.70
				15	0	22.32	16.70
		20175	1732.5	1	14	22.27	17.30
				1	0	22.49	17.80
				8	4	22.06	16.80
				15	0	22.03	16.80
		20385	1753.5	1	14	22.29	18.20
				1	0	22.53	18.00
				8	4	22.27	17.40
				15	0	22.24	17.50
3	16 QAM	19965	1711.5	1	14	22.46	17.60
				1	0	21.88	16.70
				8	4	21.51	15.70
				15	0	21.44	15.50
		20175	1732.5	1	14	21.91	17.00
				1	0	21.89	17.50
				8	4	21.21	15.80
				15	0	21.04	15.90
		20385	1753.5	1	14	22.09	17.80
				1	0	22.42	17.50
				8	4	21.47	16.60
				15	0	21.42	16.40

LTE Band 4_Uplink frequency band : 1710 to 1755MHz							
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Full power (dBm)	Reduced power (dBm)
1.4	QPSK	19957	1710.7	1	5	22.68	17.30
				1	0	22.42	17.00
				3	2	22.45	17.40
				6	0	22.29	16.40
		20175	1732.5	1	5	22.29	17.40
				1	0	22.53	17.80
				3	2	22.48	17.50
				6	0	22.20	16.50
		20393	1754.3	1	5	22.26	18.30
				1	0	22.43	18.00
				3	2	22.29	18.00
				6	0	22.24	17.30
1.4	16 QAM	19957	1710.7	1	5	22.43	17.10
				1	0	22.00	16.70
				3	2	22.01	16.50
				6	0	21.43	15.70
		20175	1732.5	1	5	21.94	17.00
				1	0	22.19	17.50
				3	2	21.77	16.50
				6	0	21.25	16.10
		20393	1754.3	1	5	22.16	17.80
				1	0	22.31	17.40
				3	2	22.15	17.00
				6	0	21.28	16.70

LTE Band 17_Uplink frequency band : 704 to 716MHz							
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Full power (dBm)	Reduced power (dBm)
5	QPSK	23755	706.5	1	24	22.81	20.00
				1	0	22.50	19.40
				12	6	22.28	19.10
				25	0	22.24	19.00
		23790	710	1	24	22.92	19.50
				1	0	22.89	19.30
				12	6	22.99	19.50
				25	0	22.87	19.20
		23825	713.5	1	24	22.05	19.20
				1	0	22.41	19.50
				12	6	22.73	19.80
				25	0	22.53	19.40
5	16 QAM	23755	706.5	1	24	22.39	19.50
				1	0	21.94	18.90
				12	6	21.32	18.10
				25	0	21.31	18.00
		23790	710	1	24	22.12	19.80
				1	0	22.04	19.00
				12	6	22.02	18.70
				25	0	21.90	18.60
		23825	713.5	1	24	21.31	18.70
				1	0	21.42	19.60
				12	6	21.91	19.00
				25	0	21.72	18.70

LTE Band 17_Uplink frequency band : 704 to 716MHz							
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Full power (dBm)	Reduced power (dBm)
10	QPSK	23780	709	1	49	22.85	20.60
				1	0	22.31	19.40
				25	12	23.20	20.00
				50	0	22.87	19.90
		23790	710	1	49	23.11	19.60
				1	0	22.51	19.00
				25	12	23.01	19.80
				50	0	22.58	19.50
		23800	711	1	49	21.72	18.80
				1	0	23.02	19.20
				25	12	22.91	19.90
				50	0	22.39	19.40
10	16 QAM	23780	709	1	49	22.40	20.10
				1	0	21.87	19.00
				25	12	22.22	19.00
				50	0	21.99	18.90
		23790	710	1	49	22.28	19.40
				1	0	22.13	18.60
				25	12	22.09	19.00
				50	0	21.65	18.60
		23800	711	1	49	20.88	18.50
				1	0	22.25	19.20
				25	12	21.87	19.00
				50	0	21.55	18.30

This device don't support MPR for LTE band

#. WLAN802.11 b/g/n (20M) conducted power table:

WLAN802.11 b		Average Power Output (dBm)			
CH	Frequency (MHz)	Data Rate (Mbps)			
		1	2	5.5	11
1	2412	13.93	13.90	13.87	13.85
6	2437	13.84	13.81	13.79	13.76
11	2462	13.68	13.66	13.62	13.60

WLAN802.11 g		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
1	2412	13.70	13.68	13.64	13.63	13.58	13.55	13.51	13.47
6	2437	13.68	13.62	13.59	13.57	13.52	13.48	13.44	13.40
11	2462	13.68	13.61	16.57	13.55	13.50	13.48	13.45	13.41

WLAN802.11 n (20M)		Average Power Output (dBm)							
CH	Frequency (MHz)	Data Rate (Mbps)							
		6.5	13	19.5	26	39	52	58.5	65
1	2412	13.13	13.08	13.02	12.98	12.92	12.86	12.81	12.76
6	2437	13.19	13.14	13.07	13.01	12.97	12.93	12.87	12.83
11	2462	13.30	13.27	13.24	13.19	13.20	13.15	13.10	13.07

#. Bluetooth conducted power table:

Frequency (MHz)	Peak Power (dBm)	
	BDR	EDR
2402	10.04	10.38
2441	10.39	10.70
2480	9.94	10.22

#. According KDB447498 , KDB648474 when the maximum transmitter and antenna output power are ≦ 60/f(GHz) (mW) SAR evaluation is typically not required .

1.4 Test Environment

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

1.5 Operation Description

1. **WWAN:** The EUT is controlled by using a Radio Communication Tester (CMU200 & CMW500), and the communication between the EUT and the tester is established by air link.
2. **WLAN:** 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.

WWAN:

Configuration 1: Lap-held mode.

Configuration 2: Primary Portrait mode.

Configuration 3: Secondary Portrait mode. (Not tested, since distance of WWAN antenna to edge is 172 mm, which is larger than 5cm)

Configuration 4: Primary Landscape mode. (Not tested, since distance of WWAN antenna to edge is 156 mm, which is larger than 5cm)

Configuration 5: Secondary Landscape mode.

WLAN:

Configuration 1: Lap-held mode.

Configuration 2: Primary Portrait mode. (Not tested, since distance of WLAN antenna to edge is 92.5 mm, which is larger than 5cm)

Configuration 3: Secondary Portrait mode. (Not tested, since distance of WLAN antenna to edge is 150 mm, which is larger than 5cm)

Configuration 4: Primary Landscape mode. (Not tested, since distance of WLAN antenna to edge is 159 mm, which is larger than 5cm)

Configuration 5: Secondary Landscape mode.

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

#. When the maximum transmitter and antenna output power are ≦ 60/f(GHz) (mW) SAR evaluation is not required for FCC or TCB approval.
(Bluetooth average power= 10.7 dBm)

#. According to **KDB248227**-SAR is not required for 802.11 g/HT20/HT40 channels when the maximum average output power is higher than that measured on the corresponding 802.11b channels but increase less than 1/4 dB.

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

#. The highest 1-g SAR for WLAN is 0.129 W/kg_ Lap-held mode and the highest 1-g SAR for WWAN is 1.38 W/kg_ Lap-held mode. The sum of 1-g for simultaneous transmitting WLAN and WWAN antenna pair is 0.129+1.38 = 1.509 W/kg < 1.6 W/kg. According to **KDB648474/ KDB447498 /KDB248227** Simultaneous SAR evaluation is not required.

#. Source-Based Average power has been determined by the addition with the measured burst-average power. The GPRS/EDGE mode with GSMK modulation scheme as boldlize in red as table of data above are chosen to perform SAR testing in accordance with KDB 941225 D-03 in which highest output power in sourced-based time average mode shall be used to perform the corresponding SAR test.

#. The given device is pure Data-Only device at which GSM function is disabled, and since CS and PS are not co-existed while operation, DTM is not applicable to this given DUT of the application.

Configuration	Σ of SAR		Note
	Lap-held Mode	Secondary Landscape	
GPRS/EDGE 850 + WLAN802.11 b	0.698 + 0.129 =0.818 W/kg	0.318 + 0.015 =0.333 W/kg	Full Power
GPRS/EDGE 1900 + WLAN802.11 b	0.635 + 0.129 =0.764 W/kg	0.514 + 0.015 =0.529 W/kg	Full Power
WCDMA BII + WLAN802.11 b	**1.38 + 0.129 =1.509 W/kg**	1.14 + 0.015 =1.155 W/kg	Full Power
WCDMA BV + WLAN802.11 b	0.727 + 0.129 =0.856 W/kg	0.271 + 0.015 =0.286 W/kg	Full Power
LTE B4 + WLAN802.11 b	0.584 + 0.129 =0.713 W/kg	0.467 + 0.015 =0.482 W/kg	Full Power
LTE B17 + WLAN802.11 b	0.278 + 0.129 =0.407 W/kg	0.138 + 0.015 =0.153 W/kg	Full Power
GPRS/EDGE 850 + WLAN802.11 b	1.18 + 0.129 =1.309 W/kg	0.533 + 0.015 =0.548 W/kg	Reduced power
GPRS/EDGE 1900 + WLAN802.11 b	0.91 + 0.129 =1.039 W/kg	0.542 + 0.015 =0.557 W/kg	Reduced power
WCDMA BII + WLAN802.11 b	1.07 + 0.129 =1.199 W/kg	0.525 + 0.015 =0.54 W/kg	Reduced power
WCDMA BV + WLAN802.11 b	1.1 + 0.129 =1.229 W/kg	0.469 + 0.015 =0.484 W/kg	Reduced power
LTE B4 + WLAN802.11 b	1.16 + 0.129 =1.289 W/kg	0.751 + 0.015 =0.766 W/kg	Reduced power
LTE B17 + WLAN802.11 b	0.917 + 0.129 =1.046 W/kg	0.487 + 0.015 =0.502 W/kg	Reduced power

1.6 Proximity sensor operation description

This information is for a 10.1 ” Tablet device which supports WWAN,WLAN, Bluetooth and wireless hotspot capabilities. This tablet PC can be used for four display orientations and it is designed with two proximity sensors beside WWAN antenna. And it can enable WWAN power reduction, and the WLAN and BT have no power reduction.
The proximity sensor itself is always available, independent of display orientation. The proximity sensors which allocates beside WWAN main antenna are implemented by sensor plates to trigger power reduction when human body approaches.

Background Information

Parasitic capacitance is the capacitance that exists between electronic components or conducting objects because of their proximity to each other. This capacitance is undesired for any proximity sensor using the surface capacitance method of sensing. This parasitic capacitance ($C_{PARASITIC}$) gets added to the capacitance of the sense plate (C_{SENSE_PLATE}), increasing the total capacitance of the sense plate environment ($C_{ENVIRONMENT}$) as depicted in Figure 1.6.1.

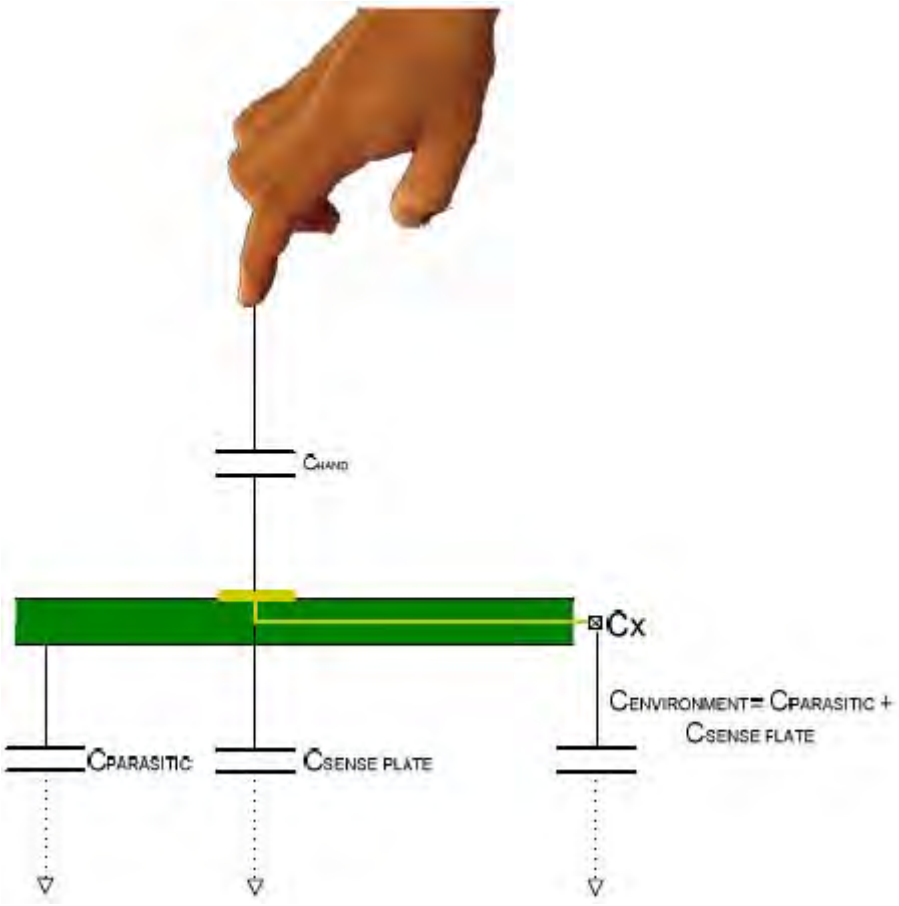


Figure 1.6.1: Illustration of environmental capacitance

The capacitance to an approaching hand (CHAND) increases as the hand comes closer to the sense plate. CHAND gets compared to CENVIRONMENT to determine if a proximity or touch condition exists. A smaller CENVIRONMENT will yield a more sensitive sensor. The ATI algorithm controls CENVIRONMENT and the proximity sensing distance can be increased considerably as depicted in Figure 1.6.3.
As mentioned above, ground planes, PCB traces or large metal objects such as device enclosures increases the parasitic capacitance which in turn considerably decreases the device sensitivity. The ATI feature counters this undesirable effect, ensuring optimum proximity detecting distance under all circumstances as illustrated by Figure 1.6.2 and Figure 1.6.3 respectively.

Present capacitive sensing solutions in the market require the designer to change the size of the external sampling capacitor. This has limited benefit and may increase the noise susceptibility. With the ATI feature, this need no longer exists.
The advantages of ATI can be summarised as follows:

- Increased sensitivity
- Automatic sensitivity adjustment for various sense pads
- Easier to integrate into new designs
- Excellent proximity detection
- No external components or programming to adjust sensitivity

No ‘tuning’ of components, settings or layouts to achieve optimum sensitivity.

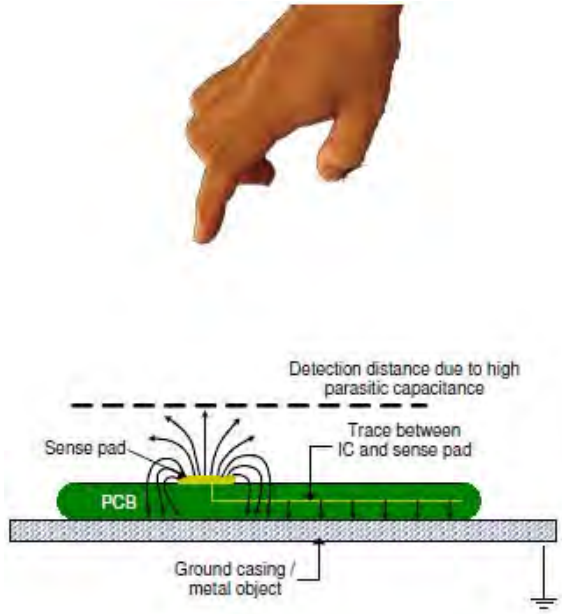


Figure 1.6.2: Electrical propagation from a sense plate with a high CP due to a grounded metal object in close range of the sense plate

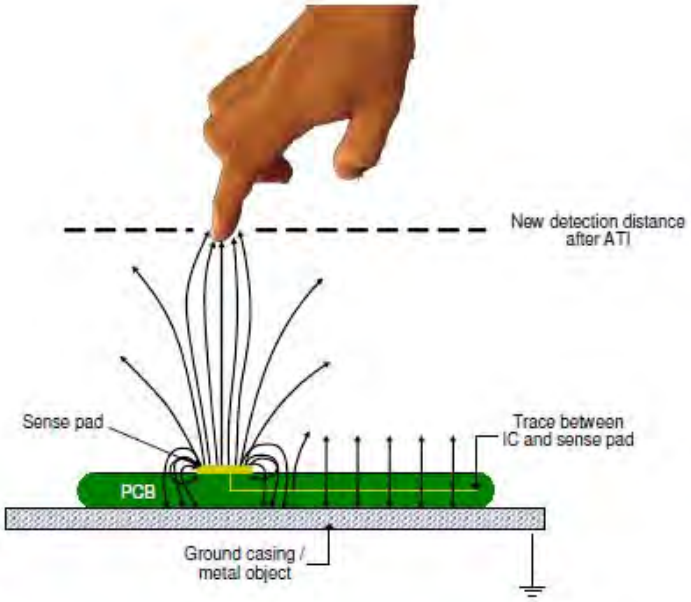


Figure 1.6.3: Electrical propagation from a sense plate with a high CP with ATI implemented to increase the sensitivity

Proximity sensor activation / power reduction conditions
(Manual tool for sensor forced activated and in-activated has been implemented as well. This tool is only for manufacturer internal use, publics will not have this tool.)

Table 1.6.1 SAR test position and distance summary

Testing Face for SAR tests (Tablet)						
	Lap-held	Front side	Secondary Landscape(top)	Primary Landscape	Secondary Portrait(left)	Primary Portrait(right)
2G/ UMTS/LTE	Yes (0 and 10.5mm)	X	Yes (0 and 11mm)	X	Yes (0mm)	X
WLAN/BT	Yes (0 mm)	X	Yes (0 mm)	X	X (0ver 50mm)	X

Proximity Sensor Status Table – Lap-held mode in conservative Proximity Sensor Operation

Distance to Lap-held of DUT (mm)	7.5	8.5	9.5	10.5	11.5	12.5	13.5	14.5
Proximity Sensor Status	ON	ON	ON	ON	ON	OFF	OFF	OFF

Proximity Sensor Status Table –Secondary Landscape mode in conservative Proximity Sensor Operation

Distance to Secondary Landscape of DUT (mm)	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
Proximity Sensor Status	ON	ON	ON	ON	ON	OFF	OFF	OFF

Proximity Sensor Status Table –Back/Top in conservative Proximity Sensor Operation

Between top and back of DUT(°)	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°
Proximity Sensor Status	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF

Note:

1. The EUT diagonal dimension is 314.25mm, per KDB 941225 D07, the EUT diagonal > 20cm and Mini-Tablet procedure is not applied. So, SAR tests follow the Tablet Mode in KDB447498 , and the EUT does not support voice call function, therefore GSM SAR is not required.
2. The test distance is 0mm to the flat phantom, and SAR evaluation is required for back side and the edges with the antenna within 5 cm to the user.
3. The test distance **11** mm is to verify the conservative condition on Secondary landscape edge **with FULL RF power**, since EUT proximity sensor maximum activate distance is 12 mm on the Secondary landscape edge. And the test distance **10.5** mm is for verify the conservative condition on back side **with FULL RF power**, since EUT proximity sensor on back side face maximum activate distance is **11.5** mm.
4. The EUT is 4 orientations are supported; the power reduction for SAR compliance is not triggered by the screen orientation, but triggered by proximity sensor when the user is **10.5** mm or closer to the EUT. Therefore, SAR test setup and test result is conservative for real life usage.
5. The proximity sensors are designed to be triggered for back-side and Secondary-landscape exposure positions. During SAR tests for EUT other edges, the sensor is disabled via software setting.
6. According to KDB 447498 4)b)ii)2),SAR evaluation is performed for the back side and the edge with antenna with 5cm. Screen orientation is not considered in SAR evaluation, and most conservative exposure condition is considered.
7. A general composite test separation distance of **0** mm was considered for the transmitting modes of the device according to “RF Exposure Procedures Update” released by FCC / OET in October 2011. The test considerations were based on the form factor, size, operational configurations, exposure conditions and display orientations pertinent for the device.

8. There are two sensors on the edge of the device to cover secondary landscape and back of the device. Please see below table 1.6.3 for the sensor activation/de-activation distance pre-scan (reliability) information.

Table 1.6.2 P-Sensor Trigger position summary

Testing Face for **P-Sensor trigger distance tests** (Tablet)						
	Lap-held	Secondary Landscape 45 degree with back side	Secondary Landscape	Primary Landscape	Secondary Portrait	Primary Portrait
WWAN	V	V	V	X	X	X
WLAN	X	X	X	X	X	X

V : Reduced maximum power applied only by activation of proximity sensors.
X : No power reduction.

Frequencies / Modes that Power reduction mechanism will activate

The following tables are the orientation which end users could be used and when the conducted power will be reduced at specific modes for all wireless modes, and frequency bands, and operating figure.

Orientation \ Mode Power Limit Activation	GPRS 850 (GMSK) Class 8/ 10	EGPRS 850 (8-PSK) Class 8/10	GPRS 1900 (GMSK) Class 8/10	EGPRS 1900 (8-PSK) Class 8/10
Primary Landscape	X	X	X	X
Secondary Landscape	V	V	V	V
Primary Portrait	X	X	X	X
Secondary Portrait	X	X	X	X
Front side	X	X	X	X
Lap-held	V	V	V	V

Orientation \ Mode Power Limit Activation	WCDMA Band II	WCDMA BandV	LTE Band IV	LTE Band 17
Primary Landscape	X	X	X	X
Secondary Landscape	V	V	V	V
Primary Portrait	X	X	X	X
Secondary Portrait	X	X	X	X
Front side	X	X	X	X
Lap-held	V	V	V	V

Orientation \ Mode Power Limit Activation	802.11b/g/n	Bluetooth
Primary Landscape	x	x
Secondary Landscape	x	x
Primary Portrait	x	x
Secondary Portrait	x	x
Front side	x	x
Lap-held	x	x

Table 1.6.3 P-Sensor Trigger distance reliability info (tested with SPEAG DAY5 system, with Flat(body) phantom)

unit: mm	Top(secondary landscape)		Back		45° between top and back	
count	P1sensor	P2sensor	P1sensor	P2sensor	P1sensor	P2sensor
1	14.5	12	13	15	12	15
2	14	14	12	15.5	14	16
3	14	16	13	15.5	14	15
4	15	15.5	15	16.5	14	14
5	15.5	16.5	20	15.5	16	14
6	15	16	14	15	16	14
7	15	16	13	15.5	15	14
8	15	16.5	13	15	16	13
9	15.5	16	13	15	15	14
10	14.5	17	12	15	15	13
11	14.5	15	12	14.5	15	14
12	15	16	11.5	15.5	14	14
13	16	14.5	14	13.5	14	15
14	15	14	14	13.5	14	15
15	16	16.5	13	12.5	12	15
16	17	16	12	13	12	15
17	16	17	13	15	14	15
18	15	15.5	13	12.5	15	16
19	15	17	13.5	13.5	16	15
20	14	15.5	13	15	17	15
21	14.5	16	13.5	15	17	14
22	14	17	14	15.5	15	13
23	13.5	15	13	15	15	15
24	14	16	14	15	14	15
25	14.5	15.5	11.5	15.5	15	16
26	15	15.5	13	15.5	16	15
27	15	15	13	14	16	15

unit: mm	Top(secondary landscape)		Back		45° between top and back	
count	P1sensor	P2sensor	P1sensor	P2sensor	P1sensor	P2sensor
28	15.5	13	14	14	17	15
29	14	15	13	14.5	16	14
30	14	13.5	13.5	14.5	15	15

The Deficit of Power

EUT mode	Frequency (MHz)	CH	1Dn1UP (dBm)	1Dn2UP (dBm)	Sensor triggering distances	
					Lap-held	Secondary Landscape
GPRS 850	824.2	128	4.40	4.40	11.5mm	12mm
GMSK/Multi-class	836.6	190	4.70	4.60		
10	848.8	251	4.80	4.80		
EDGE 850	824.2	128	2.80	2.30		
8PSK/Multi-class	836.6	190	2.70	2.20		
10	848.8	251	2.60	2.10		

EUT mode	Frequency (MHz)	CH	1Dn1UP (dBm)	1Dn2UP (dBm)	Sensor triggering distances	
					Lap-held	Secondary Landscape
GPRS 1900	1850.2	512	6.90	6.80	11.5mm	12mm
GMSK/Multi-class	1880	661	7.00	6.90		
10	1909.8	810	7.10	7.00		
EDGE 1900	1850.2	512	3.60	3.20		
8PSK/Multi-class	1880	661	3.50	3.10		
10	1909.8	810	3.10	2.80		

Band	CH	Rel99 (dBm)	HSDPA mode (dBm)				HSUPA mode (dBm)					Sensor triggering distances	
			SUB-1	SUB-2	SUB-3	SUB-4	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5	Lap-held	Secondary Landscape
WCDMA Band II	9262	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	6.44	11.5mm	12mm
	9400	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6.64		
	9538	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53	6.53		
WCDMA Band V	4132	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18	3.18		
	4183	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2		
	4233	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02		

LTE Band 4_Uplink frequency band : 1710 to 1755MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Deficit of power (dBm)	Sensor triggering distances	
							Lap-held	Secondary Landscape
5	QPSK	19975	1712.5	1	24	4.49	11.5mm	12mm
				1	0	5.40		
				12	6	5.47		
				25	0	5.44		
		20175	1732.5	1	24	4.86		
				1	0	4.61		
				12	6	4.82		
				25	0	5.21		
		20375	1752.5	1	24	3.84		
				1	0	4.55		
				12	6	4.99		
				25	0	4.88		
5	16 QAM	19975	1712.5	1	24	4.84		
				1	0	5.05		
				12	6	5.37		
				25	0	5.55		
		20175	1732.5	1	24	4.66		
				1	0	4.39		
				12	6	4.88		
				25	0	5.21		
		20375	1752.5	1	24	3.89		
				1	0	4.89		
				12	6	4.83		
				25	0	5.21		

LTE Band 4_Uplink frequency band : 1710 to 1755MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Deficit of power (dBm)	Sensor triggering distances	
							Lap-held	Secondary Landscape
10	QPSK	20000	1715	1	49	4.50	11.5mm	12mm
				1	0	5.35		
				25	12	5.49		
				50	0	5.49		
		20175	1732.5	1	49	4.91		
				1	0	4.68		
				25	12	5.12		
				50	0	5.28		
		20350	1750	1	49	4.01		
				1	0	4.78		
				25	12	5.10		
				50	0	5.10		
10	16 QAM	20000	1715	1	49	4.48		
				1	0	5.27		
				25	12	5.45		
				50	0	5.59		
		20175	1732.5	1	49	4.85		
				1	0	4.72		
				25	12	5.18		
				50	0	5.29		
		20350	1750	1	49	4.17		
				1	0	4.98		
				25	12	5.23		
				50	0	5.29		

LTE Band 4_Uplink frequency band : 1710 to 1755MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Deficit of power (dBm)	Sensor triggering distances	
							Lap-held	Secondary Landscape
3	QPSK	19965	1711.5	1	14	4.86	11.5mm	12mm
				1	0	5.45		
				8	4	5.73		
				15	0	5.62		
		20175	1732.5	1	14	4.97		
				1	0	4.69		
				8	4	5.26		
				15	0	5.23		
		20385	1753.5	1	14	4.09		
				1	0	4.53		
				8	4	4.87		
				15	0	4.74		
3	16 QAM	19965	1711.5	1	14	4.86		
				1	0	5.18		
				8	4	5.81		
				15	0	5.94		
		20175	1732.5	1	14	4.91		
				1	0	4.39		
				8	4	5.41		
				15	0	5.14		
		20385	1753.5	1	14	4.29		
				1	0	4.92		
				8	4	4.87		
				15	0	5.02		

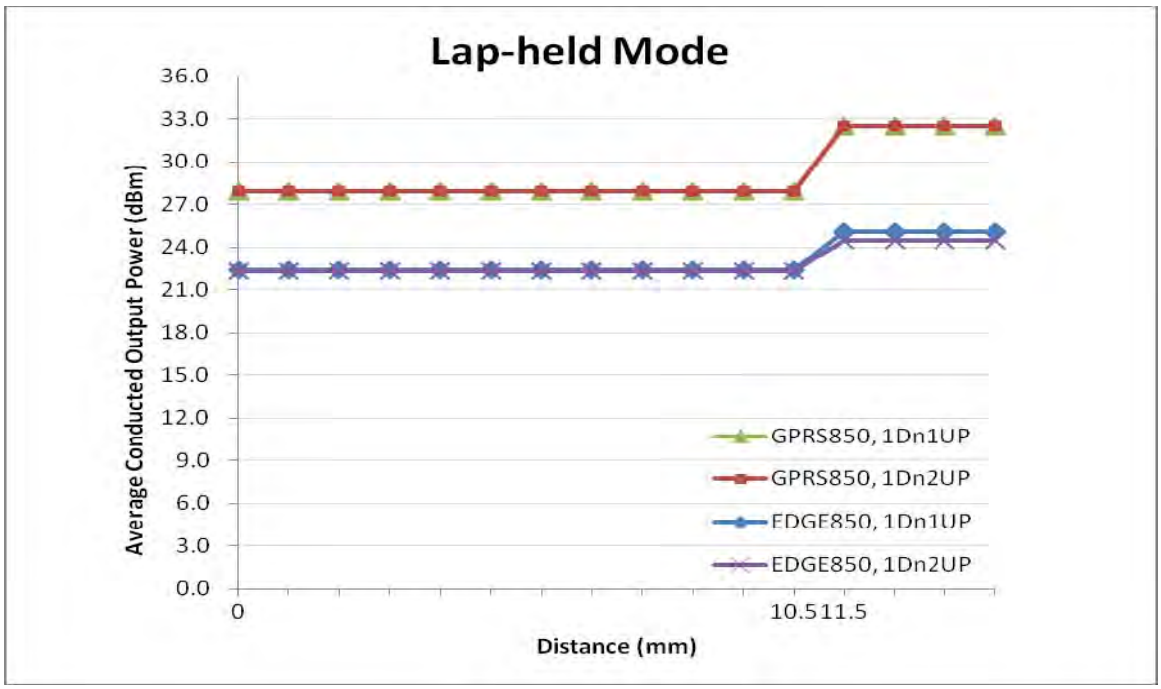
LTE Band 4_Uplink frequency band : 1710 to 1755MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Deficit of power (dBm)	Sensor triggering distances	
							Lap-held	Secondary Landscape
1.4	QPSK	19957	1710.7	1	5	5.38	11.5mm	12mm
				1	0	5.42		
				3	2	5.05		
				6	0	5.89		
		20175	1732.5	1	5	4.89		
				1	0	4.73		
				3	2	4.98		
				6	0	5.70		
		20393	1754.3	1	5	3.96		
				1	0	4.43		
				3	2	4.29		
				6	0	4.94		
1.4	16 QAM	19957	1710.7	1	5	5.33		
				1	0	5.30		
				3	2	5.51		
				6	0	5.73		
		20175	1732.5	1	5	4.94		
				1	0	4.69		
				3	2	5.27		
				6	0	5.15		
		20393	1754.3	1	5	4.36		
				1	0	4.91		
				3	2	5.15		
				6	0	4.58		

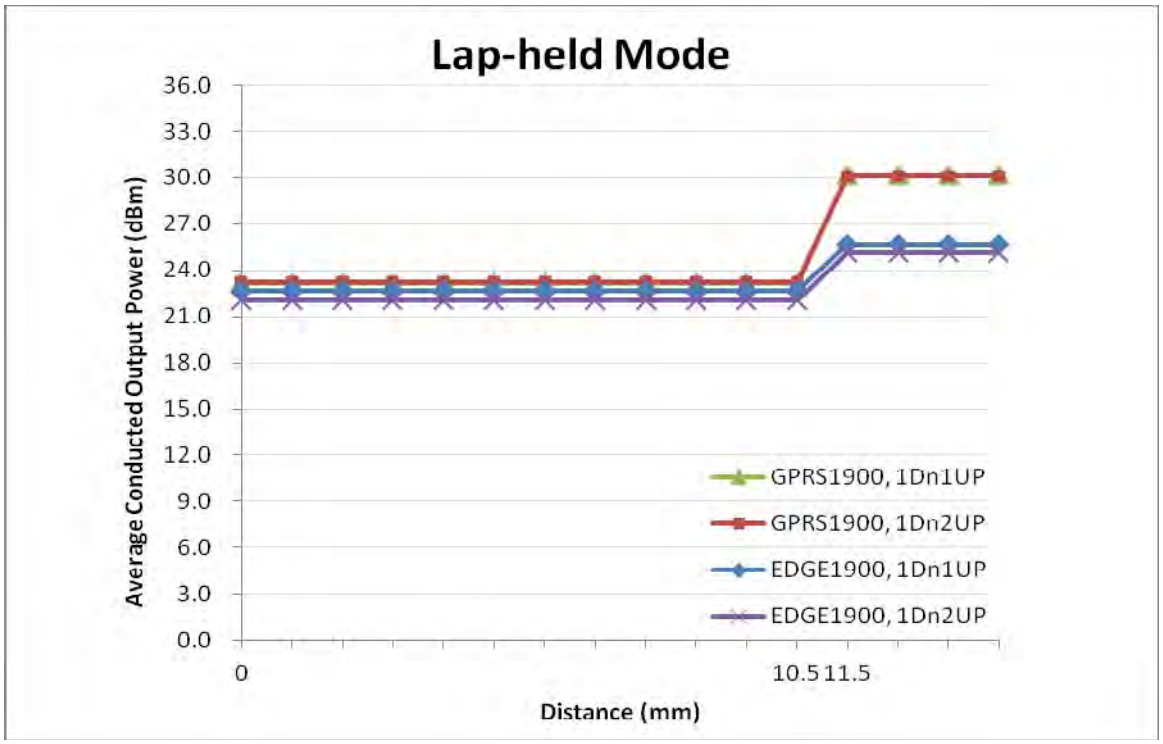
LTE Band 17_Uplink frequency band : 704 to 716MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Deficit of power (dBm)	Sensor triggering distances	
							Lap-held	Secondary Landscape
5	QPSK	23755	706.5	1	24	2.81	11.5mm	12mm
				1	0	3.10		
				12	6	3.18		
				25	0	3.24		
		23790	710	1	24	3.42		
				1	0	3.59		
				12	6	3.49		
				25	0	3.67		
		23825	713.5	1	24	2.85		
				1	0	2.91		
				12	6	2.93		
				25	0	3.13		
5	16 QAM	23755	706.5	1	24	2.89		
				1	0	3.04		
				12	6	3.22		
				25	0	3.31		
		23790	710	1	24	2.32		
				1	0	3.04		
				12	6	3.32		
				25	0	3.30		
		23825	713.5	1	24	2.61		
				1	0	1.82		
				12	6	2.91		
				25	0	3.02		

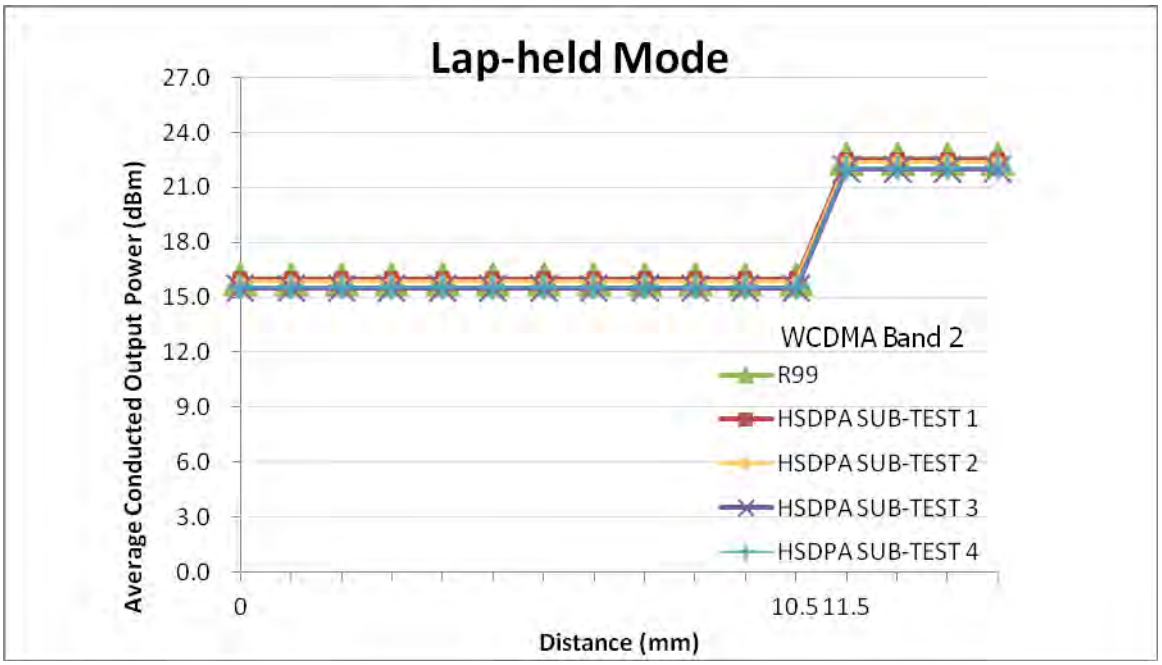
LTE Band 17_Uplink frequency band : 704 to 716MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Deficit of power (dBm)	Sensor triggering distances	
							Lap-held	Secondary Landscape
10	QPSK	23780	709	1	49	2.25	11.5mm	12mm
				1	0	2.91		
				25	12	3.20		
				50	0	2.97		
		23790	710	1	49	3.51		
				1	0	3.51		
				25	12	3.21		
				50	0	3.08		
		23800	711	1	49	2.92		
				1	0	3.82		
				25	12	3.01		
				50	0	2.99		
10	16 QAM	23780	709	1	49	2.30		
				1	0	2.87		
				25	12	3.22		
				50	0	3.09		
		23790	710	1	49	2.88		
				1	0	3.53		
				25	12	3.09		
				50	0	3.05		
		23800	711	1	49	2.38		
				1	0	3.05		
				25	12	2.87		
				50	0	3.25		

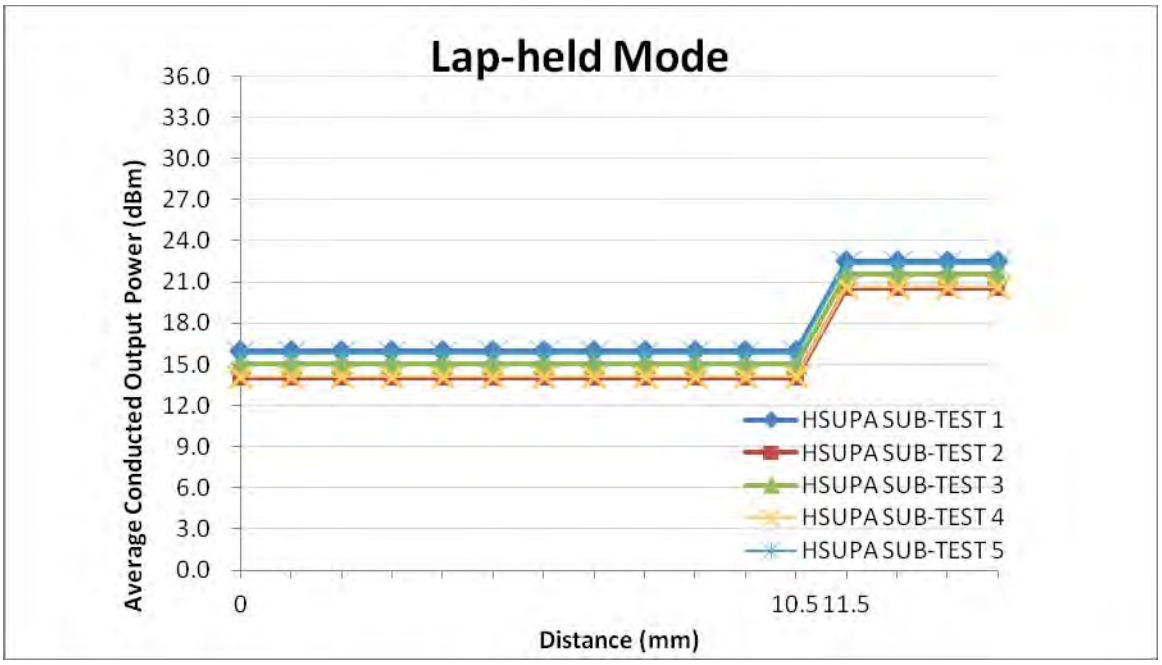
Proximity Sensor Activation

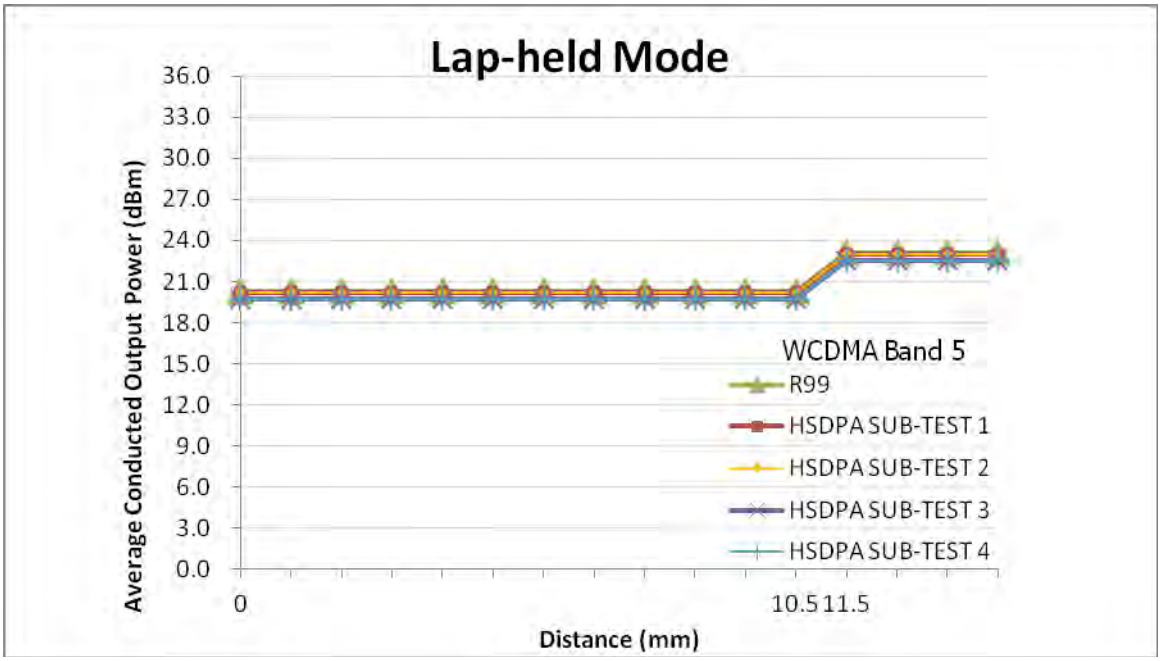
Max. Output Power vs. Distance from the body phantom

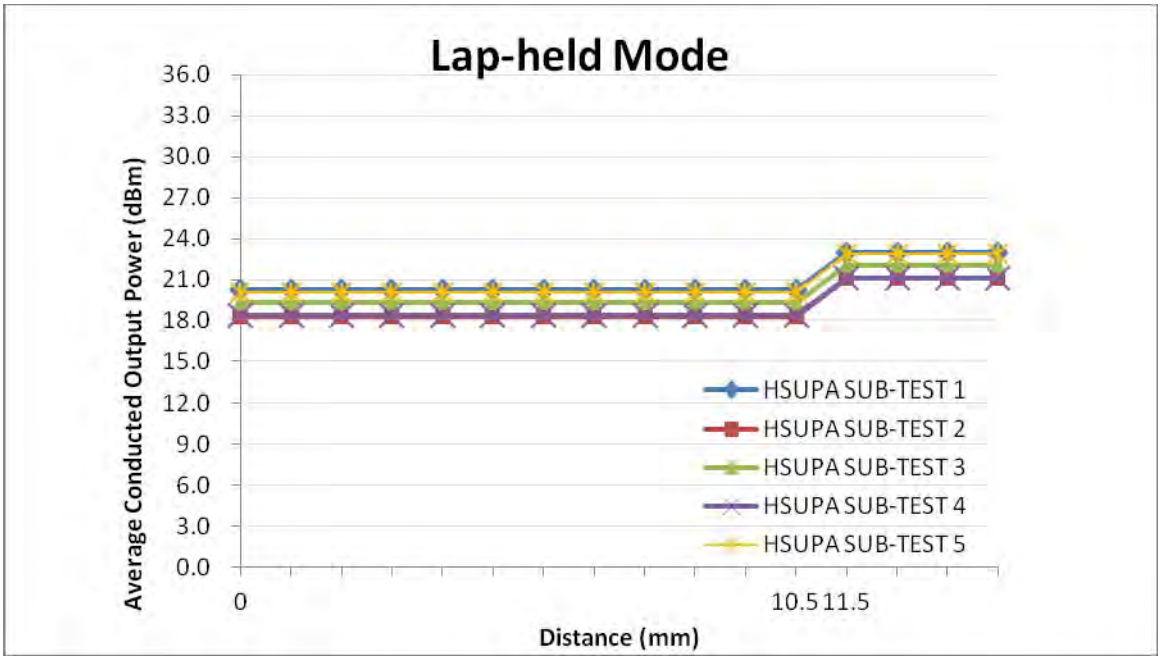


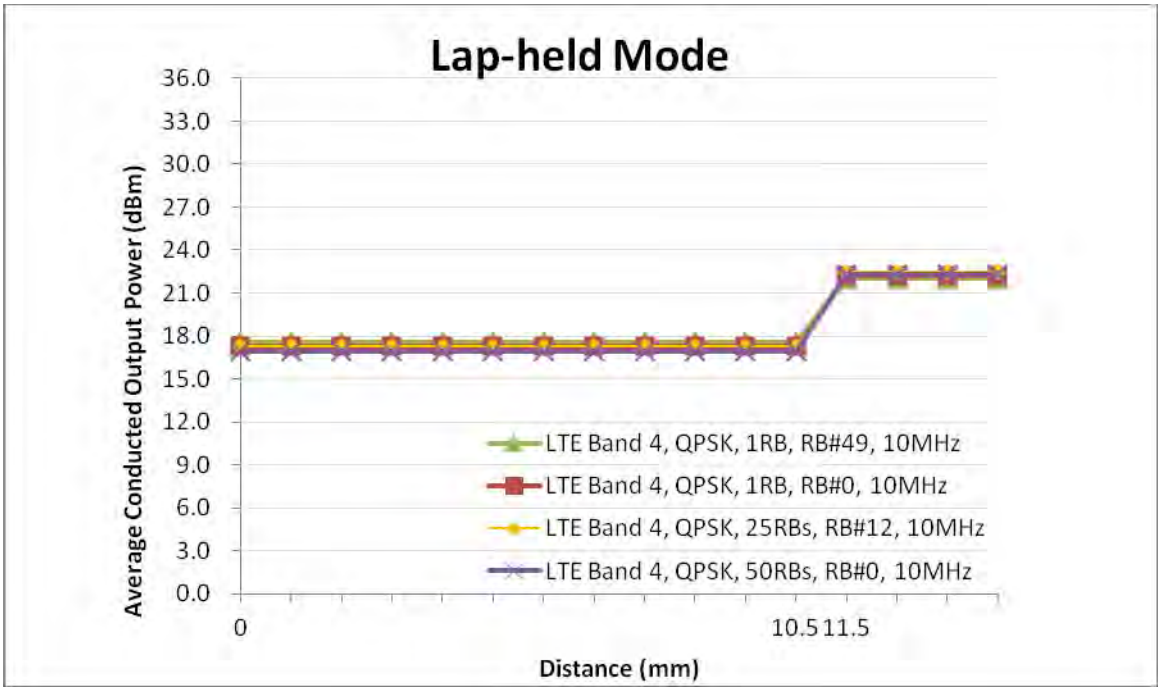


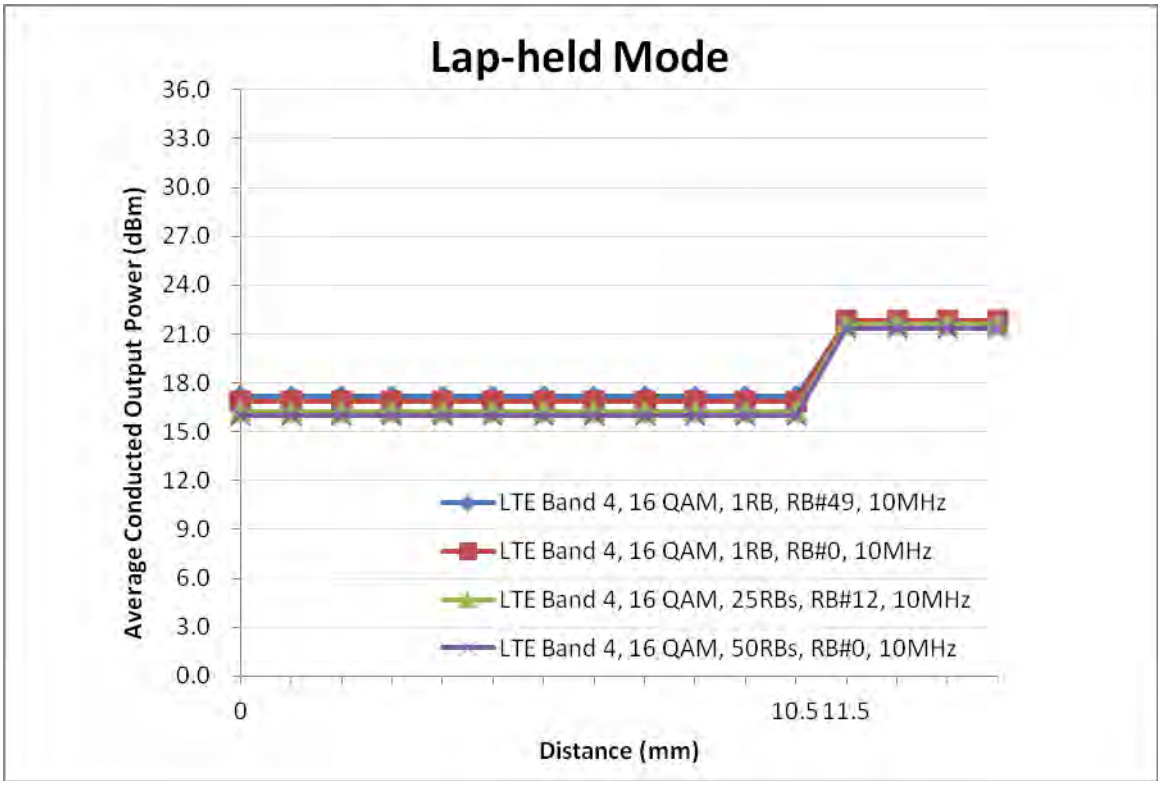


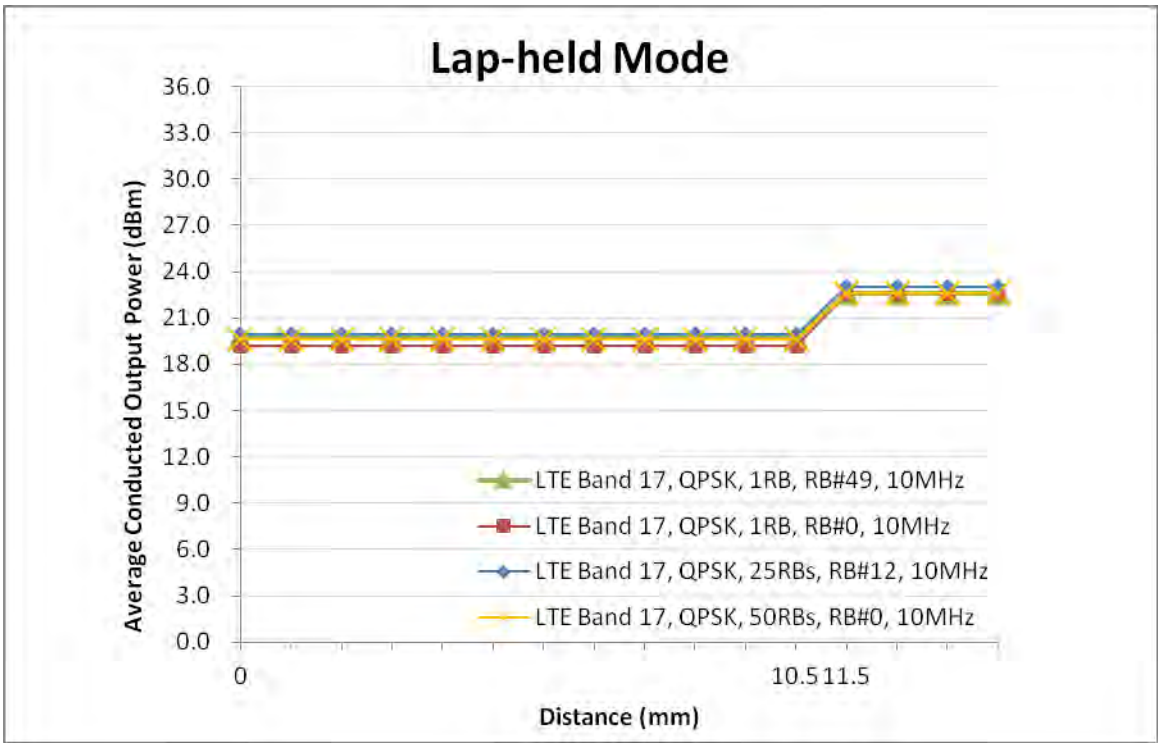


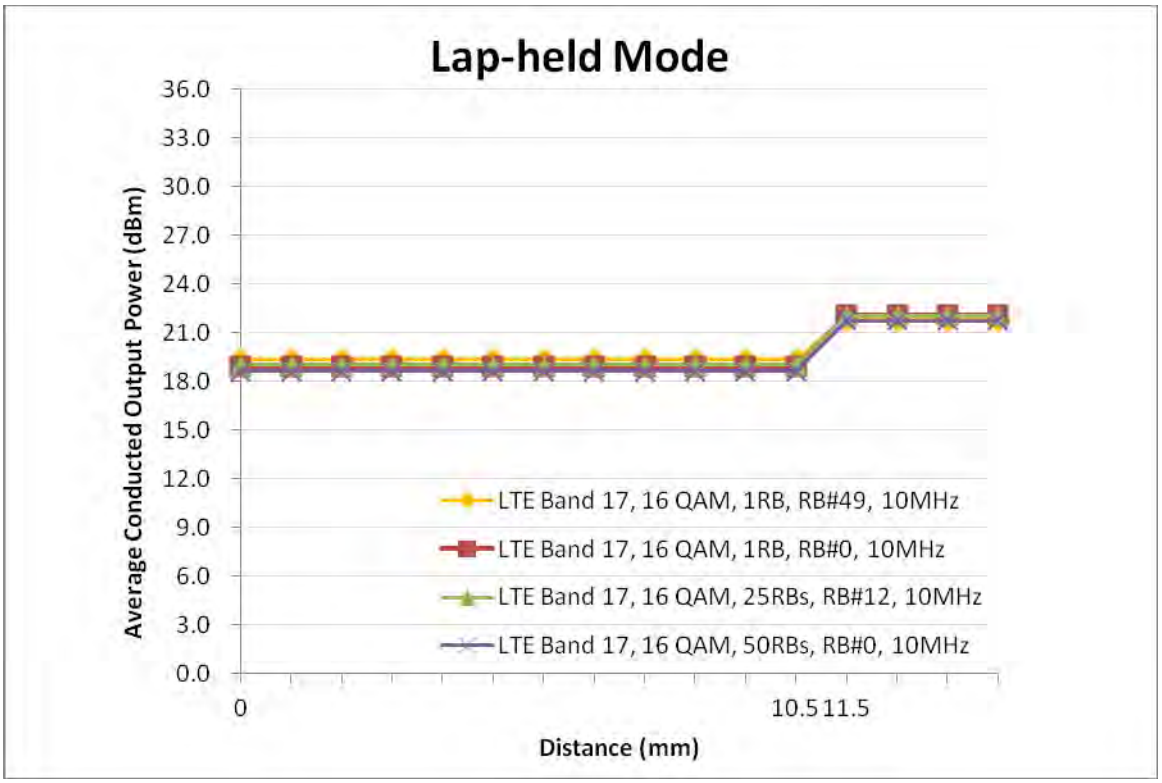


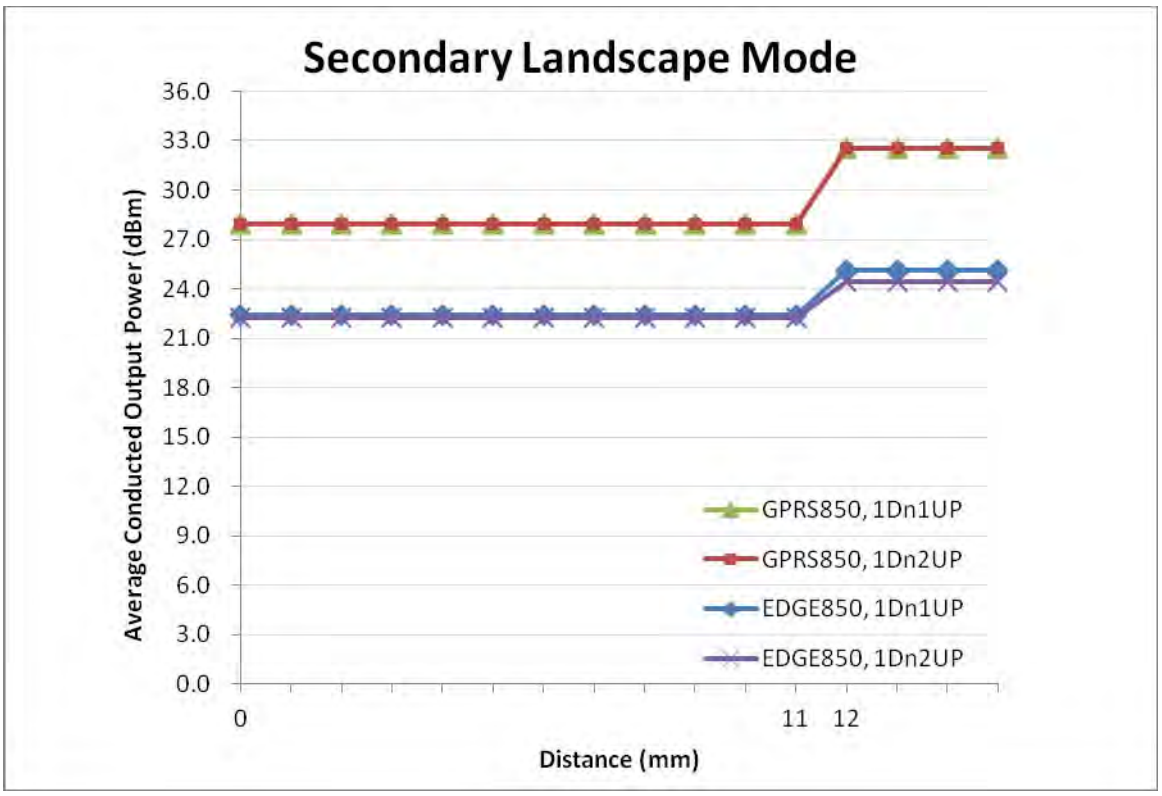


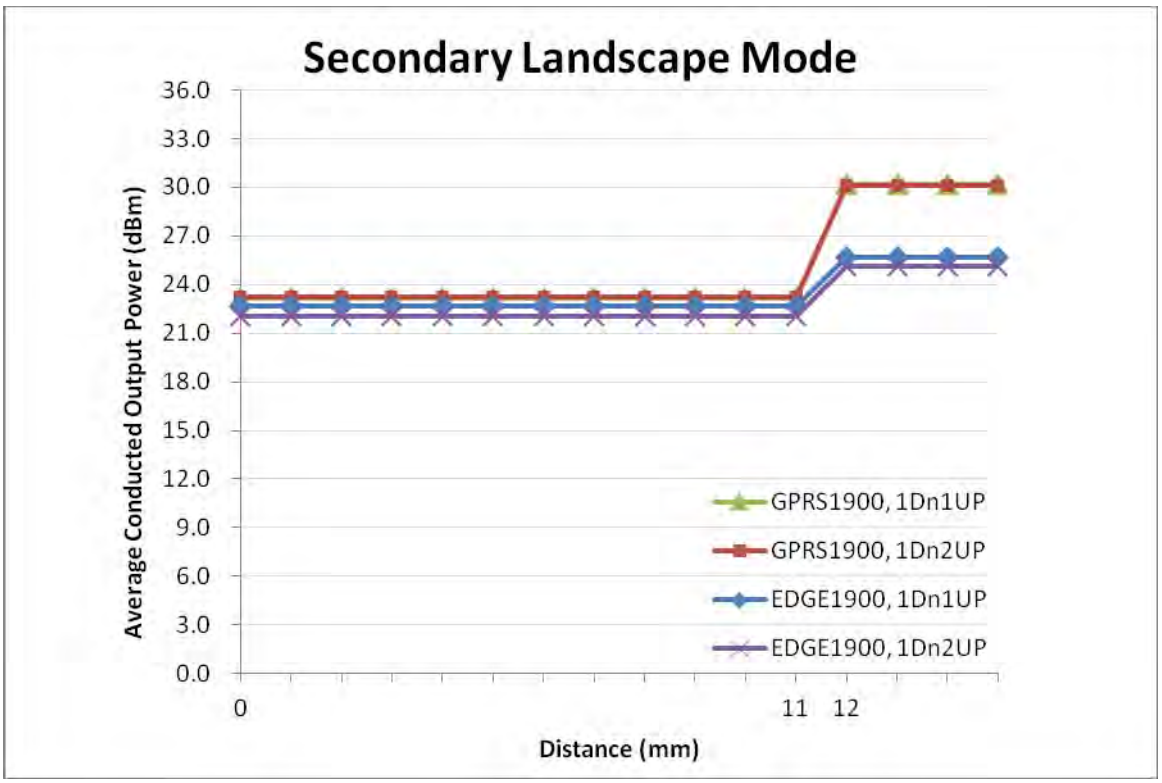


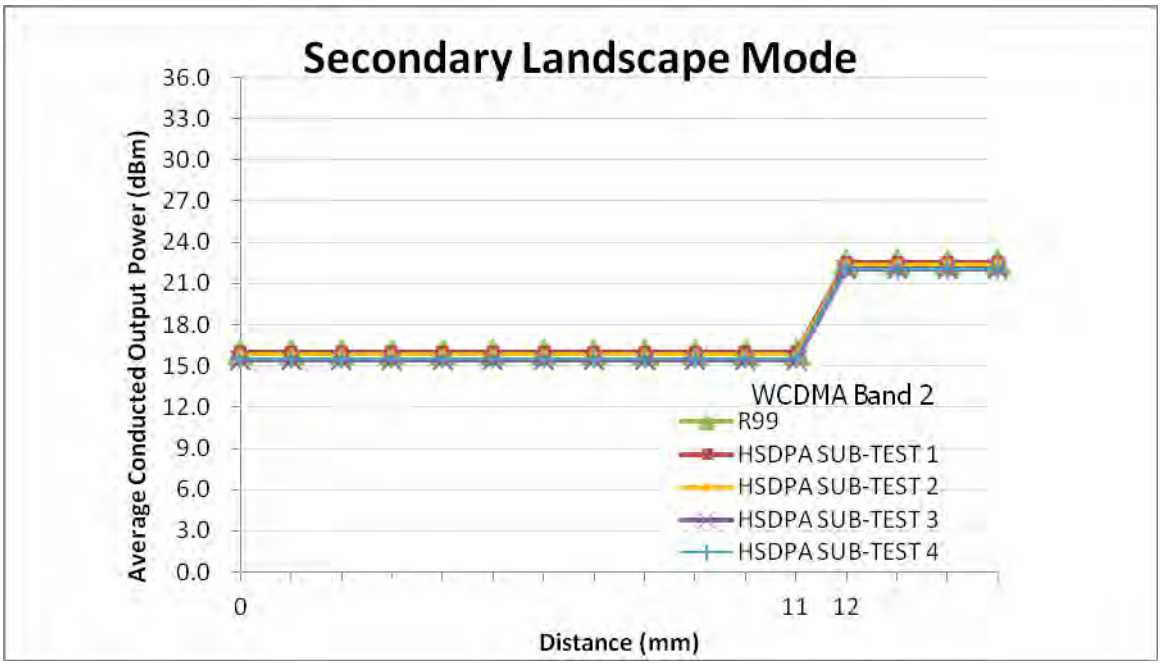


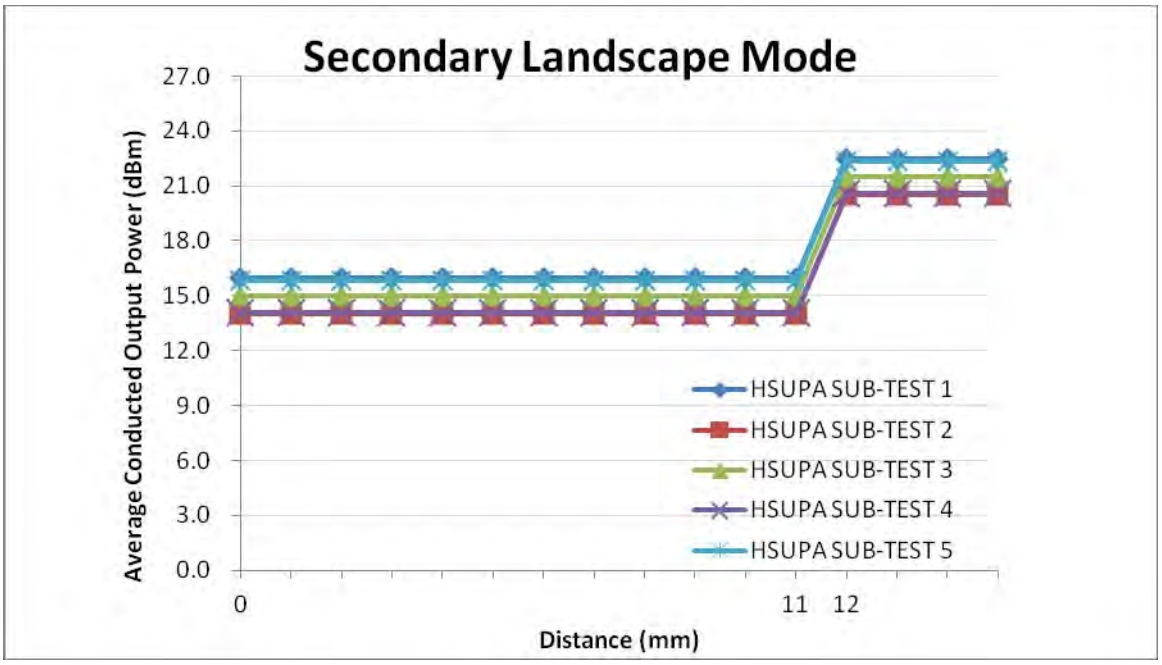


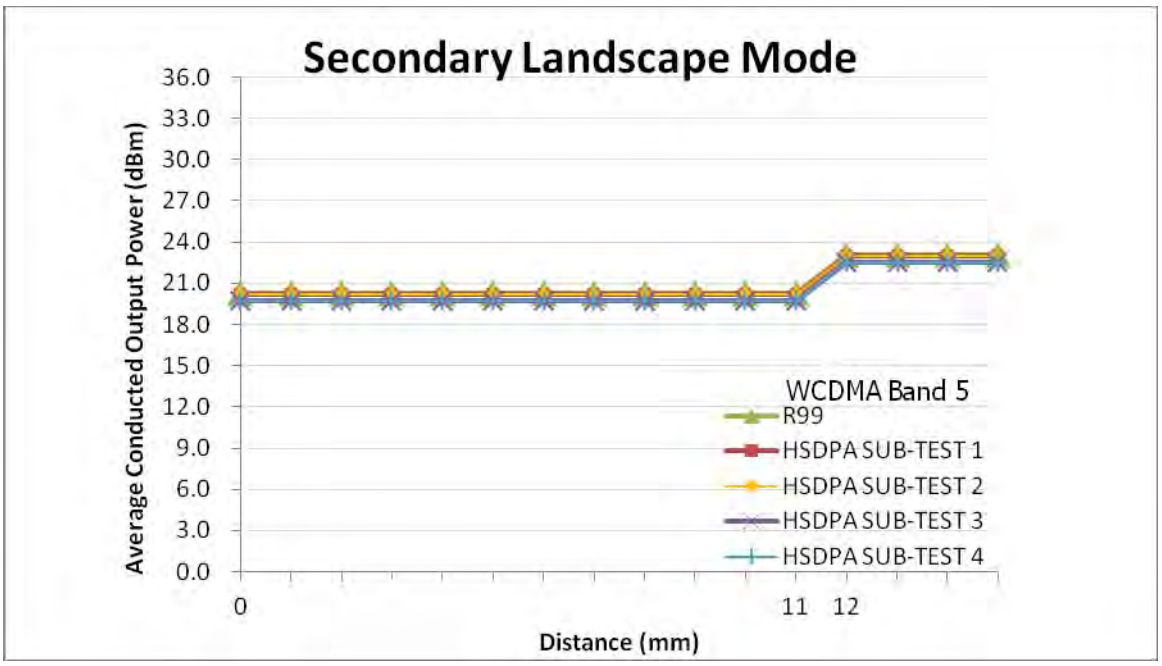


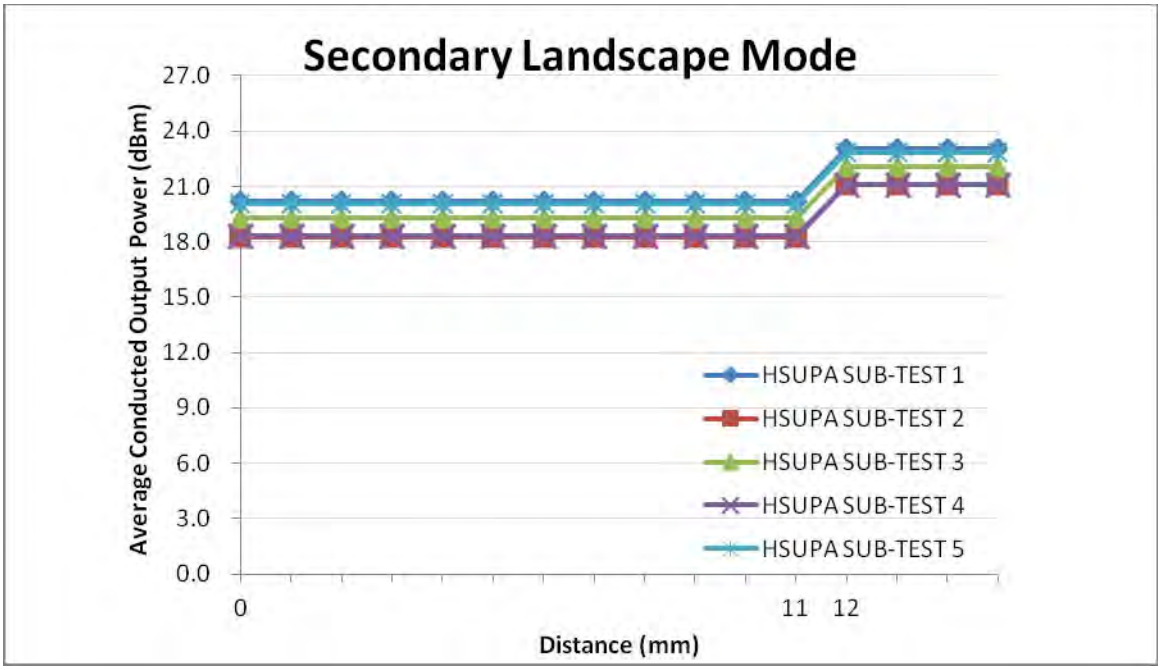


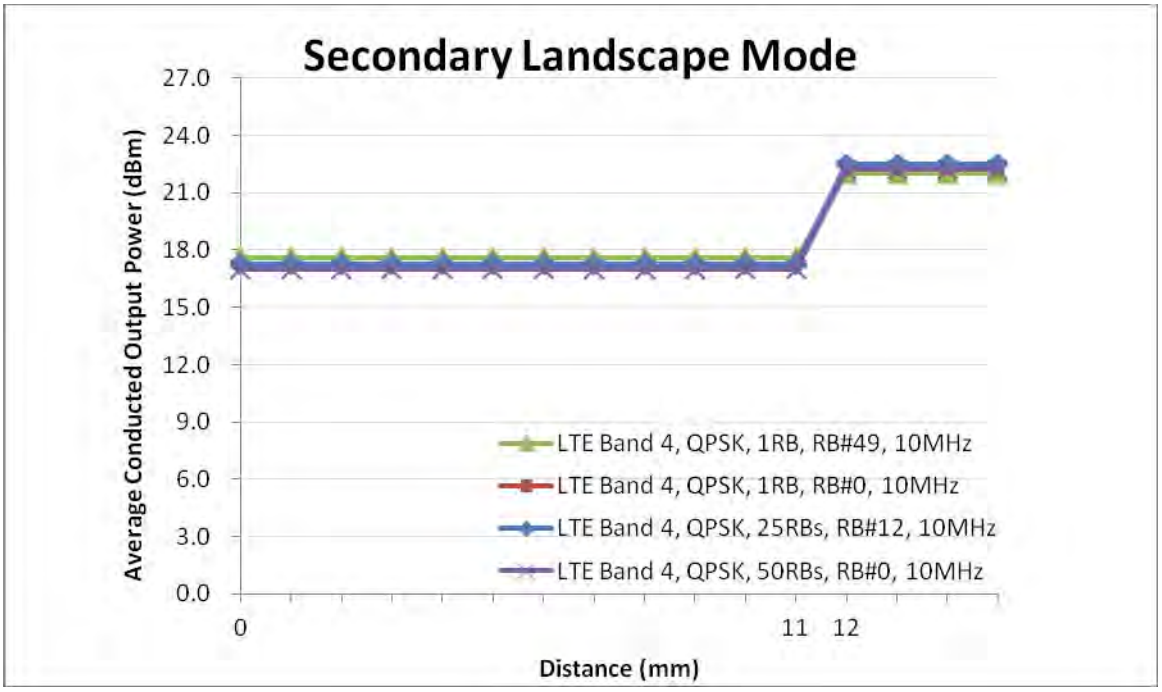


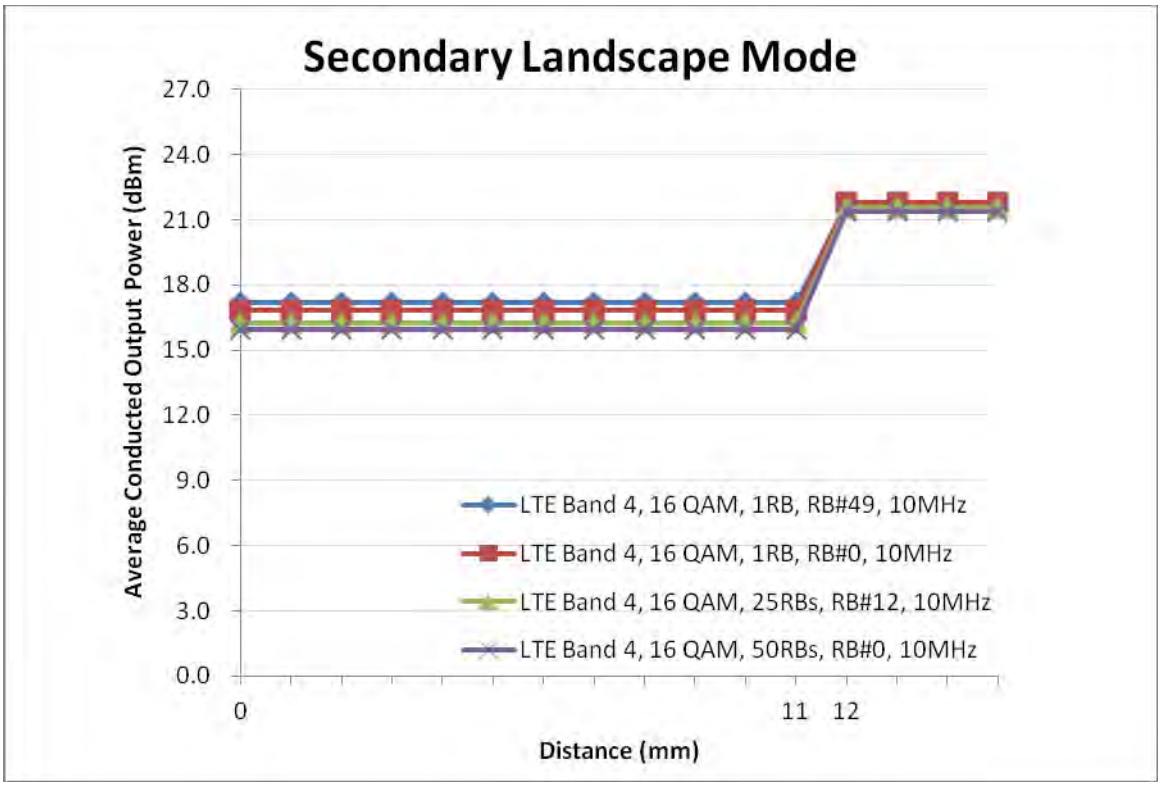


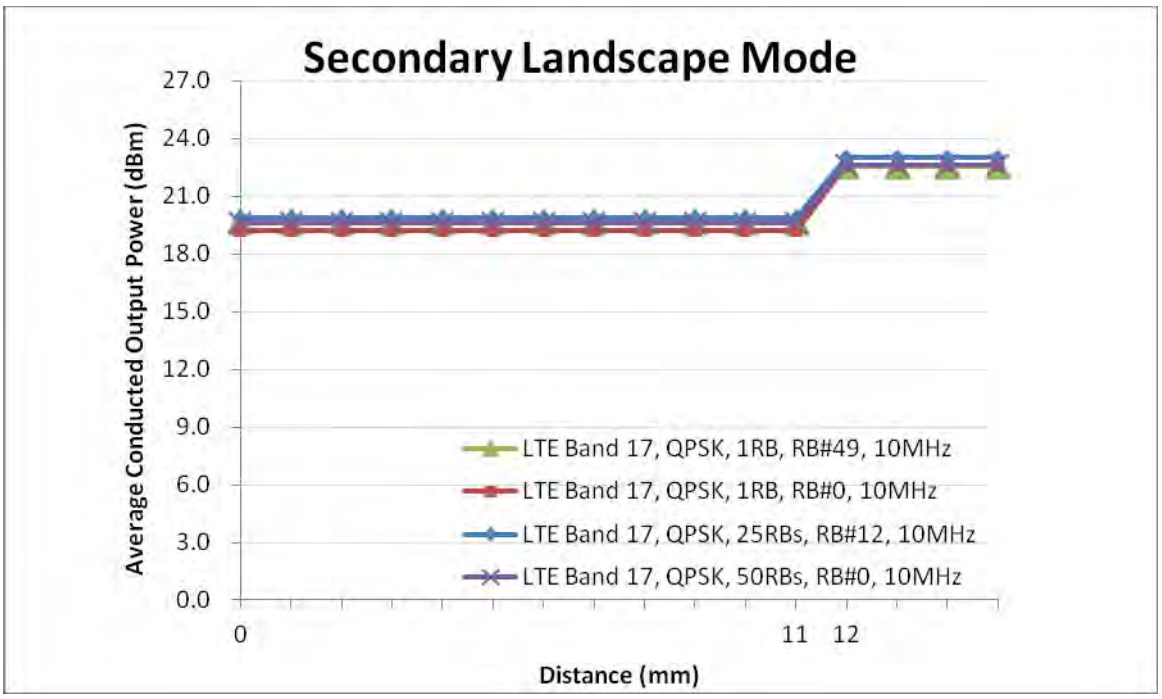


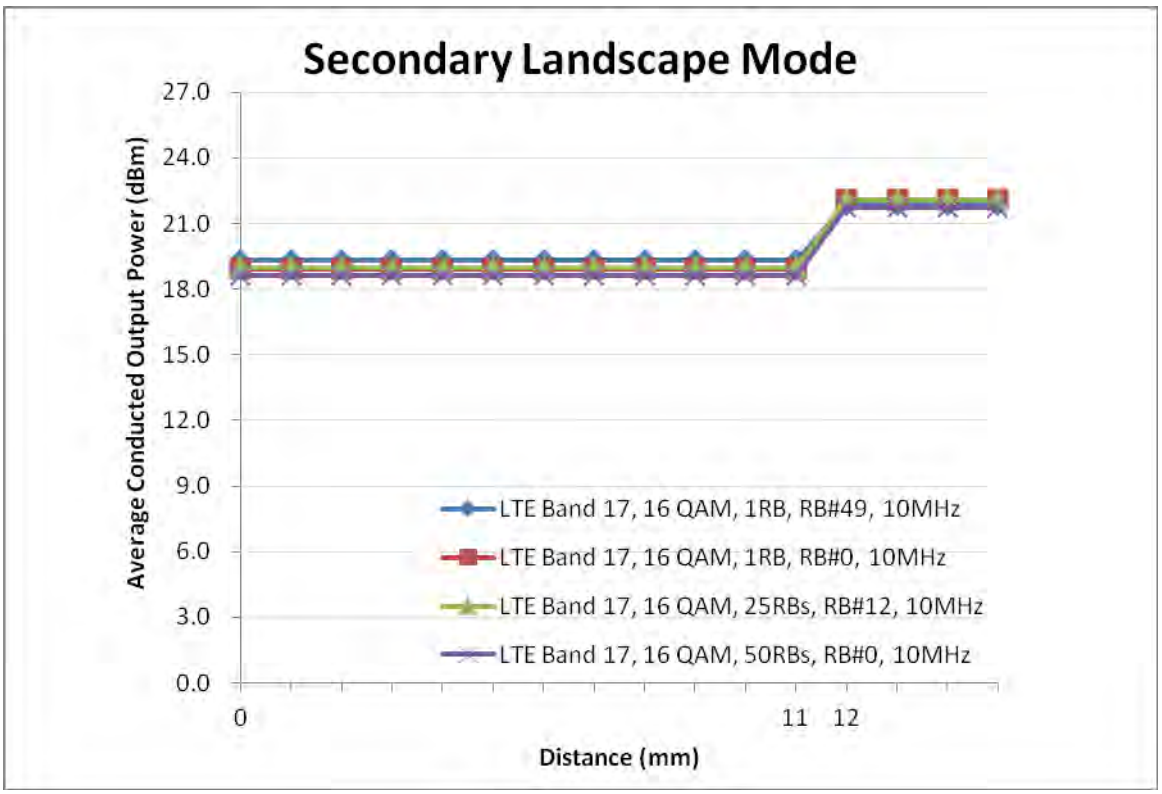












1.7 LTE Related Information of Testing Device

Identifying the wireless operating configurations and parameters for submitting a laboratory testing KDB inquiry, a TCB PBA or preparing SAR reports:

1) identify the operating frequency range of each LTE transmission band used by the device

E-UTRA Operating Band	Uplink (UL) eNode B receive UE transmit			Downlink (DL) eNode B transmit UE receive			Duplex Mode
	F_{UL_low}	–	F_{UL_high}	F_{DL_low}	–	F_{DL_high}	
4	1710 MHz	–	1755 MHz	2110 MHz	–	2155 MHz	FDD
17	704 MHz	–	716 MHz	734 MHz	–	746 MHz	FDD

2) identify the channel bandwidths used in each frequency band; 1.4, 3, 5, 10, 15, 20 MHz etc

E-UTRA band / channel bandwidth						
LTE band	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz
Band 4	Yes	Yes	Yes	Yes	No	No
Band 17	No	No	Yes	Yes	No	No

3) identify the high, middle and low (H, M, L) channel numbers and frequencies in each LTE frequency band

Test frequencies for E-UTRA channel bandwidth for operating band 4

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	1.4	19957	1710.7	1957	2110.7
	3	19965	1711.5	1965	2111.5
	5	19975	1712.5	1975	2112.5
	10	20000	1715	2000	2115
Mid Range	1.4/3/5/10	20175	1732.5	2175	2132.5
High Range	1.4	20393	1754.3	2393	2154.3
	3	20385	1753.5	2385	2153.5
	5	20375	1752.5	2375	2152.5
	10	20350	1750	2350	2150

Test frequencies for E-UTRA channel bandwidth for operating band 17

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	5	23755	706.5	5755	736.5
	10	23780	709	5780	739
Mid Range	5/10	23790	710	5790	740
High Range	5	23825	713.5	5825	743.5
	10	23800	711	5800	741

4) specify the UE category and uplink modulations used

UE LTE Category 3, UL Modulations: QPSK and 16QAM

5) include descriptions of the LTE transmitter and antenna implementation; and also identify whether it is a standalone transmitter operating independently of other wireless transmitters in the device or sharing hardware components and/or antenna(s) with other transmitters etc.

The EUT has two LTE transmitters, one for band-4 and the other for band-17. The front-end and antenna are shared between LTE, GSM and UMTS RF paths. The WWAN radios may co-transmit with the embedded WiFi radio.

6) identify the LTE voice/data requirements in each operating mode and exposure condition with respect to head and body test configurations, antenna locations, handset flip-cover or slide positions, antenna diversity conditions etc

The EUT supports data only, and not support simultaneously voice/data transmission scenario.

7) identify if Maximum Power Reduction (MPR) is optional or mandatory, i.e. built-in by design:
   a) only mandatory MPR may be considered during SAR testing, when the maximum output power is permanently limited by the MPR implemented within the UE; and only for the applicable RB (resource block) configurations specified in LTE standards.

      MPR is optional. No power reduction is set in this device.

b) A-MPR (additional MPR) must be disabled

A-MPR is disabled by hard-coded in the software and is not available to the device.

8) include the maximum average conducted output power measured on the required test channels for each channel bandwidth and UL modulation used in each frequency band:
   a) with 1 RB allocated at the upper edge of a channel
   b) with 1 RB allocated at the lower edge of a channel
   c) using 50% RB allocation centered within a channel
   d) using 100% RB allocation

Full power						
LTE Band 4_Uplink frequency band : 1710 to 1755MHz						
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)
5	QPSK	19975	1712.5	1	24	22.59
				1	0	22.40
				12	6	22.37
				25	0	22.24
		20175	1732.5	1	24	22.16
				1	0	22.41
				12	6	21.82
				25	0	21.91
		20375	1752.5	1	24	22.04
				1	0	22.55
				12	6	22.49
				25	0	22.28
5	16 QAM	19975	1712.5	1	24	22.44
				1	0	21.75
				12	6	21.47
				25	0	21.35
		20175	1732.5	1	24	21.66
				1	0	21.89
				12	6	21.08
				25	0	21.01
		20375	1752.5	1	24	21.79
				1	0	22.39
				12	6	21.63
				25	0	21.51

Full power						
LTE Band 4_Uplink frequency band : 1710 to 1755MHz						
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)
10	QPSK	20000	1715	1	49	22.40
				1	0	21.95
				25	12	22.59
				50	0	22.29
		20175	1732.5	1	49	21.81
				1	0	22.28
				25	12	22.22
				50	0	22.08
		20350	1750	1	49	21.91
				1	0	22.38
				25	12	22.70
				50	0	22.40
10	16 QAM	20000	1715	1	49	21.98
				1	0	21.57
				25	12	21.55
				50	0	21.39
		20175	1732.5	1	49	21.45
				1	0	21.82
				25	12	21.28
				50	0	21.09
		20350	1750	1	49	21.67
				1	0	22.08
				25	12	21.83
				50	0	21.59

Full power						
LTE Band 4_Uplink frequency band : 1710 to 1755MHz						
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)
3	QPSK	19965	1711.5	1	14	22.66
				1	0	22.45
				8	4	22.43
				15	0	22.32
		20175	1732.5	1	14	22.27
				1	0	22.49
				8	4	22.06
				15	0	22.03
		20385	1753.5	1	14	22.29
				1	0	22.53
				8	4	22.27
				15	0	22.24
3	16 QAM	19965	1711.5	1	14	22.46
				1	0	21.88
				8	4	21.51
				15	0	21.44
		20175	1732.5	1	14	21.91
				1	0	21.89
				8	4	21.21
				15	0	21.04
		20385	1753.5	1	14	22.09
				1	0	22.42
				8	4	21.47
				15	0	21.42

Full power						
LTE Band 4_Uplink frequency band : 1710 to 1755MHz						
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)
1.4	QPSK	19957	1710.7	1	5	22.68
				1	0	22.42
				3	2	22.45
				6	0	22.29
		20175	1732.5	1	5	22.29
				1	0	22.53
				3	2	22.48
				6	0	22.20
		20393	1754.3	1	5	22.26
				1	0	22.43
				3	2	22.29
				6	0	22.24
1.4	16 QAM	19957	1710.7	1	5	22.43
				1	0	22.00
				3	2	22.01
				6	0	21.43
		20175	1732.5	1	5	21.94
				1	0	22.19
				3	2	21.77
				6	0	21.25
		20393	1754.3	1	5	22.16
				1	0	22.31
				3	2	22.15
				6	0	21.28

Full power						
LTE Band 17_Uplink frequency band : 704 to 716MHz						
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)
5	QPSK	23755	706.5	1	24	22.81
				1	0	22.50
				12	6	22.28
				25	0	22.24
		23790	710	1	24	22.92
				1	0	22.89
				12	6	22.99
				25	0	22.87
		23825	713.5	1	24	22.05
				1	0	22.41
				12	6	22.73
				25	0	22.53
5	16 QAM	23755	706.5	1	24	22.39
				1	0	21.94
				12	6	21.32
				25	0	21.31
		23790	710	1	24	22.12
				1	0	22.04
				12	6	22.02
				25	0	21.90
		23825	713.5	1	24	21.31
				1	0	21.42
				12	6	21.91
				25	0	21.72

Full power						
LTE Band 17_Uplink frequency band : 704 to 716MHz						
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)
10	QPSK	23780	709	1	49	22.85
				1	0	22.31
				25	12	23.20
				50	0	22.87
		23790	710	1	49	23.11
				1	0	22.51
				25	12	23.01
				50	0	22.58
		23800	711	1	49	21.72
				1	0	23.02
				25	12	22.91
				50	0	22.39
10	16 QAM	23780	709	1	49	22.40
				1	0	21.87
				25	12	22.22
				50	0	21.99
		23790	710	1	49	22.28
				1	0	22.13
				25	12	22.09
				50	0	21.65
		23800	711	1	49	20.88
				1	0	22.25
				25	12	21.87
				50	0	21.55

9) include the maximum average conducted output power measured for the other wireless modes and frequency bands:

Full power				
Burst average power				
GMSK / Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
GPRS 850	824.2	128	32.40	32.40
	836.6	190	32.60	32.50
	848.8	251	32.60	32.60
Source-based time average power				
GPRS 850	824.2	128	23.37	26.38
	836.6	190	23.57	26.48
	848.8	251	23.57	26.58
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Full power				
Burst average power				
8PSK / Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
EDGE 850	824.2	128	25.30	24.70
	836.6	190	25.10	24.50
	848.8	251	24.90	24.20
Source-based time average power				
EDGE 850	824.2	128	16.27	18.68
	836.6	190	16.07	18.48
	848.8	251	15.87	18.18
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Full power				
Burst average power				
GMSK / Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
GPRS 1900	1850.2	512	30.00	29.90
	1880	661	30.20	30.10
	1909.8	810	30.30	30.30
Source-based time average power				
GPRS 1900	1850.2	512	20.97	23.88
	1880	661	21.17	24.08
	1909.8	810	21.27	24.28
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Full power				
Burst average power				
8PSK / Multi-class 10			1Dn1UP	1Dn2UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)
EDGE 1900	1850.2	512	26.00	25.40
	1880	661	25.70	25.10
	1909.8	810	25.30	24.80
Source-based time average power				
EDGE 1900	1850.2	512	16.97	19.38
	1880	661	16.67	19.08
	1909.8	810	16.27	18.78
The division factor compared to the number of TX time slot				
Division factor			1 TX time slot	2 TX time slot
			-9.03	-6.02

Full power											
Band	CH	Rel99 AV(dBm)	HSDPA mode AV(dBm)				HSUPA mode AV(dBm)				
			SUB-1	SUB-2	SUB-3	SUB-4	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5
WCDMA Band II	9262	22.75	22.92	22.63	22.44	22.51	22.67	20.72	21.73	20.85	22.56
	9400	22.57	22.46	22.43	22.01	22.02	22.55	20.62	21.57	20.67	22.41
	9538	22.26	22.12	22.11	21.59	21.71	22.20	20.24	21.28	20.28	22.11

Full power											
Band	CH	Rel99 AV(dBm)	HSDPA mode AV(dBm)				HSUPA mode AV(dBm)				
			SUB-1	SUB-2	SUB-3	SUB-4	SUB-1	SUB-2	SUB-3	SUB-4	SUB-5
WCDMA Band V	4132	23.35	23.14	23.28	22.68	22.73	23.31	21.37	22.35	21.42	23.17
	4183	23.28	23.14	23.17	22.66	22.7	23.21	21.29	22.27	21.35	23.04
	4233	22.58	22.70	22.45	22.21	22.27	22.50	20.54	21.58	20.62	22.39

10) identify all other U.S. wireless operating modes (3G, Wi-Fi, WiMax, Bluetooth etc), device/exposure configurations (head and body, antenna and handset flip-cover or slide positions, antenna diversity conditions etc.) and frequency bands used for these modes

GSM/EDGE 850, GSM/EDGE 1900, UMTS/HSPA band II & V, and WIFI 802.11 b/g/n

11) identify the simultaneous transmission conditions for the voice and data configurations supported by all wireless modes, device configurations and frequency bands, for the head and body exposure conditions and device operating configurations (handset flip or cover positions, antenna diversity conditions etc.)

Simultaneous TX Modes	UMTS	GPRS/EDGE	LTE	802.11b/g/n
1	**ON**	OFF	OFF	**ON**
2	OFF	**ON**	OFF	**ON**
3	OFF	OFF	**ON**	**ON**

12) when power reduction is applied to certain wireless modes to satisfy SAR compliance for simultaneous transmission conditions, other equipment certification or operating requirements, include the maximum average conducted output power measured in each power reduction mode applicable to the simultaneous voice/data transmission configurations for such wireless configurations and frequency bands; and also include details of the power reduction implementation and measurement setup

please refer to another document
filename “P-sensor Power Reduce PBA_v01_TF600TL.pdf”

13) include descriptions of the test equipment, test software, built-in test firmware etc. required to support testing the device when power reduction is applied to one or more transmitters/antennas for simultaneous voice/data transmission

please refer to another document
filename “P-sensor Power Reduce PBA_v01_TF600TL.pdf”

14) when appropriate, include a SAR test plan proposal with respect to the above

Follow the test guidance of KDB 941225D05(LTE SAR test consideration) to perform the LTE SAR testing and channel exclusion.

1.8 The SAR Measurement System

A block diagram of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG 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= σ ($|Ei|^2$)/ ρ where σ and ρ are the conductivity and mass density of the tissue-simulant.

The DASY 5 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.

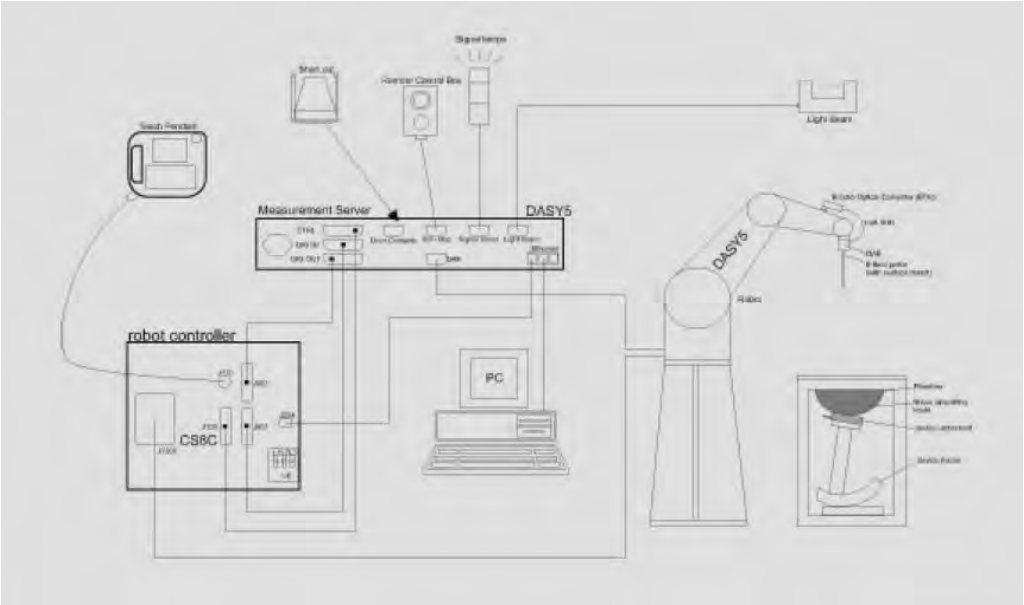


Fig. a The block diagram of SAR system

- 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.
- DASY 5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

1.9 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 750/835/1750/1900/2450 MHz Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz, Linearity: ± 0.6 dB (30 MHz to 4 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/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%.

SAM PHANTOM V4.0C

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

DEVICE HOLDER

Construction	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.	 Device Holder

1.10 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 750/835/1750/1900/2450 MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1 (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was 21.7°C, the relative humidity was 62% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

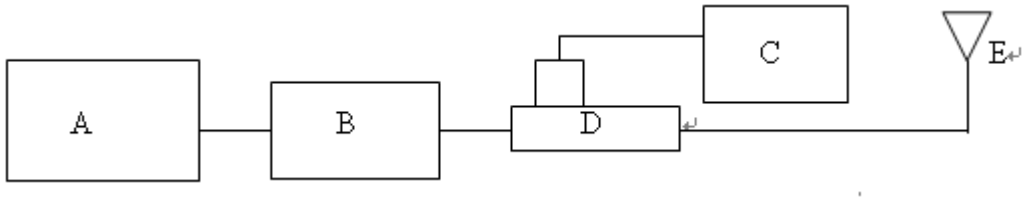


Fig.b The block diagram of system verification

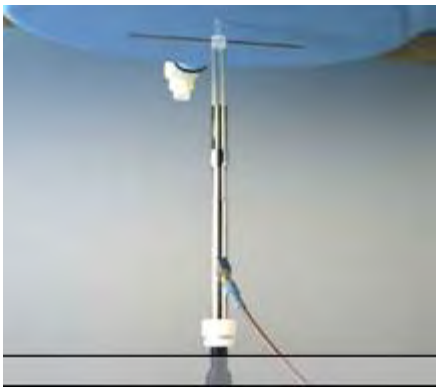
A. Signal Generator

B. Amplifier

C. Power Meter

D. Dual Directional Coupling

E. Reference Dipole Antenna



Photograph of the dipole Antenna

Validation Kit	S/N	Frequency (MHz)	Target SAR (1g) (Pin=250mW) (mW/g)	Measured SAR (1g)(mW/g)	Measured Date
D750V3	1015	750	2.2	2.14	Sep. 11, 2012
				2.16	Sep. 12, 2012
D835V2	4d063	835	2.46	2.4	Sep. 06, 2012
D1750V2	1008	1750	9.03	9.3	Sep. 08, 2012
				9.26	Sep. 09, 2012
D1900V2	5d027	1900	10	10.3	Sep. 07, 2012
D2450V2	727	2450	12.7	12.5	Sep. 12, 2012

Table 1. Results of system validation

1.11 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 (30 KHz-6000 MHz).

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

Frequency (MHz)	Dielectric Parameters		Recommended Limits	Measured	Measurement Date
750	ε_r	Verification	51.68-57.12	55.875	Sep. 11, 2012
		Test CH 23780		56.126	
		Test CH 23790		56.108	
		Test CH 23800		56.098	
	σ (S/m)	Verification	0.9-1.0	0.993	
		Test CH 23780		0.973	
		Test CH 23790		0.974	
		Test CH 23800		0.975	
	Simulated Tissue Temp.(℃)		20-24	21.7	
	ε_r	Verification	51.68-57.12	55.902	Sep. 12, 2012
		Test CH 23780		56.154	
		Test CH 23800		56.113	
	σ (S/m)	Verification	0.9-1.0	0.996	
		Test CH 23780		0.977	
		Test CH 23800		0.979	
	Simulated Tissue Temp.(℃)		20-24	21.7	

Frequency (MHz)	Dielectric Parameters		Recommended Limits	Measured	Measurement Date
835	ε_r	Verification	51.59-57.02	54.652	Sep. 06, 2012
		Test CH 128		54.744	
		Test CH 190		54.63	
		Test CH 251		54.488	
		Test CH 4132		54.728	
		Test CH 4183		54.63	
		Test CH 4233		54.514	
	σ (S/m)	Verification	0.95-1.05	1.006	
		Test CH 128		0.995	
		Test CH 190		1.008	
		Test CH 251		1.021	
		Test CH 4132		0.997	
		Test CH 4183		1.008	
		Test CH 4233		1.018	
	Simulated Tissue Temp.(℃)		20-24	21.7	

Frequency (MHz)	Dielectric Parameters		Recommended Limits	Measured	Measurement Date
1750	ε_r	Verification	50.26-55.55	53.881	Sep. 08, 2012
		Test CH 20000		53.945	
		Test CH 20175		53.908	
		Test CH 20350		53.881	
	σ (S/m)	Verification	1.39-1.53	1.456	
		Test CH 20000		1.416	
		Test CH 20175		1.435	
		Test CH 20350		1.456	
	Simulated Tissue Temp.(℃)		20-24	21.7	
	ε_r	Verification	50.26-55.55	53.993	Sep. 09, 2012
		Test CH 20000		54.083	
		Test CH 20175		54.045	
		Test CH 20350		53.993	
	σ (S/m)	Verification	1.39-1.53	1.451	
		Test CH 20000		1.413	
		Test CH 20175		1.431	
		Test CH 20350		1.451	
	Simulated Tissue Temp.(℃)		20-24	21.7	

Frequency (MHz)	Dielectric Parameters		Recommended Limits	Measured	Measurement Date
1900	ε_r	Verification	50.64-55.97	52.445	Sep. 07, 2012
		Test CH 512		52.675	
		Test CH 661		52.553	
		Test CH 810		52.41	
		Test CH 9262		52.669	
		Test CH 9400		52.553	
		Test CH 9538		52.417	
	σ (S/m)	Verification	1.43-1.59	1.488	
		Test CH 512		1.436	
		Test CH 661		1.465	
		Test CH 810		1.501	
		Test CH 9262		1.439	
		Test CH 9400		1.465	
		Test CH 9538		1.498	
	Simulated Tissue Temp.(℃)		20-24	21.7	
2450	ε_r	Verification	49.78-55.02	52.986	Sep. 12, 2012
		Test CH 1		53.074	
		Test CH 6		52.999	
		Test CH 11		52.969	
	σ (S/m)	Verification	1.88-2.08	1.951	
		Test CH 1		1.89	
		Test CH 6		1.931	
		Test CH 11		1.968	
	Simulated Tissue Temp.(℃)		20-24	21.7	

Table 2. Dielectric Parameters of Tissue Simulant Fluid

The composition of the brain tissue simulating liquid:

Frequency (MHz)	Mode	Ingredient						Total amount
		DGMBE	Water	Salt	Preventol D-7	Cellulose	Sugar	
850M	Body	—	631.68 g	11.72 g	1.2 g	—	600 g	1.0L(Kg)
1900M	Body	300.67 g	716.56 g	4 g	—	—	—	1.0L(Kg)
2450M	Body	301.7ml	698.3ml	—	—	—	—	1.0L(Kg)

Table 3. Recipes for Tissue Simulating Liquid

1.12 Evaluation Procedures

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

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

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

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

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

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

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

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

1.13 Probe Calibration Procedures

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

1.13.1 Transfer Calibration with Temperature Probes

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

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

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

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

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

The measured volume around the temperature probe is not well defined. It is difficult to calculate the energy transfer from a surrounding gradient temperature field into the probe. These effects must be considered, since temperature probes are calibrated in liquid with homogeneous temperatures. There is no traceable standard for temperature rise measurements.

The calibration depends on the assessment of the specific density, the heat capacity and the conductivity of the medium. While the specific density and heat capacity can be measured accurately with standardized procedures (~ 2% for c; much better for ρ) , there is no standard for the measurement of the conductivity. Depending on the method and liquid, the error can well exceed ±5%.

Temperature rise measurements are not very sensitive and therefore are often performed at a higher power level than the E-field measurements. The nonlinearities in the system (e.g., power measurements, different components, etc.) must be considered.

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

1.13.2 Calibration with Analytical Fields

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

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

The setup must enable accurate determination of the incident power.

The accuracy of the calculated field strength will depend on the assessment of the dielectric parameters of the liquid.

Due to the small wavelength in liquids with high permittivity, even small setups might be above the resonant cutoff frequencies. The field distribution in the setup must be carefully checked for conformity with the theoretical field distribution.

References

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

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

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

1.14 Test Standards and Limits

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

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

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

(3) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are

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

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

Table 4. RF exposure limits

Notes:

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

2. Summary of Results

GSM850

Full power								
Band	Mode	EUT Position	Test Distance (mm)	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
					CH 128	CH 190	CH 251	
					824.20 MHz	836.60 MHz	848.80 MHz	
GSM 850	GPRS 1Dn2UP	Body Worn	0	Primary Portrait	—	0.361	—	1.6
			10.5	Lap-held	—	0.698	—	1.6
			11	Secondary Landscape	—	0.318	—	1.6

Reduced power								
Band	Mode	EUT Position	Test Distance (mm)	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
					CH 128	CH 190	CH 251	
					824.20 MHz	836.60 MHz	848.80 MHz	
GSM 850	GPRS 1Dn2UP	Body Worn	0	Lap-held	1.18	1.16	1.13	1.6
				Secondary Landscape	—	0.533	—	1.6

GSM1900

Full power								
Band	Mode	EUT Position	Test Distance (mm)	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
					CH 512	CH 661	CH 810	
					1850.20 MHz	1880.00 MHz	1909.80 MHz	
GSM 1900	GPRS 1Dn2UP	Body Worn	0	Primary Portrait	—	0.054	—	1.6
			10.5	Lap-held	—	0.635	—	1.6
			11	Secondary Landscape	—	0.514	—	1.6

Reduced power								
Band	Mode	EUT Position	Test Distance (mm)	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
					CH 512	CH 661	CH 810	
					1850.20 MHz	1880.00 MHz	1909.80 MHz	
GSM 1900	GPRS 1Dn2UP	Body Worn	0	Lap-held	0.672	0.803	0.91	1.6
				Secondary Landscape	—	0.542	—	1.6

WCDMA Band II

Full power								
Band	Mode	EUT Position	Test Distance (mm)	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
					CH 9262	CH 9400	CH 9538	
					1852.40 MHz	1880.00 MHz	1907.60 MHz	
WCDMA Band II	R99	Body Worn	0	Primary Portrait	—	0.119	—	1.6
			10.5	Lap-held	0.995	1.1	1.38	1.6
			11	Secondary Landscape	0.822	0.821	1.14	1.6

Reduced power								
Band	Mode	EUT Position	Test Distance (mm)	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
					CH 9262	CH 9400	CH 9538	
					1852.40 MHz	1880.00 MHz	1907.60 MHz	
WCDMA Band II	R99	Body Worn	0	Lap-held	1.07	0.874	1.06	1.6
				Secondary Landscape	—	0.525	—	1.6

WCDMA Band V

Full power								
Band	Mode	EUT Position	Test Distance (mm)	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
					CH 4132	CH 4183	CH 4233	
					826.40 MHz	836.60 MHz	846.60 MHz	
WCDMA Band V	R99	Body Worn	0	Primary Portrait	—	0.228	—	1.6
			10.5	Lap-held	—	0.727	—	1.6
			11	Secondary Landscape	—	0.271	—	1.6

Reduced power								
Band	Mode	EUT Position	Test Distance (mm)	Test Configuration	Averaged SAR over 1g (W/kg)			SAR Limit 1g (W/kg)
					CH 4132	CH 4183	CH 4233	
					826.40 MHz	836.60 MHz	846.60 MHz	
WCDMA Band V	R99	Body Worn	0	Lap-held	1.1	0.785	1.05	1.6
				Secondary Landscape	—	0.469	—	1.6

LTE Band 4_ Primary Portrait _Full power_0 mm

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)	Max SAR value(W/kg)	Test case
10	QPSK	20000	1715	1	49	22.40	Note.3	3
				1	0	21.95	Note.4	4
				25	12	22.59	Note.1	1
				50	0	22.29	Note.2	2
		20175	1732.5	1	49	21.81	Note.3	3
				1	0	22.28	Note.4	4
				25	12	22.22	**0.034**	1
				50	0	22.08	Note.2	2
		20350	1750	1	49	21.91	**0.046**	3
				1	0	22.38	**0.03**	4
				25	12	22.70	Note.1	1
				50	0	22.40	Note.2	2
	16 QAM	20000	1715	1	49	21.98	Note.7	7
				1	0	21.57	Note.8	8
				25	12	21.55	Note.5	5
				50	0	21.39	Note.6	6
		20175	1732.5	1	49	21.45	Note.7	7
				1	0	21.82	Note.8	8
				25	12	21.28	Note.5	5
				50	0	21.09	Note.6	6
		20350	1750	1	49	21.67	**0.036**	7
				1	0	22.08	**0.014**	8
				25	12	21.83	**0.042**	5
				50	0	21.59	Note.6	6

LTE Band 4_ Lap-held _Full power_10.5 mm

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)	Max SAR value(W/kg)	Test case
10	QPSK	20000	1715	1	49	22.40	Note.3	3
				1	0	21.95	Note.4	4
				25	12	22.59	Note.1	1
				50	0	22.29	Note.2	2
		20175	1732.5	1	49	21.81	Note.3	3
				1	0	22.28	Note.4	4
				25	12	22.22	**0.435**	1
				50	0	22.08	Note.2	2
		20350	1750	1	49	21.91	**0.584**	3
				1	0	22.38	**0.541**	4
				25	12	22.70	Note.1	1
				50	0	22.40	Note.2	2
	16 QAM	20000	1715	1	49	21.98	Note.7	7
				1	0	21.57	Note.8	8
				25	12	21.55	Note.5	5
				50	0	21.39	Note.6	6
		20175	1732.5	1	49	21.45	**0.475**	7
				1	0	21.82	Note.8	8
				25	12	21.28	Note.5	5
				50	0	21.09	Note.6	6
		20350	1750	1	49	21.67	Note.7	7
				1	0	22.08	**0.463**	8
				25	12	21.83	**0.505**	5
				50	0	21.59	Note.6	6

LTE Band 4_ Secondary Landscape _Full power_11 mm

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)	Max SAR value(W/kg)	Test case
10	QPSK	20000	1715	1	49	22.40	Note.3	3
				1	0	21.95	Note.4	4
				25	12	22.59	Note.1	1
				50	0	22.29	Note.2	2
		20175	1732.5	1	49	21.81	Note.3	3
				1	0	22.28	Note.4	4
				25	12	22.22	**0.3**	1
				50	0	22.08	Note.2	2
		20350	1750	1	49	21.91	**0.467**	3
				1	0	22.38	**0.436**	4
				25	12	22.70	Note.1	1
				50	0	22.40	Note.2	2
	16 QAM	20000	1715	1	49	21.98	Note.7	7
				1	0	21.57	Note.8	8
				25	12	21.55	Note.5	5
				50	0	21.39	Note.6	6
		20175	1732.5	1	49	21.45	Note.7	7
				1	0	21.82	Note.8	8
				25	12	21.28	Note.5	5
				50	0	21.09	Note.6	6
		20350	1750	1	49	21.67	**0.168**	7
				1	0	22.08	**0.187**	8
				25	12	21.83	**0.424**	5
				50	0	21.59	Note.6	6

LTE Band 4_ Lap-held_Reduced power_0 mm

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)	Max SAR value(W/kg)	Test case
10	QPSK	20000	1715	1	49	17.90	**1.1**	3
				1	0	16.60	Note.4	4
				25	12	17.10	**1.05**	1
				50	0	16.80	Note.2	2
		20175	1732.5	1	49	16.90	Note.3	3
				1	0	17.60	**0.779**	4
				25	12	17.10	**0.825**	1
				50	0	16.80	Note.2	2
		20350	1750	1	49	17.90	**1.16**	3
				1	0	17.60	**0.812**	4
				25	12	17.60	**1.15**	1
				50	0	17.30	Note.2	2
	16 QAM	20000	1715	1	49	17.50	**0.778**	7
				1	0	16.30	Note.8	8
				25	12	16.10	Note.5	5
				50	0	15.80	Note.6	6
		20175	1732.5	1	49	16.60	Note.7	7
				1	0	17.10	**0.592**	8
				25	12	16.10	Note.5	5
				50	0	15.80	Note.6	6
		20350	1750	1	49	17.50	**1.07**	7
				1	0	17.10	**0.733**	8
				25	12	16.60	**0.878**	5
				50	0	16.30	Note.6	6

LTE Band 4_ Secondary Landscape _Reduced power_0 mm

LTE Band 4_Uplink frequency band : 1710 to 1755 MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)	Max SAR value(W/kg)	Test case
10	QPSK	20000	1715	1	49	17.90	**0.751**	3
				1	0	16.60	Note.4	4
				25	12	17.10	Note.1	1
				50	0	16.80	Note.2	2
		20175	1732.5	1	49	16.90	Note.3	3
				1	0	17.60	**0.518**	4
				25	12	17.10	**0.436**	1
				50	0	16.80	Note.2	2
		20350	1750	1	49	17.90	**0.729**	3
				1	0	17.60	**0.527**	4
				25	12	17.60	Note.1	1
				50	0	17.30	Note.2	2
	16 QAM	20000	1715	1	49	17.50	**0.645**	7
				1	0	16.30	Note.8	8
				25	12	16.10	Note.5	5
				50	0	15.80	Note.6	6
		20175	1732.5	1	49	16.60	Note.7	7
				1	0	17.10	**0.437**	8
				25	12	16.10	Note.5	5
				50	0	15.80	Note.6	6
		20350	1750	1	49	17.50	**0.609**	7
				1	0	17.10	**0.426**	8
				25	12	16.60	**0.582**	5
				50	0	16.30	Note.6	6

LTE Band 17_ Primary Portrait_Full power_0 mm

LTE Band 17_Uplink frequency band : 704 to 716MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)	Max SAR value(W/kg)	Test case
10	QPSK	23780	709	1	49	22.85	Note.3	3
				1	0	22.31	Note.4	4
				25	12	23.20	Note.1	1
				50	0	22.87	Note.2	2
		23790	710	1	49	23.11	Note.3	3
				1	0	22.51	Note.4	4
				25	12	23.01	**0.137**	1
				50	0	22.58	Note.2	2
		23800	711	1	49	21.72	**0.026**	3
				1	0	23.02	**0.073**	4
				25	12	22.91	Note.1	1
				50	0	22.39	Note.2	2
	16 QAM	23780	709	1	49	22.40	Note.7	7
				1	0	21.87	Note.8	8
				25	12	22.22	Note.5	5
				50	0	21.99	Note.6	6
		23790	710	1	49	22.28	Note.7	7
				1	0	22.13	Note.8	8
				25	12	22.09	Note.5	5
				50	0	21.65	Note.6	6
		23800	711	1	49	20.88	**0.052**	7
				1	0	22.25	**0.057**	8
				25	12	21.87	**0.078**	5
				50	0	21.55	Note.6	6

LTE Band 17_ Lap-held_Full power_10.5 mm

LTE Band 17_Uplink frequency band : 704 to 716MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)	Max SAR value(W/kg)	Test case
10	QPSK	23780	709	1	49	22.85	Note.3	3
				1	0	22.31	Note.4	4
				25	12	23.20	Note.1	1
				50	0	22.87	Note.2	2
		23790	710	1	49	23.11	Note.3	3
				1	0	22.51	Note.4	4
				25	12	23.01	**0.278**	1
				50	0	22.58	Note.2	2
		23800	711	1	49	21.72	**0.151**	3
				1	0	23.02	**0.157**	4
				25	12	22.91	Note.1	1
				50	0	22.39	Note.2	2
	16 QAM	23780	709	1	49	22.40	Note.7	7
				1	0	21.87	Note.8	8
				25	12	22.22	Note.5	5
				50	0	21.99	Note.6	6
		23790	710	1	49	22.28	Note.7	7
				1	0	22.13	Note.8	8
				25	12	22.09	Note.5	5
				50	0	21.65	Note.6	6
		23800	711	1	49	20.88	**0.127**	7
				1	0	22.25	**0.14**	8
				25	12	21.87	**0.211**	5
				50	0	21.55	Note.6	6

LTE Band 17_ Secondary Landscape_Full power_11 mm

LTE Band 17_Uplink frequency band : 704 to 716MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)	Max SAR value(W/kg)	Test case
10	QPSK	23780	709	1	49	22.85	Note.3	3
				1	0	22.31	Note.4	4
				25	12	23.20	Note.1	1
				50	0	22.87	Note.2	2
		23790	710	1	49	23.11	Note.3	3
				1	0	22.51	Note.4	4
				25	12	23.01	**0.138**	1
				50	0	22.58	Note.2	2
		23800	711	1	49	21.72	**0.076**	3
				1	0	23.02	**0.076**	4
				25	12	22.91	Note.1	1
				50	0	22.39	Note.2	2
	16 QAM	23780	709	1	49	22.40	Note.7	7
				1	0	21.87	Note.8	8
				25	12	22.22	Note.5	5
				50	0	21.99	Note.6	6
		23790	710	1	49	22.28	Note.7	7
				1	0	22.13	Note.8	8
				25	12	22.09	Note.5	5
				50	0	21.65	Note.6	6
		23800	711	1	49	20.88	**0.064**	7
				1	0	22.25	**0.063**	8
				25	12	21.87	**0.113**	5
				50	0	21.55	Note.6	6

LTE Band 17_ Lap-held_Reduced power_0 mm

LTE Band 17_Uplink frequency band : 704 to 716MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)	Max SAR value(W/kg)	Test case
10	QPSK	23780	709	1	49	20.60	**0.917**	3
				1	0	19.40	Note.4	4
				25	12	20.00	**0.842**	1
				50	0	19.90	Note.2	2
		23790	710	1	49	19.60	Note.3	3
				1	0	19.00	Note.4	4
				25	12	19.80	**0.888**	1
				50	0	19.50	Note.2	2
		23800	711	1	49	18.80	Note.3	3
				1	0	19.20	**0.478**	4
				25	12	19.90	**0.902**	1
				50	0	19.40	Note.2	2
	16 QAM	23780	709	1	49	17.50	**0.771**	7
				1	0	16.30	Note.8	8
				25	12	16.10	Note.5	5
				50	0	15.80	Note.6	6
		23790	710	1	49	16.60	Note.7	7
				1	0	17.10	Note.8	8
				25	12	16.10	Note.5	5
				50	0	15.80	Note.6	6
		23800	711	1	49	17.50	Note.7	7
				1	0	17.10	**0.405**	8
				25	12	16.60	**0.7**	5
				50	0	16.30	Note.6	6

LTE Band 17_ Secondary Landscape_Reduced power_0 mm

LTE Band 17_Uplink frequency band : 704 to 716MHz								
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Conducted power(dBm)	Max SAR value(W/kg)	Test case
10	QPSK	23780	709	1	49	20.60	**0.024**	3
				1	0	19.40	Note.4	4
				25	12	20.00	Note.1	1
				50	0	19.90	Note.2	2
		23790	710	1	49	19.60	Note.3	3
				1	0	19.00	Note.4	4
				25	12	19.80	**0.487**	1
				50	0	19.50	Note.2	2
		23800	711	1	49	18.80	Note.3	3
				1	0	19.20	**0.268**	4
				25	12	19.90	Note.1	1
				50	0	19.40	Note.2	2
	16 QAM	23780	709	1	49	17.50	**0.026**	7
				1	0	16.30	Note.8	8
				25	12	16.10	Note.5	5
				50	0	15.80	Note.6	6
		23790	710	1	49	16.60	Note.7	7
				1	0	17.10	Note.8	8
				25	12	16.10	Note.5	5
				50	0	15.80	Note.6	6
		23800	711	1	49	17.50	Note.7	7
				1	0	17.10	**0.165**	8
				25	12	16.60	**0.425**	5
				50	0	16.30	Note.6	6

Test Case			Test case 1 (QPSK)		Test case 2 (QPSK)		Test case 3 (QPSK)		Test case 4 (QPSK)	
LTE channel bandwidth	50% Resouce block allocations	100% Resouce block allocations	RB start centered with 50% resouce block allocations		100% Resouce block allocations		1 RB start at the high end of the channel edge		1 RB start at the low end of the channel edge	
10 MHZ	25	50	25 RB	RB start 12	50 RB	RB start 0	1 RB	RB start 49	1 RB	RB start 0
Test Case			**Test case 5 (16QAM)**		**Test case 6 (16QAM)**		**Test case 7 (16QAM)**		**Test case 8 (16QAM)**	
LTE channel bandwidth	**50% Resouce block allocations**	**100% Resouce block allocations**	**RB start centered with 50% resouce block allocations**		**100% Resouce block allocations**		**1 RB start at the high end of the channel edge**		**1 RB start at the low end of the channel edge**	
10 MHZ	25	50	25 RB	RB start 12	50 RB	RB start 0	1 RB	RB start 49	1 RB	RB start 0

Note.

1. 0.8w/kg criterria :

   When conducted power in all channels<0.5 dB, measure SAR on middle channel; When conducted power in all channels>0.5 dB, measure maximum SAR conducted power channel;When SAR<0.8w/kg, no need measure other SAR channels (L/H).

2. Measured SAR<1.45w/kg in 50%RB(Test case 1), no need measure 100%RB (Test case 2)

3. When conducted power in 1 RB start at the high end_QPSK (Test case 3) less than 50%RB_QPSK(Test case 1) , measure maximum SAR channel in 50%RB_QPSK(Test case 1). Otherwise, measure maximum SAR channel in 1 RB start at the high end_QPSK (Test case 3). 1.45w/kg criterria: if SAR <1.45w/kg, no need measure other SAR channels (L/H).

4.When conducted power in1 RB start at the low end_QPSK(Test case 4) less than 50%RB_QPSK(Test case 1), measure maximum SAR channel in50%RB_QPSK(Test case 1). Otherwise, measure maximum SAR channel in 1 RB start at the low end_QPSK(Test case 4). 1.45w/kg criterria: if SAR <1.45w/kg, no need measure other SAR channels.

5.When conducted power in 50%RB_16QAM(Test case 5) less than 50%RB_QPSK(Test case 1), measure maximum SAR channel in 50%RB_QPSK(Test case 1). Otherwise, measure maximum SAR channel in 50%RB_16QAM(Test case 5).

1.45w/kg criterria: if SAR <1.45w/kg, no need measure other SAR channels (L/H).

6. Measured SAR<1.45w/kg in 50%RB_16QAM(Test case 5), no need measure 100%RB_16QAM(Test case 6).

7.When conducted power in 50%RB_16QAM(Test case 5) less than 1 RB start at the high end_16QAM (Test case 7), measure maximum SAR channel in 50%RB_16QAM(Test case 5). Otherwise, measure maximum SAR channel in 1 RB start at the high end_16QAM (Test case 7). 1.45w/kg criterria: if SAR <1.45w/kg, no need measure other SAR channels (L/H).

8.When conducted power in 1 RB start at the low end_16QAM(Test case 8) less than 50%RB_16QAM(Test case 5), measure maximum SAR channel in 50%RB_16QAM(Test case 5). Otherwise, measure maximum SAR channel in 1 RB start at the low end_16QAM(Test case 8). 1.45w/kg criterria: if SAR <1.45w/kg, no need measure other SAR channels (L/H).

9. Follow the test guidance of KDB941125 D05(LTE SAR test considerations) to perform the LTE SAR testing and channel exclusion.

10. No need SAR testing with 1.4MHz / 3MHz / 5MHz channel bandwidth due to the max conductive power of 1.4MHz / 3MHz / 5MHz with different RB allocations compared to 10 MHz channel bandwidth are all within 0.5dB, and the SAR value of 10 MHz with different RB allocations are all below 1.45w/kg.

WLAN802.11 b

Band	EUT Position	Test Distance (mm)	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	0	Lap-held	0.116	0.124	0.129	1.6
			Secondary Landscape	—	0.015	—	1.6

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

#. According to **KDB248227**-SAR is not required for 802.11 g/HT20/HT40 channels when the maximum average output power is higher than that measured on the corresponding 802.11b channels but increase less than 1/4 dB.

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	3848	Jun.04,2012	Jun.03,2013
Schmid & Partner Engineering AG	750/835/1750/ 1900/2450 MHz System Validation Dipole	D750V3 D835V2 D1750V2 D1900V2 D2450V2	1015 4d063 1008 5d027 727	Aug.24.2012 May25.2012 May29.2012 Apr.26.2012 Apr.25,2012	Aug.23.2013 May24.2013 May28.2013 Apr.25.2013 Apr.24,2013
Schmid & Partner Engineering AG	Data acquisition Electronics	DAE4	1336	Jun.05,2012	Jun.04,2013
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	E5071C	MY46107530	Feb.16,2012	Feb.15,2013
Agilent	Dielectric Probe Kit	85070E	MY44300677	Calibration not required	Calibration not required
Agilent	Dual-directional coupler	772D 778D	MY46151242 MY48220468	Jul.05,2012 Mar.30.2012	Jul.04,2013 Mar.29.2013
Agilent	RF Signal Generator	N5181A	MY50141235	Jan.06,2012	Jan.05,2013
Agilent	Power Meter	E4417A	MY51410006	Oct.24.2011	Oct.23.2013
R&S	Radio Communication Test	CMU200 CMW500	122498 125470	Jun.27.2012 Jul.05.2012	Jun.26.2013 Jul.04.2013

4. Measurements

Date: 2012/9/6

Primary Portrait_CH190_0mm

Communication System: GPRS (Class 10); Frequency: 836.6 MHz

Medium parameters used: f = 837 MHz; σ = 1.008 mho/m; ε_r = 54.63; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.409 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

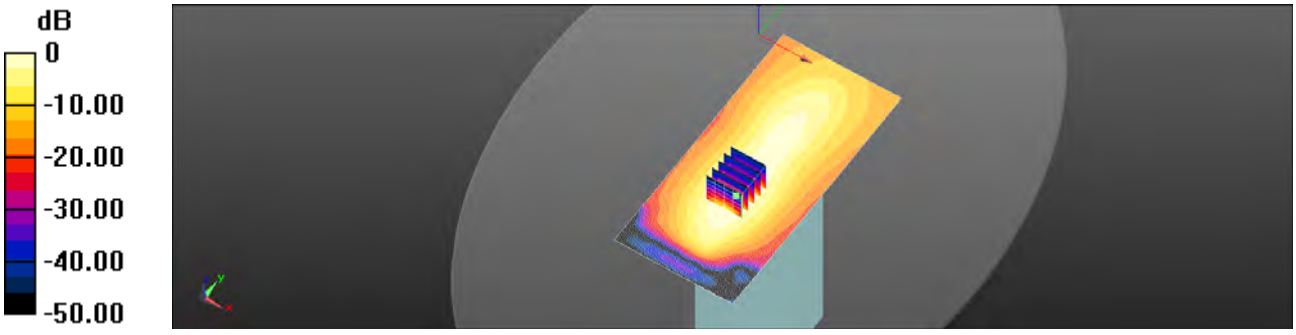
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.312 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.687 mW/g

SAR(1 g) = 0.361 mW/g; SAR(10 g) = 0.210 mW/g

Maximum value of SAR (measured) = 0.535 mW/g



0 dB = 0.409 mW/g = -7.77 dB mW/g

Date: 2012/9/6

Lap-held_CH190_10.5mm

Communication System: GPRS (Class 10); Frequency: 836.6 MHz

Medium parameters used: f = 837 MHz; σ = 1.008 mho/m; ε_r = 54.63; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.879 mW/g

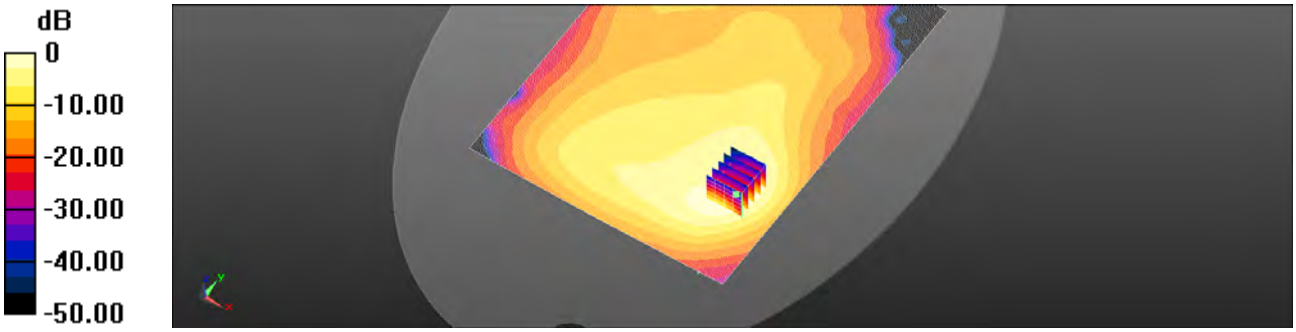
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.818 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.147 mW/g

SAR(1 g) = 0.698 mW/g; SAR(10 g) = 0.417 mW/g

Maximum value of SAR (measured) = 0.939 mW/g



0 dB = 0.879 mW/g = -1.12 dB mW/g

Secondary Landscape_CH190_11mm

Communication System: GPRS (Class 10); Frequency: 836.6 MHz

Medium parameters used: f = 837 MHz; σ = 1.008 mho/m; ε_r = 54.63; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

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

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

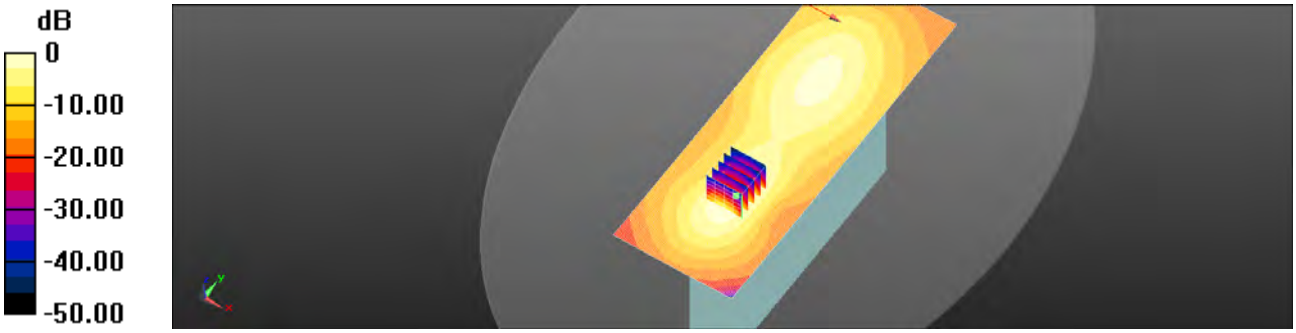
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.662 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.496 mW/g

SAR(1 g) = 0.318 mW/g; SAR(10 g) = 0.194 mW/g

Maximum value of SAR (measured) = 0.414 mW/g



0 dB = 0.450 mW/g = -6.93 dB mW/g

Lap-held_CH128_0mm

Communication System: GPRS (Class 10); Frequency: 824.2 MHz

Medium parameters used: f = 824.2 MHz; σ = 0.995 mho/m; ε_r = 54.744; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.58 mW/g

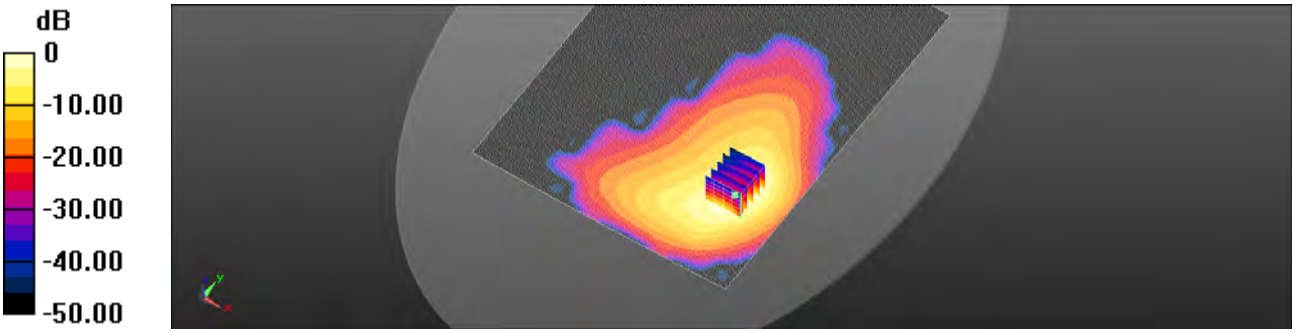
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.361 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 2.413 mW/g

SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.606 mW/g

Maximum value of SAR (measured) = 1.70 mW/g



0 dB = 1.58 mW/g = 3.97 dB mW/g

Date: 2012/9/6

Lap-held_CH190_0mm

Communication System: GPRS (Class 10); Frequency: 836.6 MHz

Medium parameters used: f = 837 MHz; σ = 1.008 mho/m; ε_r = 54.63; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.60 mW/g

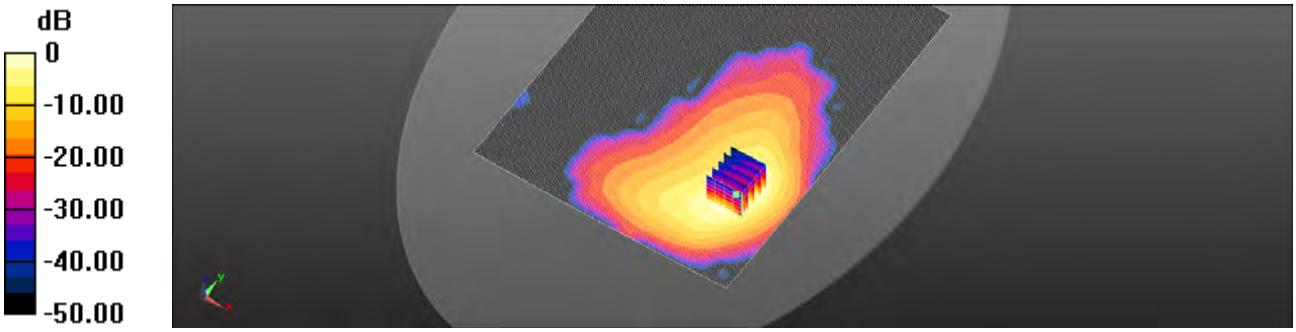
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.890 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 2.365 mW/g

SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.589 mW/g

Maximum value of SAR (measured) = 1.68 mW/g



0 dB = 1.60 mW/g = 4.06 dB mW/g

Date: 2012/9/6

Lap-held_CH251_0mm

Communication System: GPRS (Class 10); Frequency: 848.8 MHz

Medium parameters used: f = 849 MHz; σ = 1.021 mho/m; ε_r = 54.488; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.58 mW/g

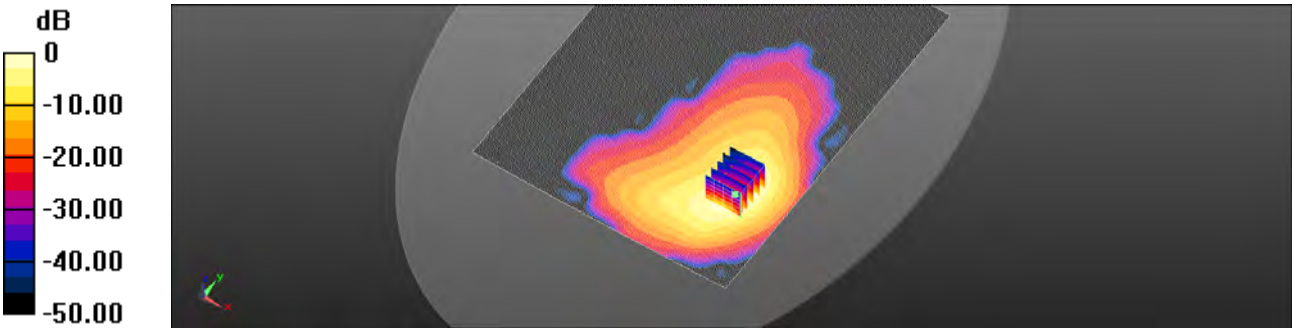
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.208 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 2.322 mW/g

SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.570 mW/g

Maximum value of SAR (measured) = 1.67 mW/g



0 dB = 1.58 mW/g = 4.00 dB mW/g

Date: 2012/9/6

Secondary Landscape_CH190_0mm

Communication System: GPRS (Class 10); Frequency: 836.6 MHz

Medium parameters used: f = 837 MHz; σ = 1.008 mho/m; ε_r = 54.63; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.652 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

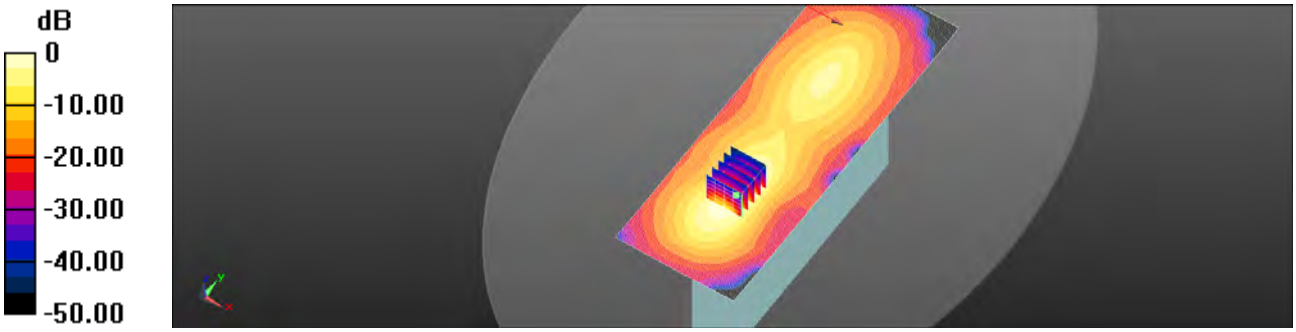
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.530 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.030 mW/g

SAR(1 g) = 0.533 mW/g; SAR(10 g) = 0.282 mW/g

Maximum value of SAR (measured) = 0.808 mW/g



0 dB = 0.652 mW/g = -3.71 dB mW/g

Date: 2012/9/7

Primary Portrait_CH661_0mm

Communication System: GPRS (Class 10); Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz; σ = 1.465 mho/m; ε_r = 52.553; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x181x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0818 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

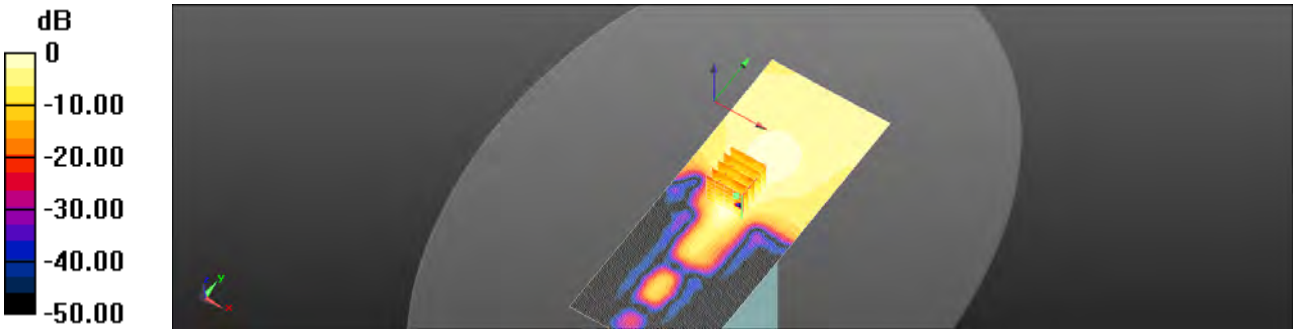
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.561 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.106 mW/g

SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.027 mW/g

Maximum value of SAR (measured) = 0.0824 mW/g



0 dB = 0.0818 mW/g = -21.74 dB mW/g

Date: 2012/9/7

Lap-held_CH661_10.5mm

Communication System: GPRS (Class 10); Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz; σ = 1.465 mho/m; ε_r = 52.553; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.836 mW/g

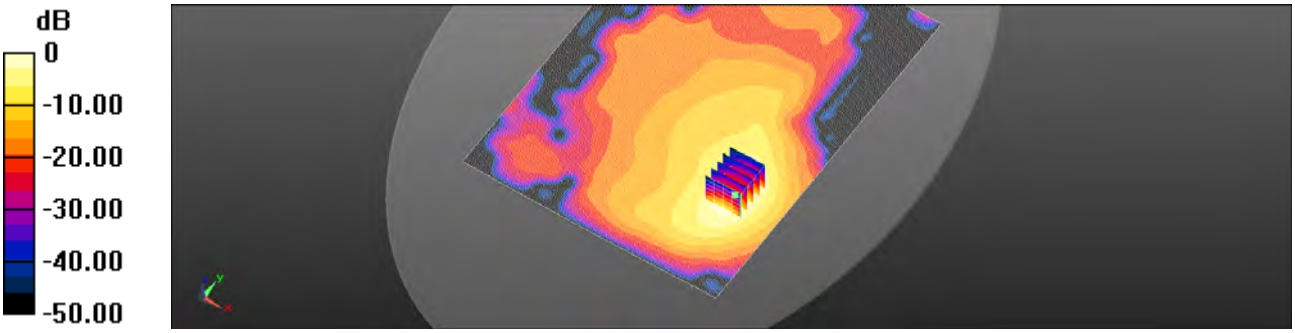
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.387 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.078 mW/g

SAR(1 g) = 0.635 mW/g; SAR(10 g) = 0.349 mW/g

Maximum value of SAR (measured) = 0.865 mW/g



0 dB = 0.836 mW/g = -1.56 dB mW/g

Date: 2012/9/7

Secondary Landscape_CH661_11mm

Communication System: GPRS (Class 10); Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz; σ = 1.465 mho/m; ε_r = 52.553; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.699 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

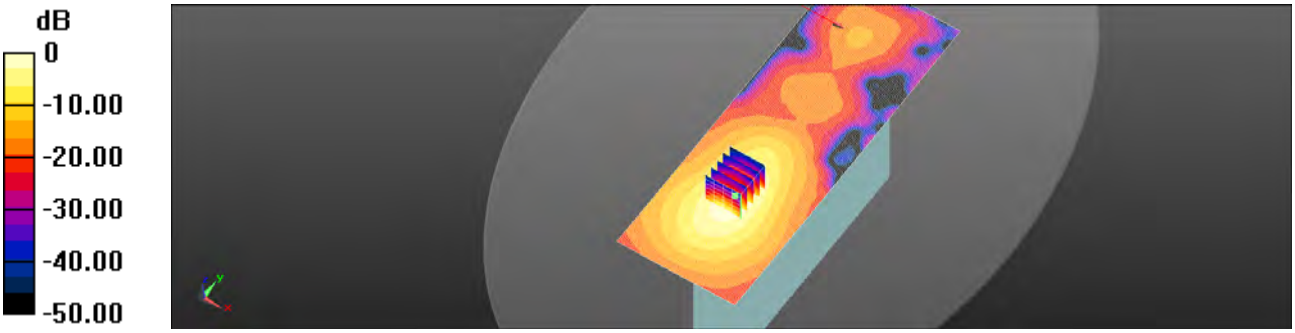
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.733 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.840 mW/g

SAR(1 g) = 0.514 mW/g; SAR(10 g) = 0.296 mW/g

Maximum value of SAR (measured) = 0.683 mW/g



0 dB = 0.699 mW/g = -3.12 dB mW/g

Date: 2012/9/7

Lap-held_CH512_0mm

Communication System: GPRS (Class 10); Frequency: 1850.2 MHz

Medium parameters used: f = 1850.2 MHz; σ = 1.436 mho/m; ε_r = 52.675; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.784 mW/g

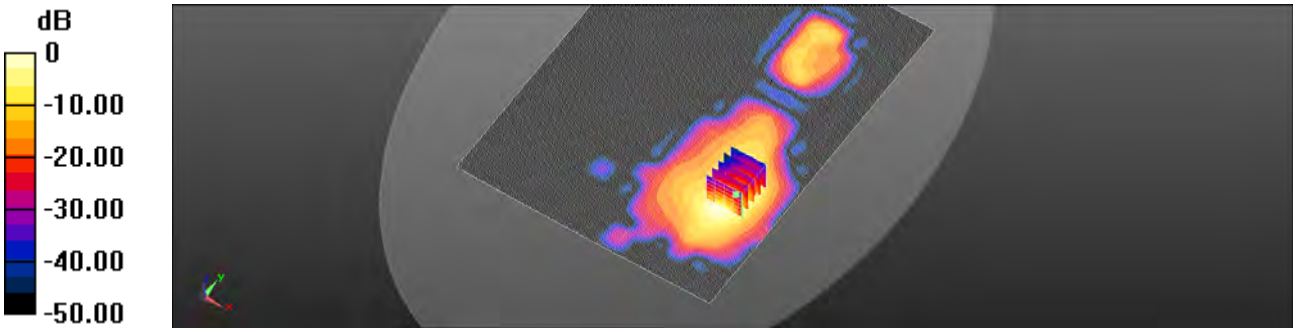
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.958 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 1.375 mW/g

SAR(1 g) = 0.672 mW/g; SAR(10 g) = 0.302 mW/g

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



0 dB = 0.784 mW/g = -2.12 dB mW/g

Date: 2012/9/7

Lap-held_CH661_0mm

Communication System: GPRS (Class 10); Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz; σ = 1.465 mho/m; ε_r = 52.553; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.929 mW/g

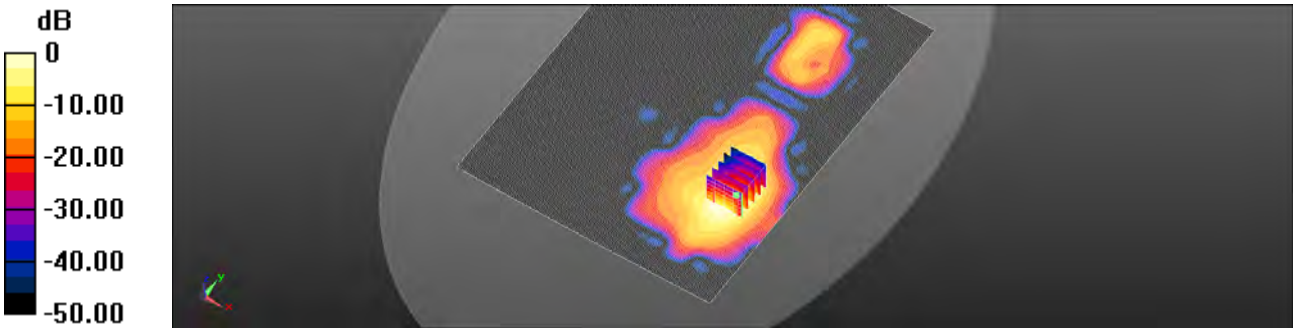
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.854 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.655 mW/g

SAR(1 g) = 0.803 mW/g; SAR(10 g) = 0.361 mW/g

Maximum value of SAR (measured) = 1.28 mW/g



0 dB = 0.929 mW/g = -0.64 dB mW/g

Date: 2012/9/7

Lap-held_CH810_0mm

Communication System: GPRS (Class 10); Frequency: 1909.8 MHz

Medium parameters used: f = 1909.93 MHz; σ = 1.501 mho/m; ε_r = 52.41; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.04 mW/g

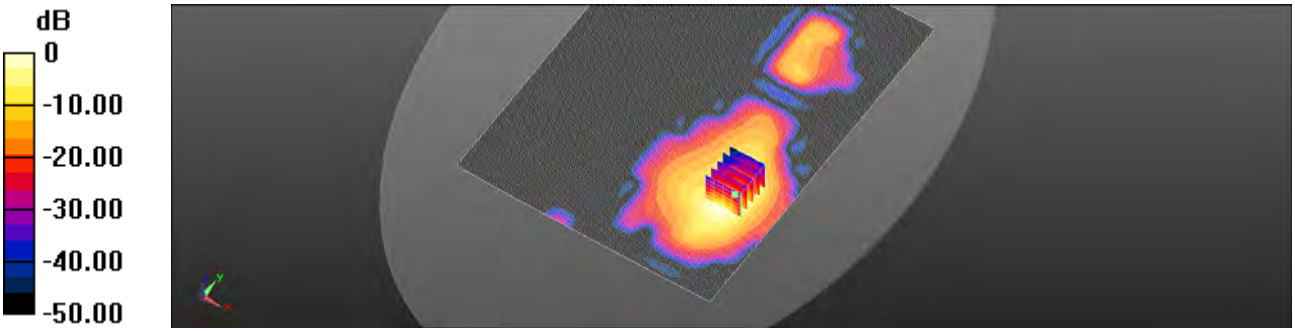
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.518 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 1.890 mW/g

SAR(1 g) = 0.910 mW/g; SAR(10 g) = 0.412 mW/g

Maximum value of SAR (measured) = 1.48 mW/g



0 dB = 1.04 mW/g = 0.37 dB mW/g

Date: 2012/9/7

Secondary Landscape_CH661_0mm

Communication System: GPRS (Class 10); Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz; σ = 1.465 mho/m; ε_r = 52.553; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.831 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

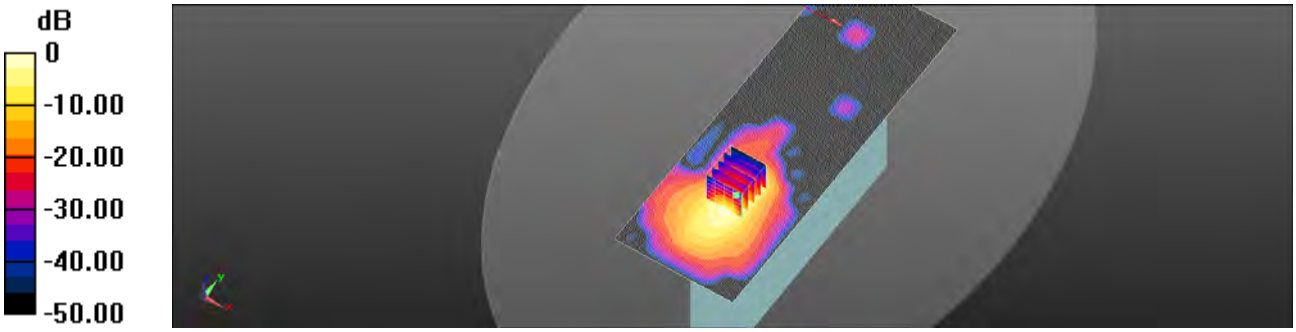
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.272 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.023 mW/g

SAR(1 g) = 0.542 mW/g; SAR(10 g) = 0.271 mW/g

Maximum value of SAR (measured) = 0.780 mW/g



0 dB = 0.831 mW/g = -1.61 dB mW/g

Date: 2012/9/7

Primary Portrait_CH9400_0mm

Communication System: WCDMA; Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz; σ = 1.465 mho/m; ε_r = 52.553; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x181x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.138 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

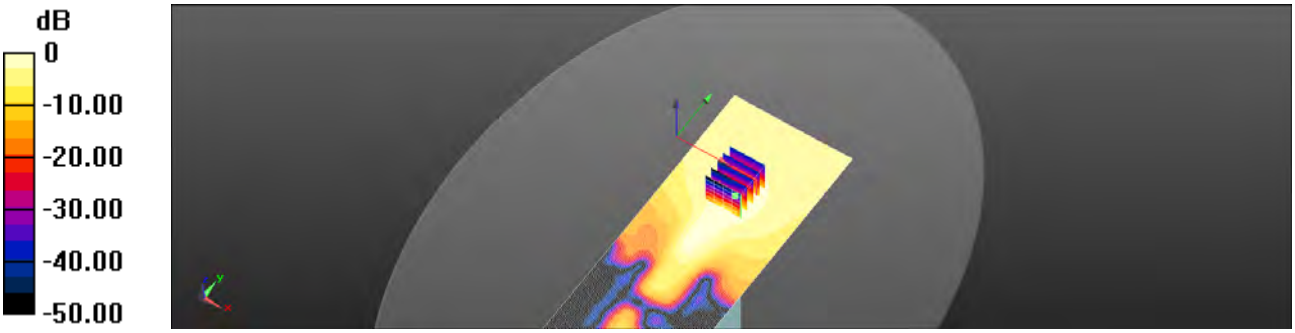
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.158 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.259 mW/g

SAR(1 g) = 0.119 mW/g; SAR(10 g) = 0.063 mW/g

Maximum value of SAR (measured) = 0.200 mW/g



0 dB = 0.138 mW/g = -17.18 dB mW/g

Date: 2012/9/7

Lap-held_CH9262_10.5mm

Communication System: WCDMA; Frequency: 1852.4 MHz

Medium parameters used: f = 1852.4 MHz; σ = 1.439 mho/m; ε_r = 52.669; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

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

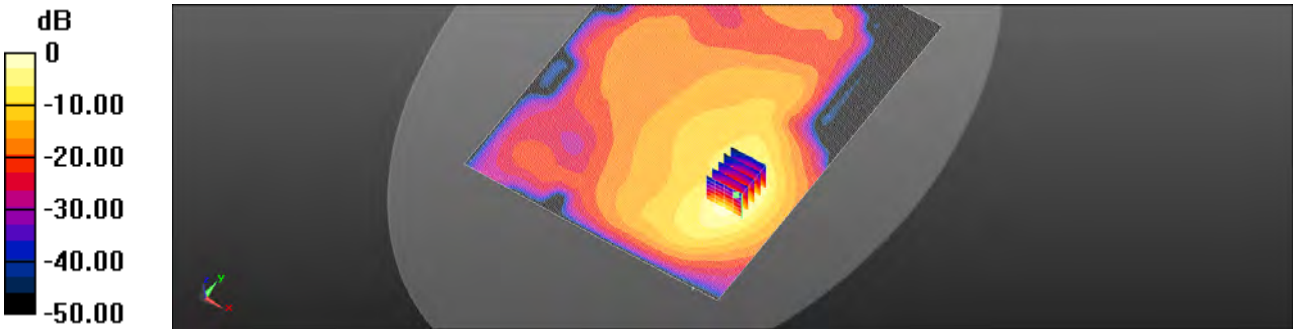
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.320 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.705 mW/g

SAR(1 g) = 0.995 mW/g; SAR(10 g) = 0.541 mW/g

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



0 dB = 1.37 mW/g = 2.74 dB mW/g

Date: 2012/9/7

Lap-held_CH9400_10.5mm

Communication System: WCDMA; Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz; σ = 1.465 mho/m; ε_r = 52.553; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.46 mW/g

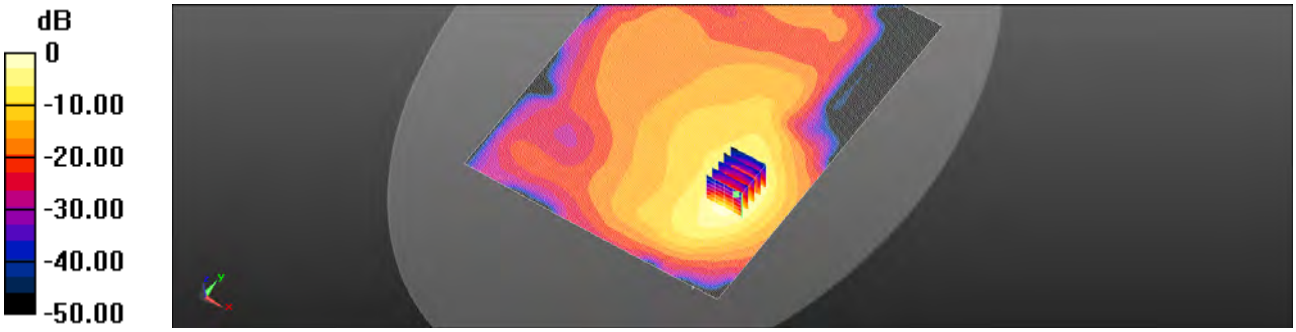
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.625 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.882 mW/g

SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.596 mW/g

Maximum value of SAR (measured) = 1.51 mW/g



0 dB = 1.46 mW/g = 3.26 dB mW/g

Date: 2012/9/7

Lap-held_CH9538_10.5mm

Communication System: WCDMA; Frequency: 1907.6 MHz

Medium parameters used: f = 1907.9 MHz; σ = 1.498 mho/m; ε_r = 52.417; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.88 mW/g

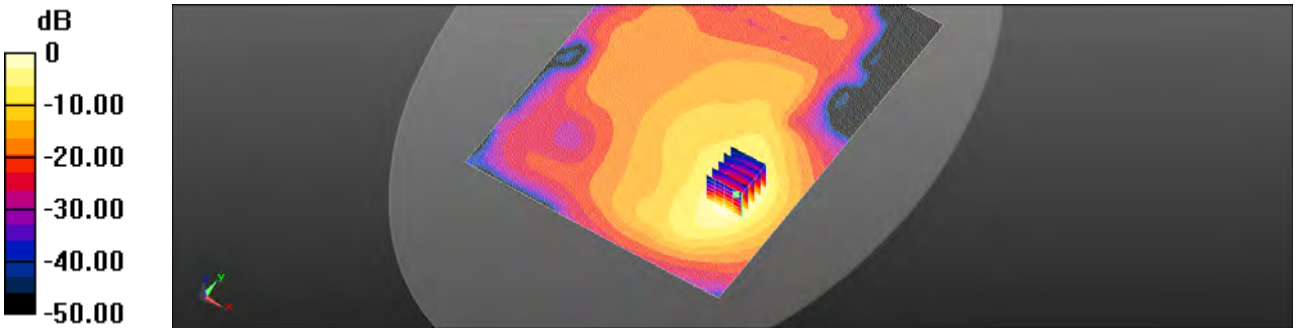
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.478 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 2.345 mW/g

SAR(1 g) = 1.38 mW/g; SAR(10 g) = 0.755 mW/g

Maximum value of SAR (measured) = 1.90 mW/g



0 dB = 1.88 mW/g = 5.46 dB mW/g

Date: 2012/9/7

Secondary Landscape_CH9262_11mm

Communication System: WCDMA; Frequency: 1852.4 MHz

Medium parameters used: f = 1852.4 MHz; σ = 1.439 mho/m; ε_r = 52.669; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm.

Maximum value of SAR (interpolated) = 1.12 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

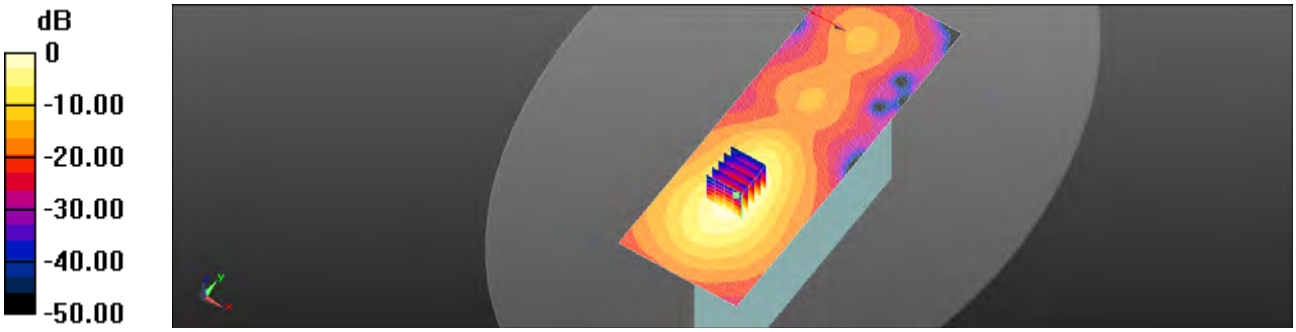
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.674 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.341 mW/g

SAR(1 g) = 0.822 mW/g; SAR(10 g) = 0.472 mW/g

Maximum value of SAR (measured) = 1.09 mW/g



0 dB = 1.12 mW/g = 0.99 dB mW/g

Date: 2012/9/7

Secondary Landscape_CH9400_11mm

Communication System: WCDMA; Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz; σ = 1.465 mho/m; ε_r = 52.553; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.12 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

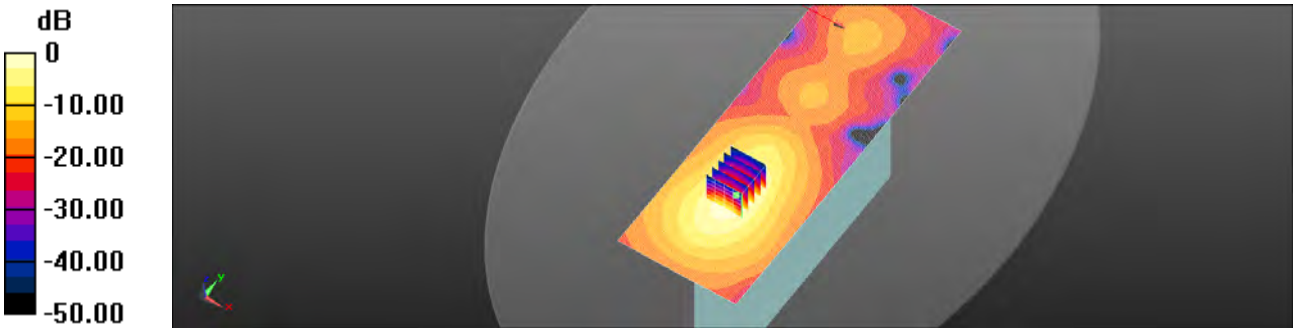
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.960 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.343 mW/g

SAR(1 g) = 0.821 mW/g; SAR(10 g) = 0.471 mW/g

Maximum value of SAR (measured) = 1.10 mW/g



0 dB = 1.12 mW/g = 0.96 dB mW/g

Date: 2012/9/7

Secondary Landscape_CH9538_11mm

Communication System: WCDMA; Frequency: 1907.6 MHz

Medium parameters used: f = 1907.9 MHz; σ = 1.498 mho/m; ε_r = 52.417; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.55 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

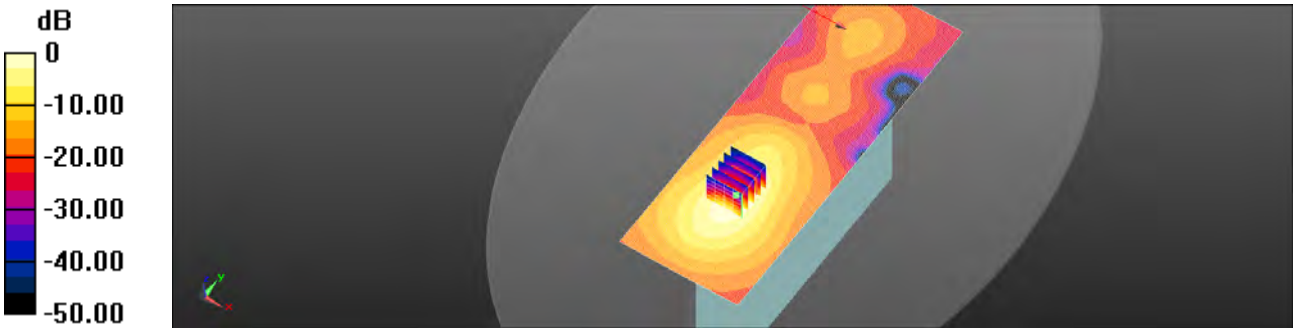
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.980 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.879 mW/g

SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.650 mW/g

Maximum value of SAR (measured) = 1.51 mW/g



0 dB = 1.55 mW/g = 3.80 dB mW/g

Date: 2012/9/7

Lap-held_CH9262_0mm

Communication System: WCDMA; Frequency: 1852.4 MHz

Medium parameters used: f = 1852.4 MHz; σ = 1.439 mho/m; ε_r = 52.669; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.27 mW/g

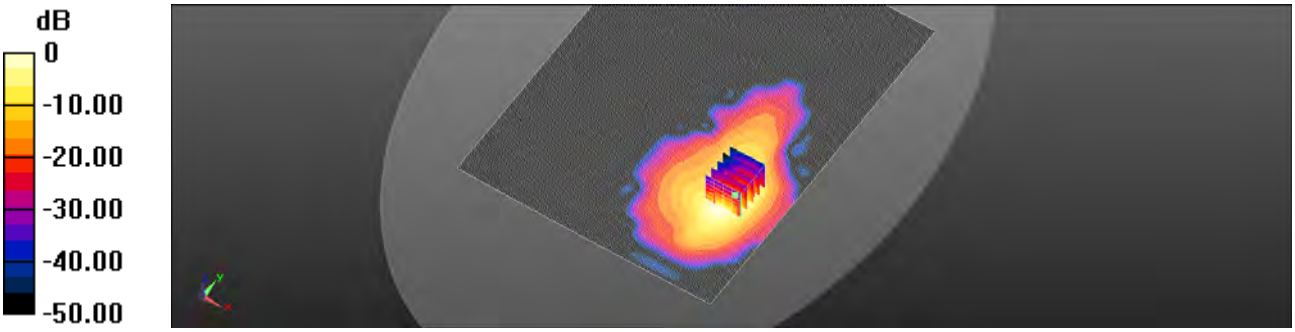
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.884 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 2.196 mW/g

SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.477 mW/g

Maximum value of SAR (measured) = 1.62 mW/g



0 dB = 1.27 mW/g = 2.10 dB mW/g

Date: 2012/9/7

Lap-held_CH9400_0mm

Communication System: WCDMA; Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz; σ = 1.465 mho/m; ε_r = 52.553; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm.

Maximum value of SAR (interpolated) = 1.02 mW/g

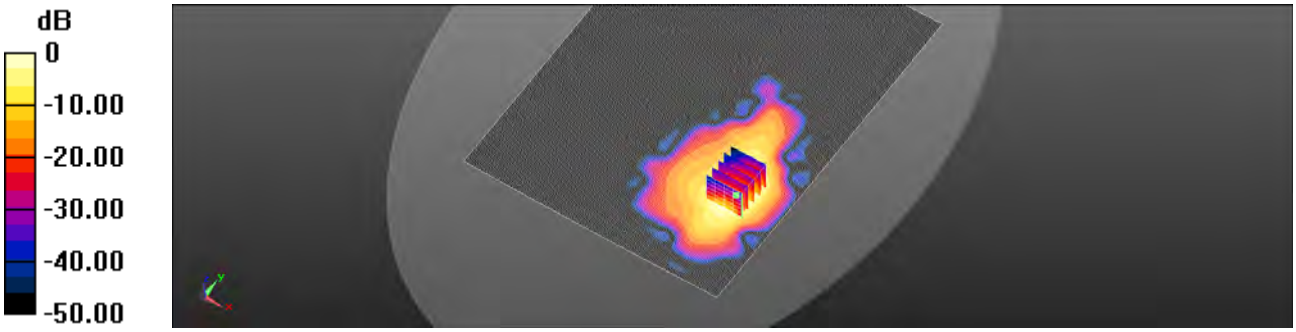
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.769 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.764 mW/g

SAR(1 g) = 0.874 mW/g; SAR(10 g) = 0.392 mW/g

Maximum value of SAR (measured) = 1.32 mW/g



0 dB = 1.02 mW/g = 0.19 dB mW/g

Date: 2012/9/7

Lap-held_CH9538_0mm

Communication System: WCDMA; Frequency: 1907.6 MHz

Medium parameters used: f = 1907.9 MHz; σ = 1.498 mho/m; ε_r = 52.417; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.26 mW/g

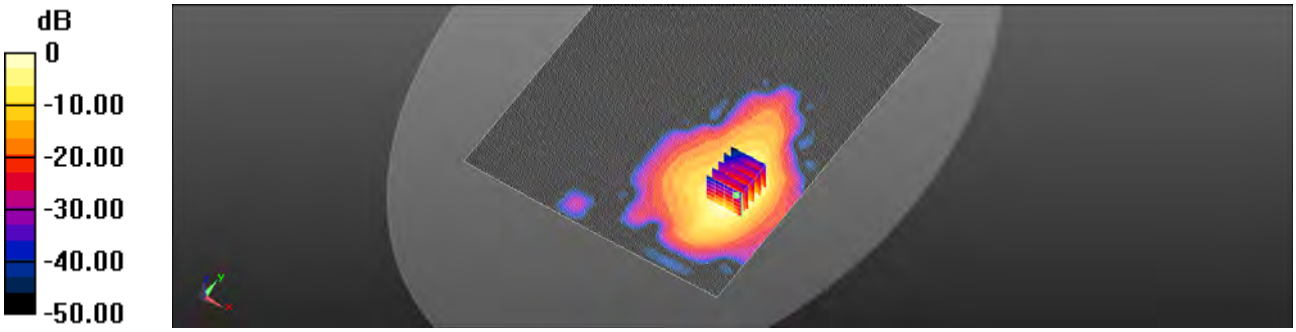
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.816 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 2.142 mW/g

SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.475 mW/g

Maximum value of SAR (measured) = 1.60 mW/g



0 dB = 1.26 mW/g = 2.04 dB mW/g

Date: 2012/9/7

Secondary Landscape_CH9400_0mm

Communication System: WCDMA; Frequency: 1880 MHz

Medium parameters used: f = 1880 MHz; σ = 1.465 mho/m; ε_r = 52.553; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.816 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

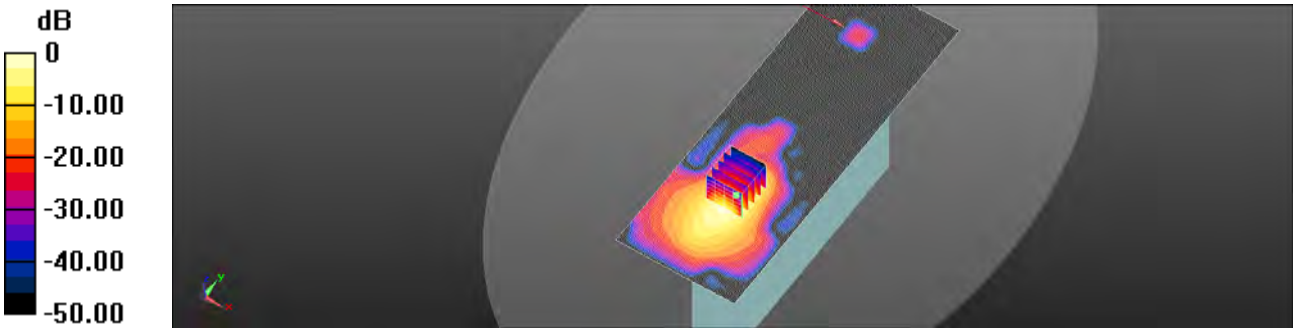
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.058 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.988 mW/g

SAR(1 g) = 0.525 mW/g; SAR(10 g) = 0.261 mW/g

Maximum value of SAR (measured) = 0.776 mW/g



0 dB = 0.816 mW/g = -1.77 dB mW/g

Date: 2012/9/6

Primary Portrait_CH4183_0mm

Communication System: WCDMA; Frequency: 836.6 MHz

Medium parameters used: f = 837 MHz; σ = 1.008 mho/m; ε_r = 54.63; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.289 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

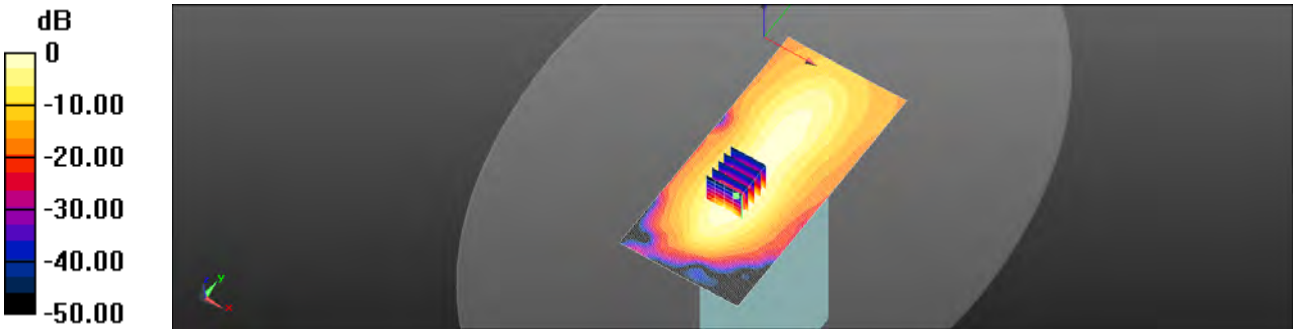
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.909 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.386 mW/g

SAR(1 g) = 0.228 mW/g; SAR(10 g) = 0.136 mW/g

Maximum value of SAR (measured) = 0.302 mW/g



0 dB = 0.289 mW/g = -10.78 dB mW/g

Lap-held_CH4183_10.5mm

Communication System: WCDMA; Frequency: 836.6 MHz

Medium parameters used: f = 837 MHz; σ = 1.008 mho/m; ε_r = 54.63; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.934 mW/g

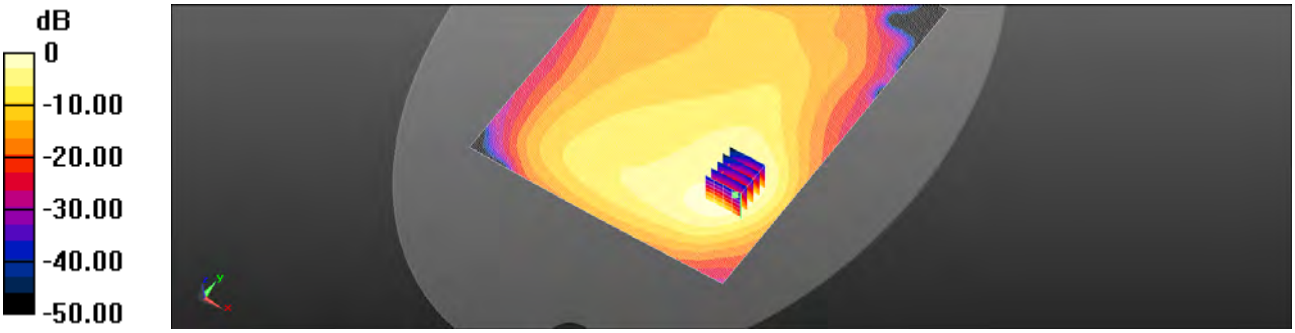
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.366 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.207 mW/g

SAR(1 g) = 0.727 mW/g; SAR(10 g) = 0.434 mW/g

Maximum value of SAR (measured) = 0.980 mW/g



0 dB = 0.934 mW/g = -0.59 dB mW/g

Date: 2012/9/6

Secondary Landscape_CH4183_11mm

Communication System: WCDMA; Frequency: 836.6 MHz

Medium parameters used: f = 837 MHz; σ = 1.008 mho/m; ε_r = 54.63; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.347 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

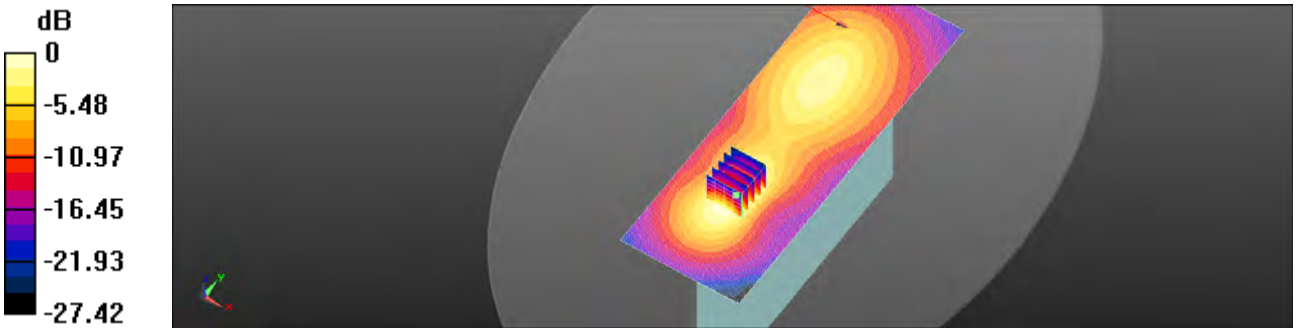
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.563 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.420 mW/g

SAR(1 g) = 0.271 mW/g; SAR(10 g) = 0.166 mW/g

Maximum value of SAR (measured) = 0.352 mW/g



0 dB = 0.347 mW/g = -9.19 dB mW/g

Lap-held_CH4132_0mm

Communication System: WCDMA; Frequency: 826.4 MHz

Medium parameters used: f = 826.4 MHz; σ = 0.997 mho/m; ε_r = 54.728; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.67 mW/g

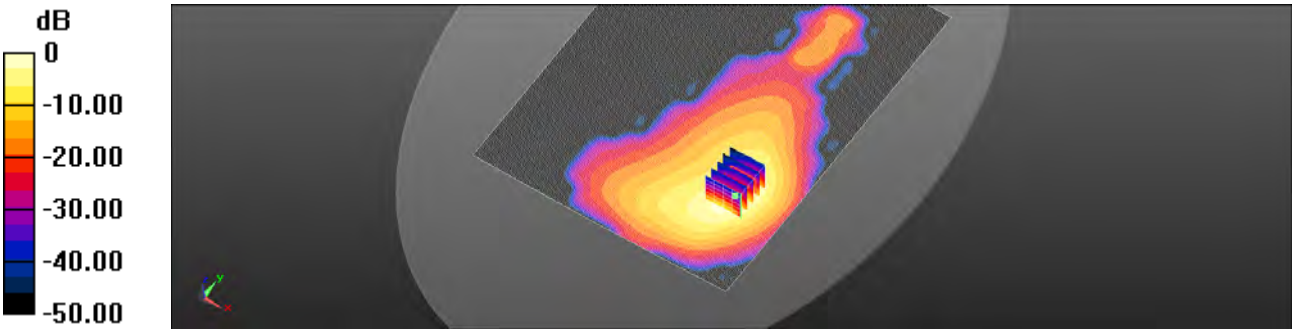
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.838 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 2.303 mW/g

SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.559 mW/g

Maximum value of SAR (measured) = 1.67 mW/g



0 dB = 1.67 mW/g = 4.47 dB mW/g

Date: 2012/9/6

Lap-held_CH4183_0mm

Communication System: WCDMA; Frequency: 836.6 MHz

Medium parameters used: f = 837 MHz; σ = 1.008 mho/m; ε_r = 54.63; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.11 mW/g

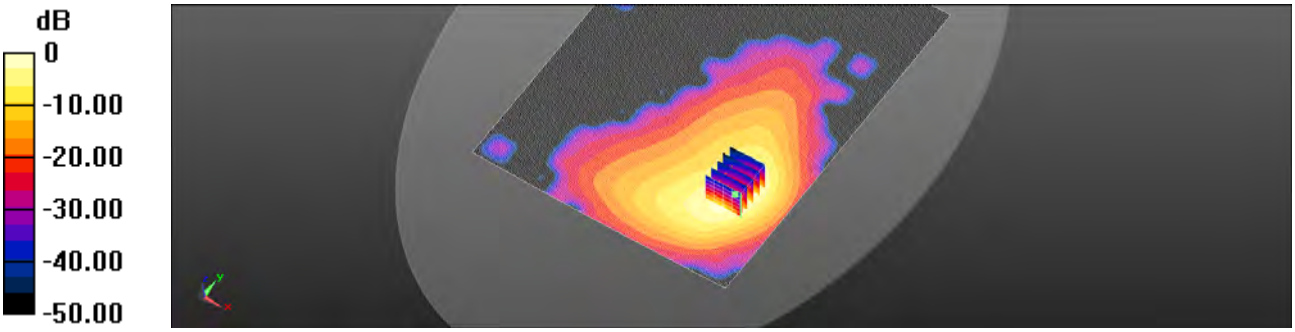
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.204 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.625 mW/g

SAR(1 g) = 0.785 mW/g; SAR(10 g) = 0.401 mW/g

Maximum value of SAR (measured) = 1.18 mW/g



0 dB = 1.11 mW/g = 0.93 dB mW/g

Lap-held_CH4233_0mm

Communication System: WCDMA; Frequency: 846.6 MHz

Medium parameters used: f = 847 MHz; σ = 1.018 mho/m; ε_r = 54.514; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.50 mW/g

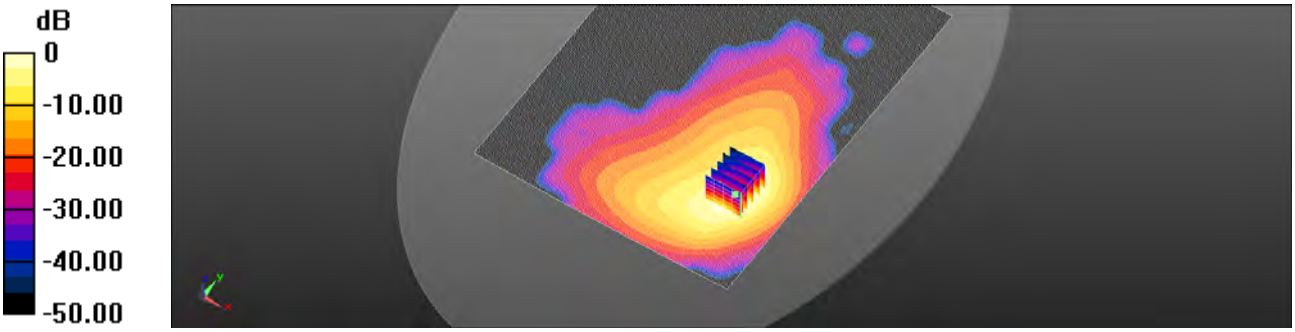
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.345 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 2.156 mW/g

SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.537 mW/g

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



0 dB = 1.50 mW/g = 3.53 dB mW/g

Date: 2012/9/6

Secondary Landscape_CH4183_0mm

Communication System: WCDMA; Frequency: 836.6 MHz

Medium parameters used: f = 837 MHz; σ = 1.008 mho/m; ε_r = 54.63; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.585 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

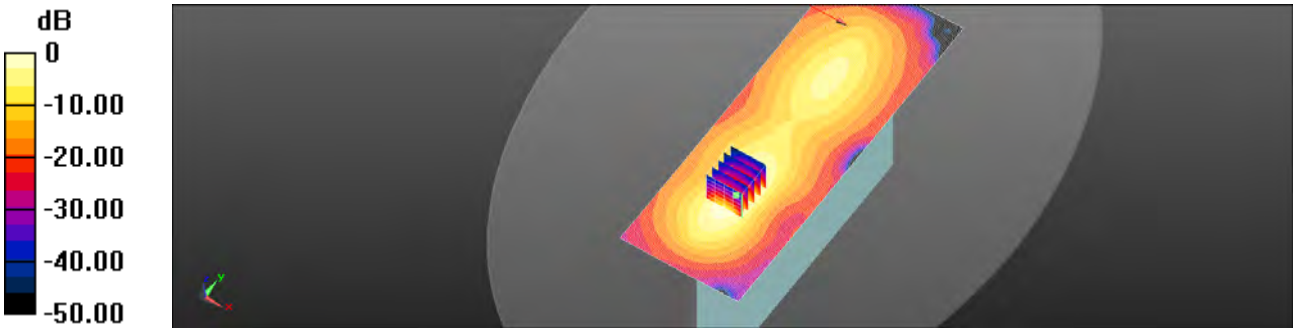
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.744 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.871 mW/g

SAR(1 g) = 0.469 mW/g; SAR(10 g) = 0.251 mW/g

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



0 dB = 0.585 mW/g = -4.66 dB mW/g

Date: 2012/9/8

Primary Portrait_CH20175_0mm_Test Case 1

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used: f = 1732.5 MHz; σ = 1.435 mho/m; ε_r = 53.908; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x181x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0475 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

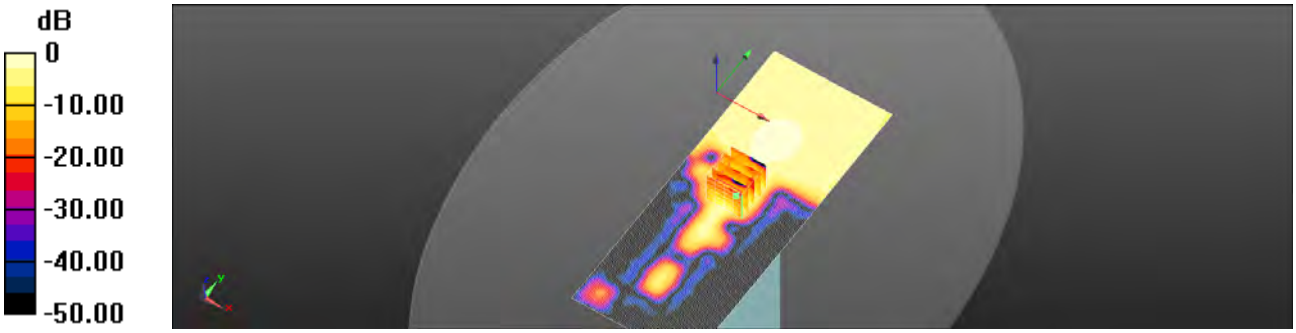
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.927 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.074 mW/g

SAR(1 g) = 0.034 mW/g; SAR(10 g) = 0.016 mW/g

Maximum value of SAR (measured) = 0.0615 mW/g



0 dB = 0.0475 mW/g = -26.46 dB mW/g

Primary Portrait_CH20350_0mm_Test Case 3

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x181x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0698 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

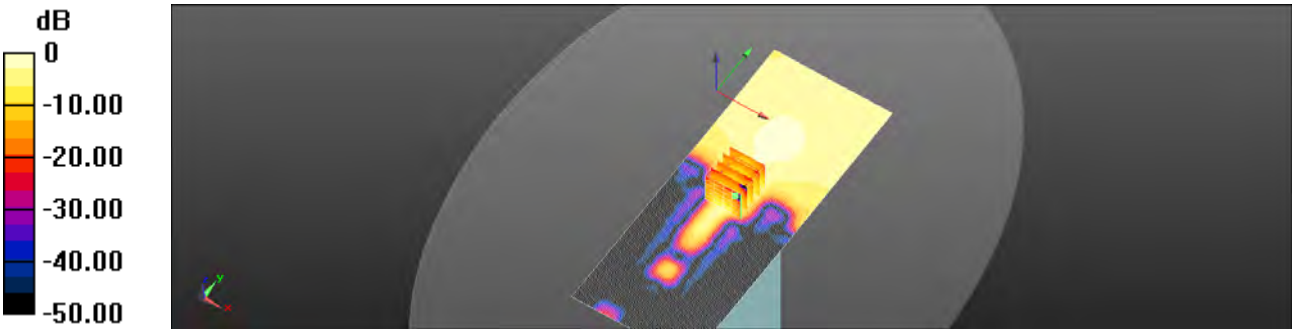
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.968 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.106 mW/g

SAR(1 g) = 0.046 mW/g; SAR(10 g) = 0.021 mW/g

Maximum value of SAR (measured) = 0.0830 mW/g



0 dB = 0.0698 mW/g = -23.13 dB mW/g

Date: 2012/9/8

Primary Portrait_CH20350_0mm_Test Case 4

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x181x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0461 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

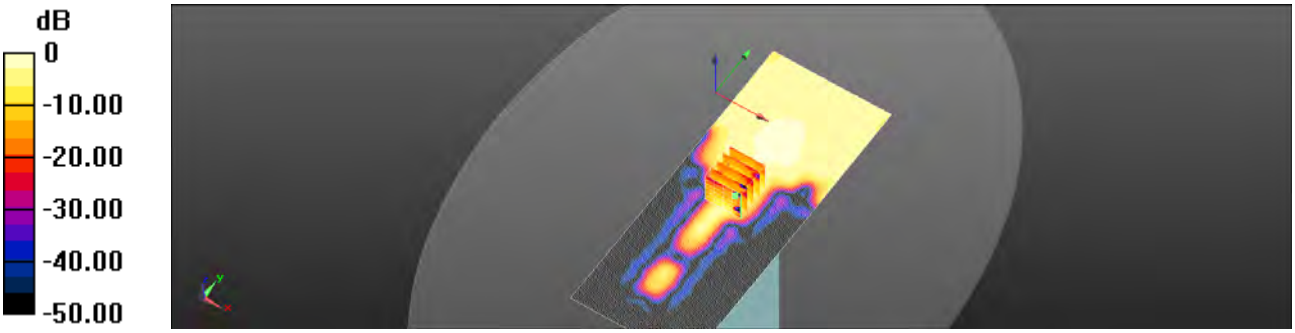
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.148 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.072 mW/g

SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.014 mW/g

Maximum value of SAR (measured) = 0.0558 mW/g



0 dB = 0.0461 mW/g = -26.73 dB mW/g

Date: 2012/9/9

Primary Portrait_CH20350_0mm_Test Case 7

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x181x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0548 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

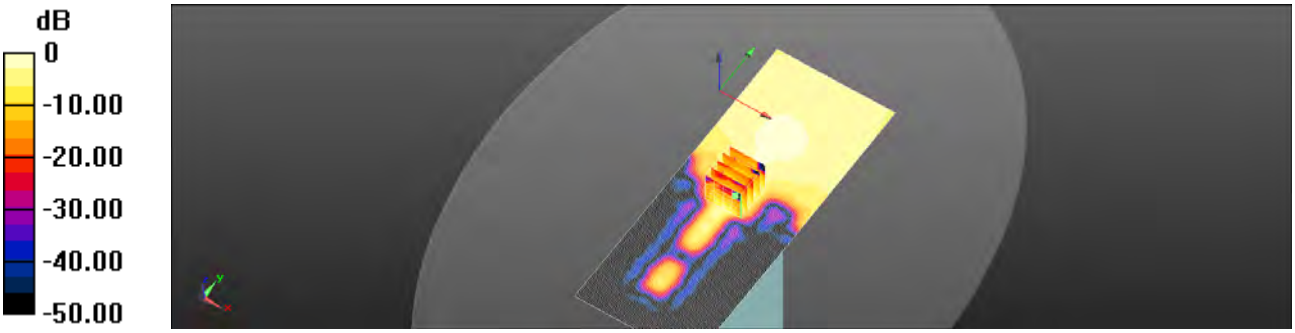
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.523 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.073 mW/g

SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.016 mW/g

Maximum value of SAR (measured) = 0.0577 mW/g



0 dB = 0.0548 mW/g = -25.23 dB mW/g

Date: 2012/9/9

Primary Portrait_CH20350_0mm_Test Case 8

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x181x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0577 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

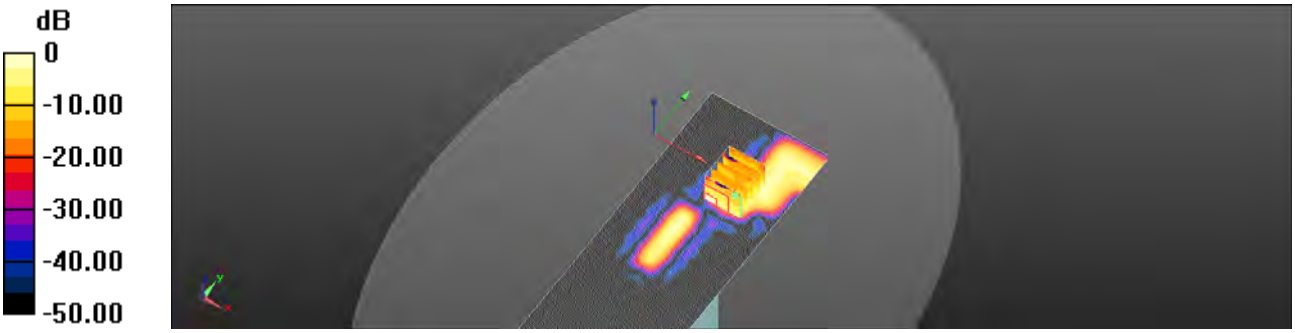
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.695 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.044 mW/g

SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00742 mW/g

Maximum value of SAR (measured) = 0.0296 mW/g



0 dB = 0.0577 mW/g = -24.78 dB mW/g

Date: 2012/9/9

Primary Portrait_CH20350_0mm_Test Case 5

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x181x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0589 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

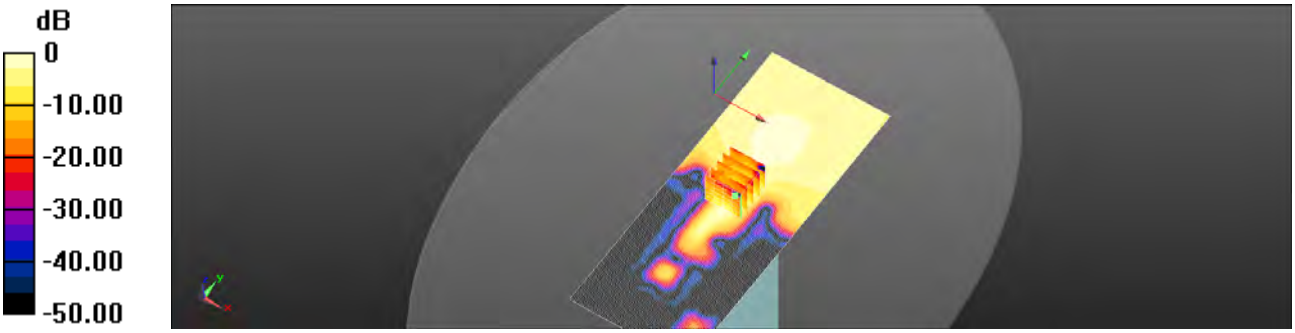
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.817 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.102 mW/g

SAR(1 g) = 0.042 mW/g; SAR(10 g) = 0.018 mW/g

Maximum value of SAR (measured) = 0.0777 mW/g



0 dB = 0.0589 mW/g = -24.59 dB mW/g

Date: 2012/9/8

Lap-held_CH20175_10.5mm_Test Case 1

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used: f = 1732.5 MHz; σ = 1.435 mho/m; ε_r = 53.908; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.540 mW/g

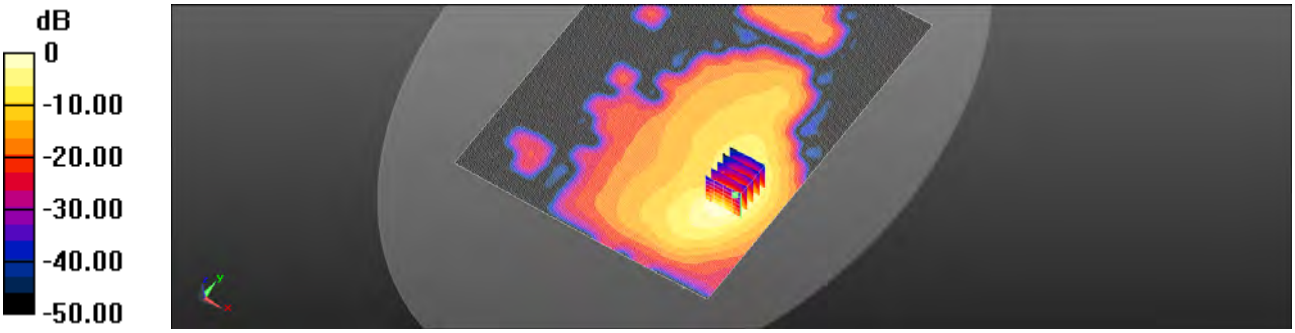
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.571 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.746 mW/g

SAR(1 g) = 0.435 mW/g; SAR(10 g) = 0.232 mW/g

Maximum value of SAR (measured) = 0.599 mW/g



0 dB = 0.540 mW/g = -5.34 dB mW/g

Date: 2012/9/8

Lap-held_CH20350_10.5mm_Test Case 3

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.746 mW/g

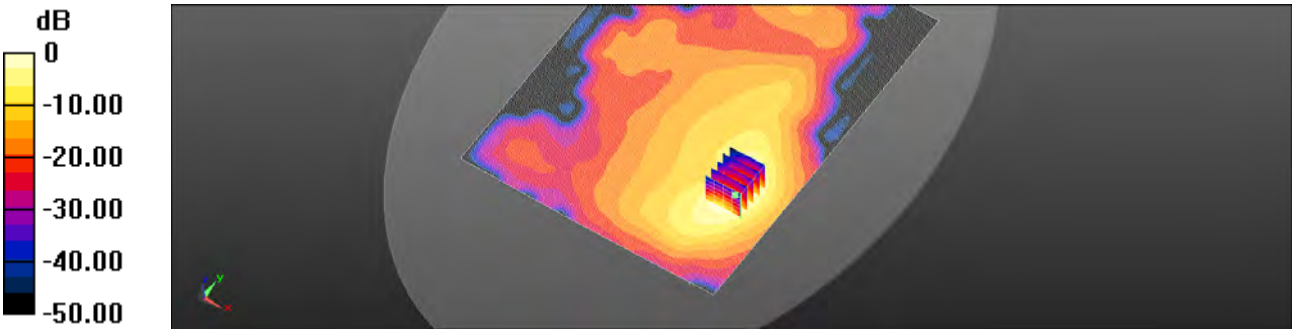
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.652 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.006 mW/g

SAR(1 g) = 0.584 mW/g; SAR(10 g) = 0.312 mW/g

Maximum value of SAR (measured) = 0.809 mW/g



0 dB = 0.746 mW/g = -2.54 dB mW/g

Date: 2012/9/8

Lap-held_CH20350_10.5mm_Test Case 4

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.697 mW/g

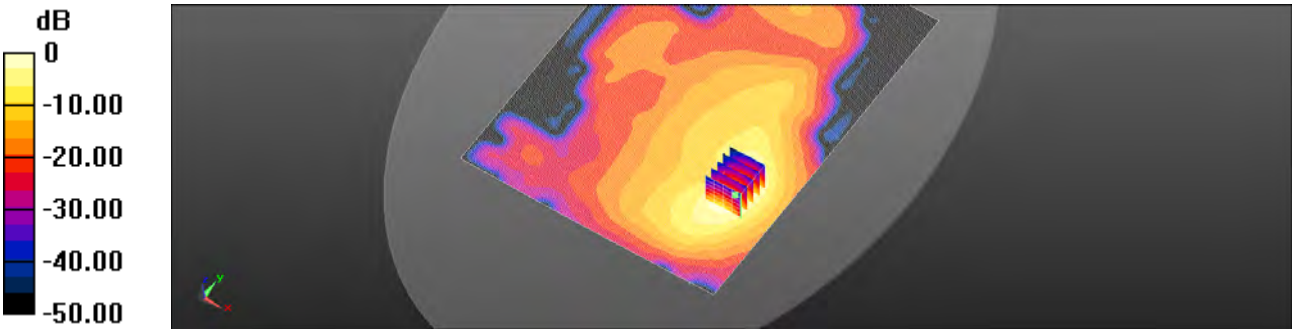
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.225 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.938 mW/g

SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.291 mW/g

Maximum value of SAR (measured) = 0.757 mW/g



0 dB = 0.697 mW/g = -3.14 dB mW/g

Date: 2012/9/9

Lap-held_CH20175_10.5mm_Test Case 7

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used: f = 1732.5 MHz; σ = 1.431 mho/m; εr = 54.045; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.575 mW/g

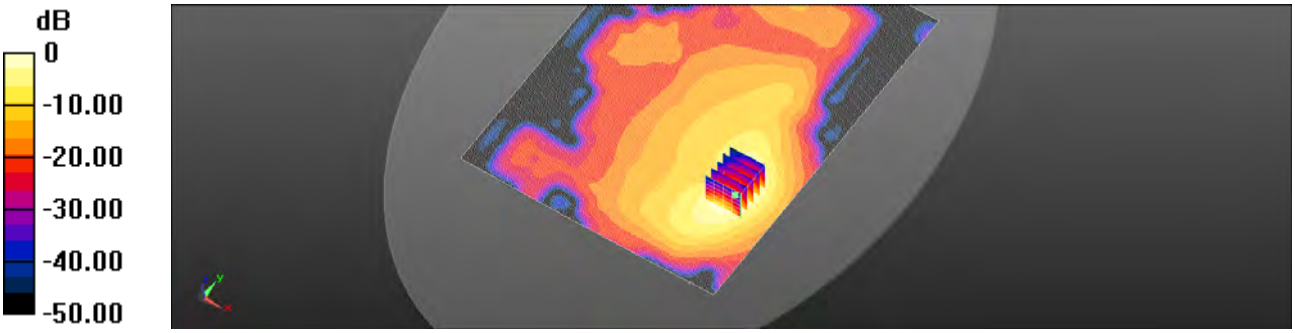
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.985 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.816 mW/g

SAR(1 g) = 0.475 mW/g; SAR(10 g) = 0.254 mW/g

Maximum value of SAR (measured) = 0.657 mW/g



0 dB = 0.575 mW/g = -4.80 dB mW/g

Date: 2012/9/9

Lap-held_CH20350_10.5mm_Test Case 8

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.568 mW/g

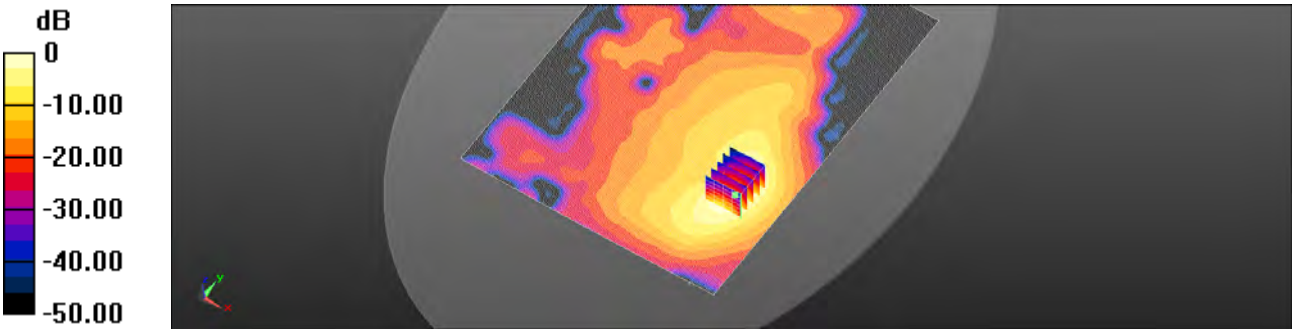
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.812 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.800 mW/g

SAR(1 g) = 0.463 mW/g; SAR(10 g) = 0.249 mW/g

Maximum value of SAR (measured) = 0.629 mW/g



0 dB = 0.568 mW/g = -4.92 dB mW/g

Date: 2012/9/9

Lap-held_CH20350_10.5mm_Test Case 5

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.645 mW/g

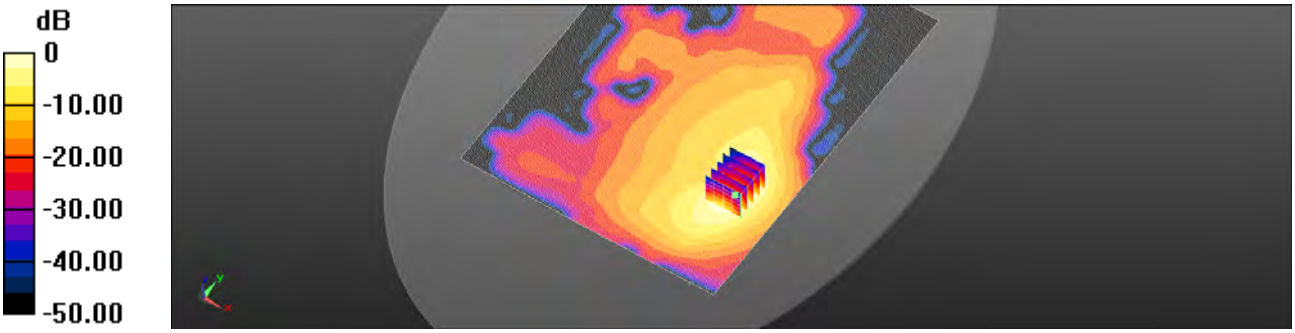
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.061 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.873 mW/g

SAR(1 g) = 0.505 mW/g; SAR(10 g) = 0.269 mW/g

Maximum value of SAR (measured) = 0.698 mW/g



0 dB = 0.645 mW/g = -3.81 dB mW/g

Date: 2012/9/8

Secondary Landscape_CH20175_11mm_Test Case 1

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used: f = 1732.5 MHz; σ = 1.435 mho/m; ε_r = 53.908; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.417 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

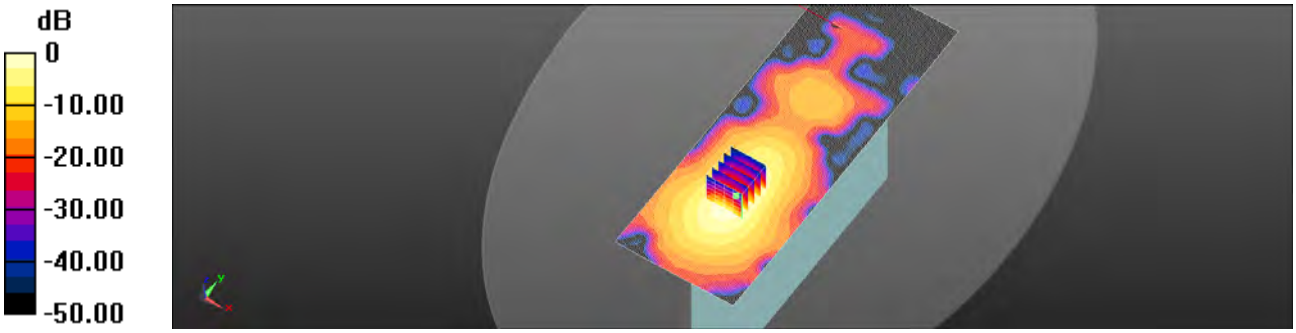
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.153 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.498 mW/g

SAR(1 g) = 0.300 mW/g; SAR(10 g) = 0.170 mW/g

Maximum value of SAR (measured) = 0.405 mW/g



0 dB = 0.417 mW/g = -7.60 dB mW/g

Date: 2012/9/8

Secondary Landscape_CH20350_11mm_Test Case 3

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.644 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

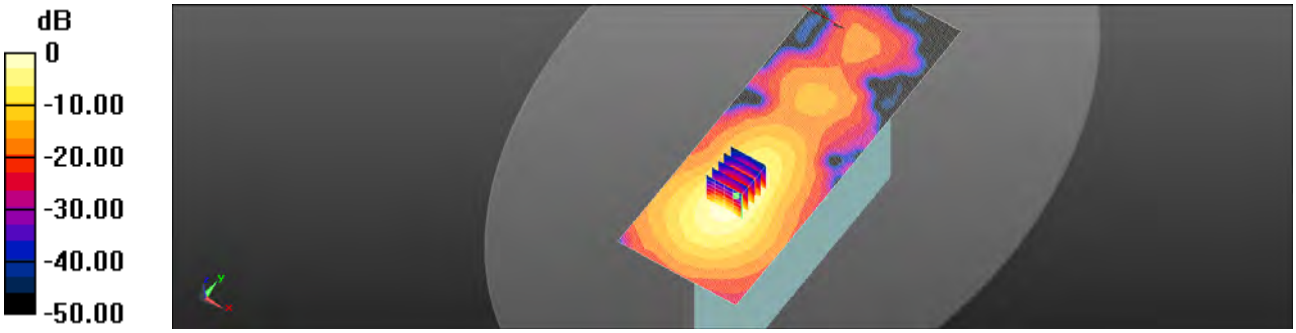
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.135 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.769 mW/g

SAR(1 g) = 0.467 mW/g; SAR(10 g) = 0.266 mW/g

Maximum value of SAR (measured) = 0.630 mW/g



0 dB = 0.644 mW/g = -3.83 dB mW/g

Date: 2012/9/8

Secondary Landscape_CH20350_11mm_Test Case 4

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.585 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

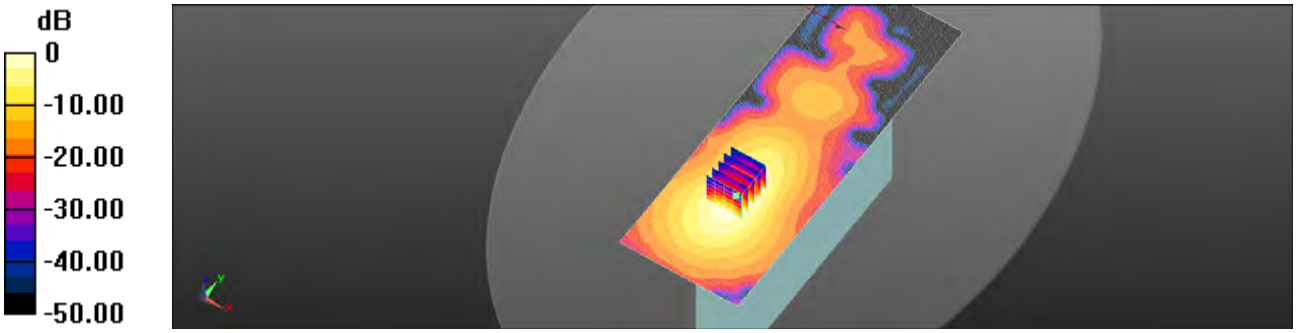
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.731 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.731 mW/g

SAR(1 g) = 0.436 mW/g; SAR(10 g) = 0.247 mW/g

Maximum value of SAR (measured) = 0.586 mW/g



0 dB = 0.585 mW/g = -4.66 dB mW/g

Date: 2012/9/9

Secondary Landscape_CH20350_11mm_Test Case 7

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.235 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

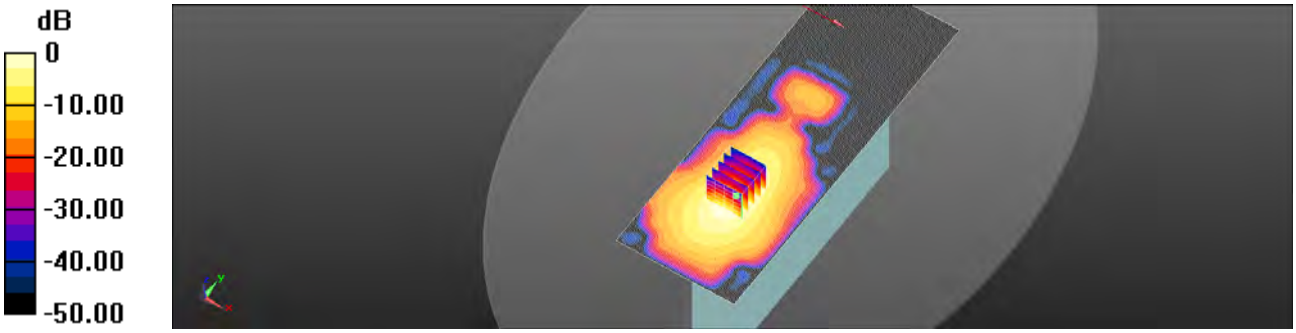
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.167 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.281 mW/g

SAR(1 g) = 0.168 mW/g; SAR(10 g) = 0.094 mW/g

Maximum value of SAR (measured) = 0.227 mW/g



0 dB = 0.235 mW/g = -12.59 dB mW/g

Date: 2012/9/9

Secondary Landscape_CH20350_11mm_Test Case 8

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.264 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

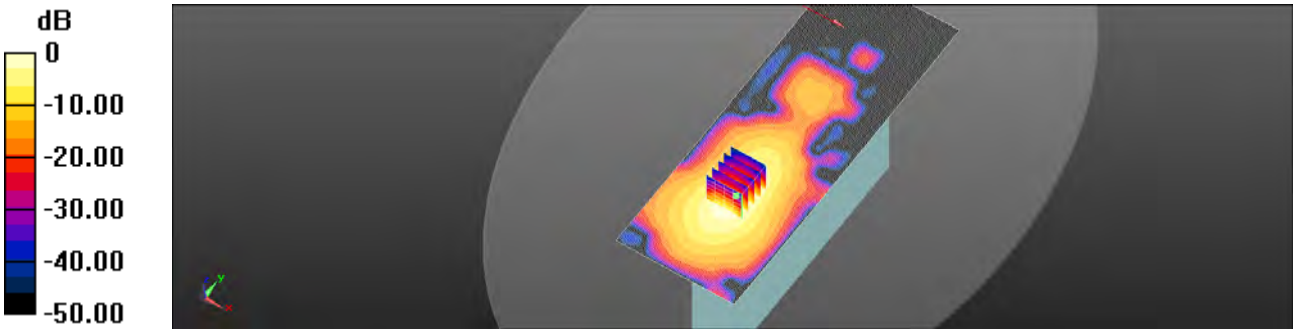
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.404 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.312 mW/g

SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.106 mW/g

Maximum value of SAR (measured) = 0.253 mW/g



0 dB = 0.264 mW/g = -11.56 dB mW/g

Date: 2012/9/9

Secondary Landscape_CH20350_11mm_Test Case 5

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.590 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

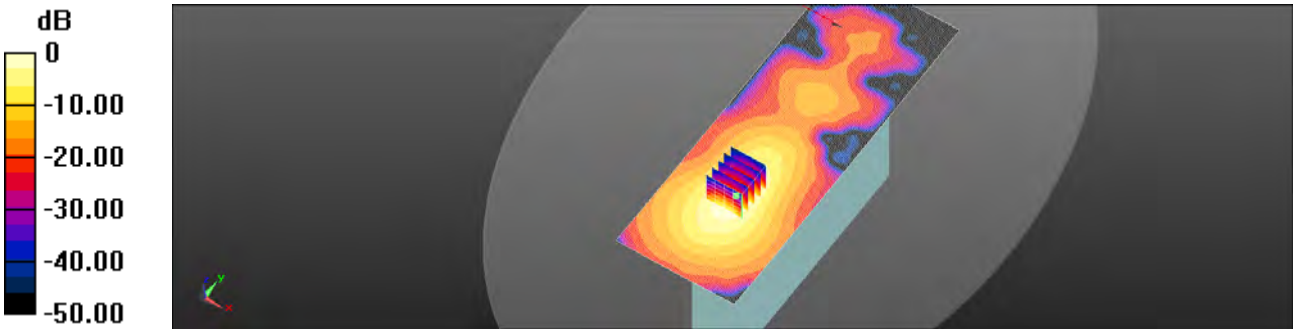
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.833 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.703 mW/g

SAR(1 g) = 0.424 mW/g; SAR(10 g) = 0.241 mW/g

Maximum value of SAR (measured) = 0.573 mW/g



0 dB = 0.590 mW/g = -4.58 dB mW/g

Date: 2012/9/8

Lap-held_CH20000_0mm_Test Case 3

Communication System: LTE; Frequency: 1715 MHz

Medium parameters used: f = 1715 MHz; σ = 1.416 mho/m; ε_r = 53.945; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.45 mW/g

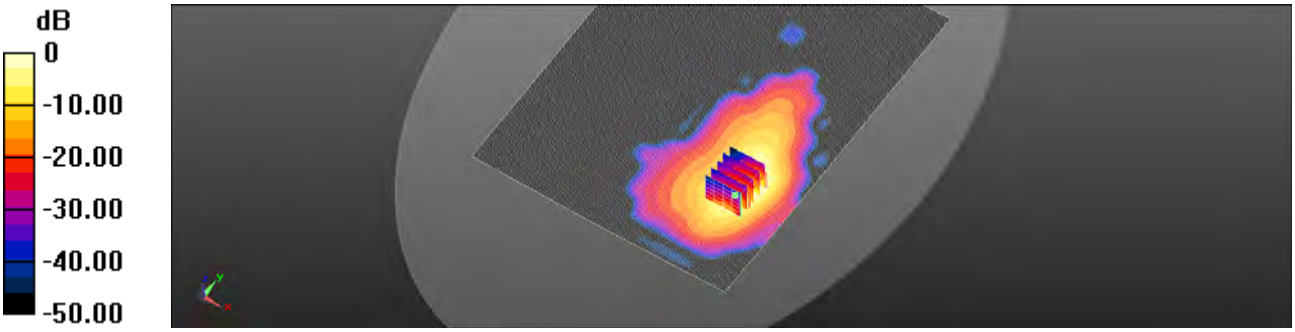
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.723 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 2.227 mW/g

SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.494 mW/g

Maximum value of SAR (measured) = 1.52 mW/g



0 dB = 1.45 mW/g = 3.24 dB mW/g

Date: 2012/9/8

Lap-held_CH20000_0mm_Test Case 1

Communication System: LTE; Frequency: 1715 MHz

Medium parameters used: f = 1715 MHz; σ = 1.416 mho/m; ε_r = 53.945; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.41 mW/g

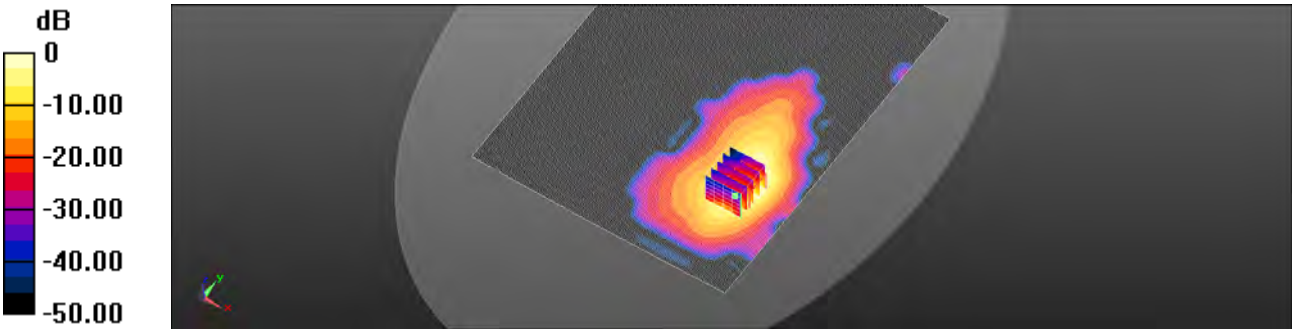
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.831 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 2.193 mW/g

SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.465 mW/g

Maximum value of SAR (measured) = 1.48 mW/g



0 dB = 1.41 mW/g = 3.00 dB mW/g

Lap-held_CH20175_0mm_Test Case 4

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used: f = 1732.5 MHz; σ = 1.435 mho/m; ε_r = 53.908; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.02 mW/g

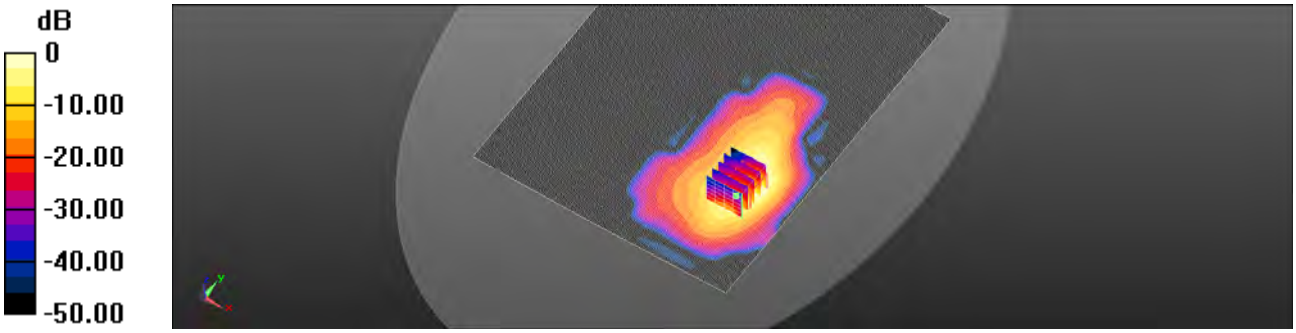
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.286 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.574 mW/g

SAR(1 g) = 0.779 mW/g; SAR(10 g) = 0.348 mW/g

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



0 dB = 1.02 mW/g = 0.16 dB mW/g

Lap-held_CH20175_0mm_Test Case 1

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used: f = 1732.5 MHz; σ = 1.435 mho/m; ε_r = 53.908; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.04 mW/g

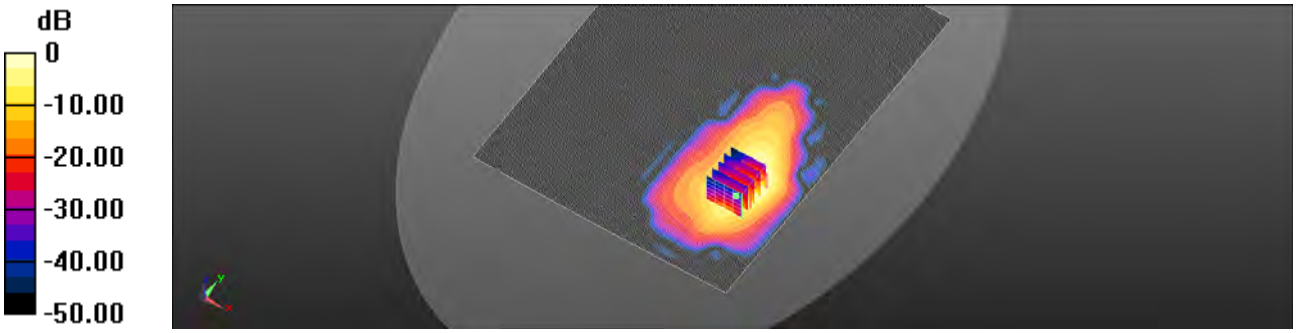
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.311 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 1.751 mW/g

SAR(1 g) = 0.825 mW/g; SAR(10 g) = 0.359 mW/g

Maximum value of SAR (measured) = 1.14 mW/g



0 dB = 1.04 mW/g = 0.37 dB mW/g

Date: 2012/9/8

Lap-held_CH20350_0mm_Test Case 3

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.53 mW/g

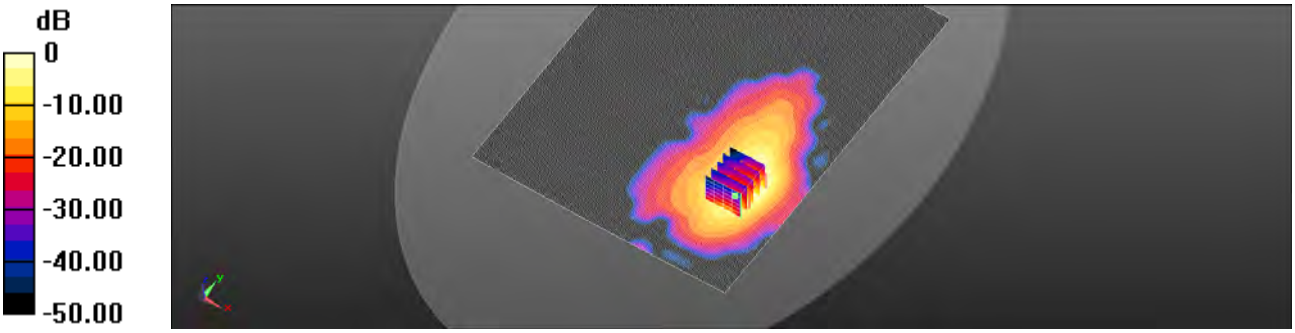
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.953 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 2.361 mW/g

SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.517 mW/g

Maximum value of SAR (measured) = 1.59 mW/g



0 dB = 1.53 mW/g = 3.69 dB mW/g

Lap-held_CH20350_0mm_Test Case 4

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.04 mW/g

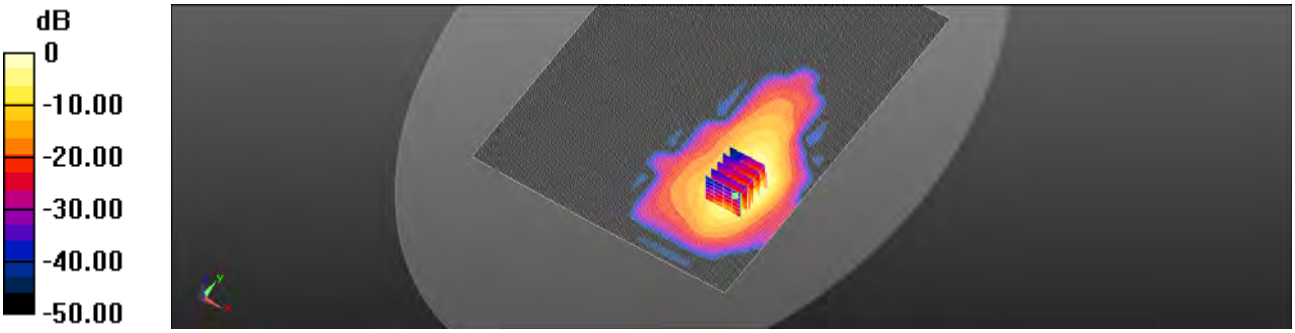
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.323 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 1.646 mW/g

SAR(1 g) = 0.812 mW/g; SAR(10 g) = 0.361 mW/g

Maximum value of SAR (measured) = 1.11 mW/g



0 dB = 1.04 mW/g = 0.35 dB mW/g

Date: 2012/9/8

Lap-held_CH20350_0mm_Test Case 1

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.46 mW/g

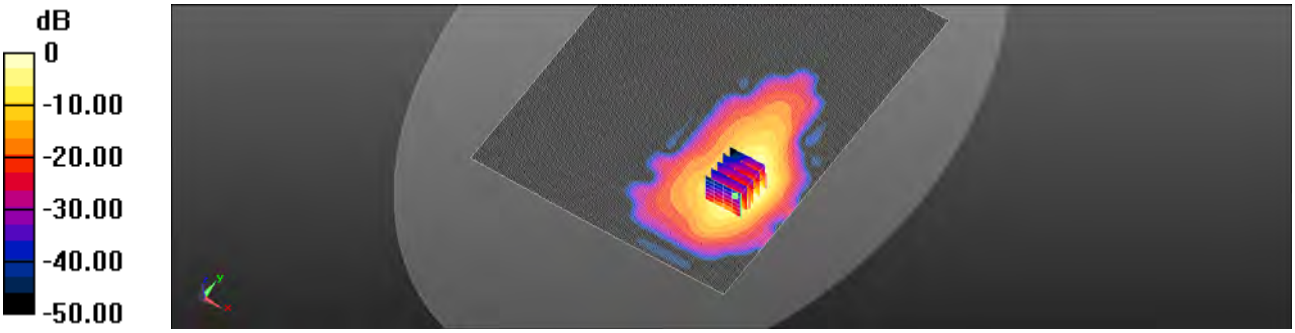
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.053 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 2.363 mW/g

SAR(1 g) = 1.15 mW/g; SAR(10 g) = 0.510 mW/g

Maximum value of SAR (measured) = 1.53 mW/g



0 dB = 1.46 mW/g = 3.27 dB mW/g

Lap-held_CH20000_0mm_Test Case 7

Communication System: LTE; Frequency: 1715 MHz

Medium parameters used: f = 1715 MHz; σ = 1.413 mho/m; εr = 54.083; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.936 mW/g

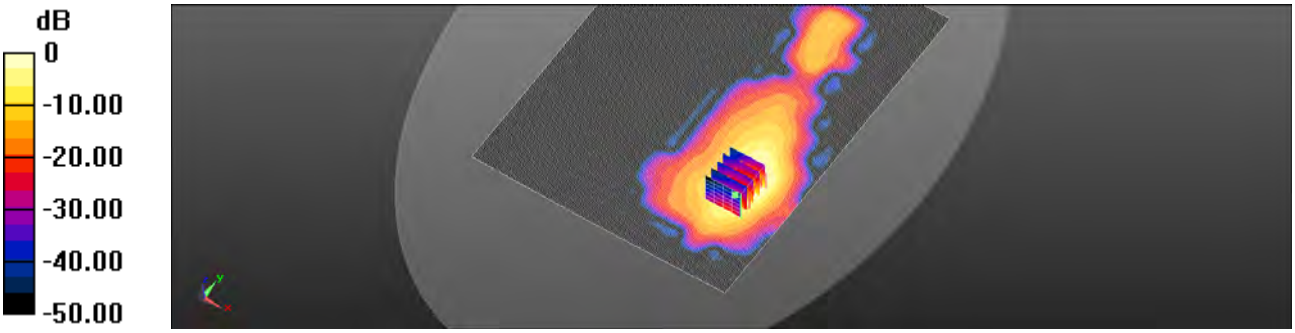
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.817 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.621 mW/g

SAR(1 g) = 0.778 mW/g; SAR(10 g) = 0.333 mW/g

Maximum value of SAR (measured) = 1.24 mW/g



0 dB = 0.936 mW/g = -0.58 dB mW/g

Lap-held_CH20175_0mm_Test Case 8

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used: f = 1732.5 MHz; σ = 1.431 mho/m; εr = 54.045; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.698 mW/g

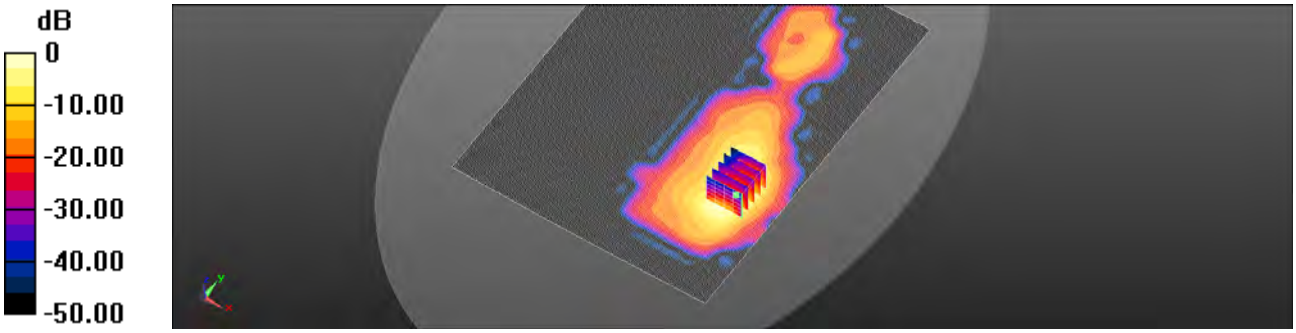
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.886 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.192 mW/g

SAR(1 g) = 0.592 mW/g; SAR(10 g) = 0.266 mW/g

Maximum value of SAR (measured) = 0.925 mW/g



0 dB = 0.698 mW/g = -3.12 dB mW/g

Date: 2012/9/9

Lap-held_CH20350_0mm_Test Case 7

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.33 mW/g

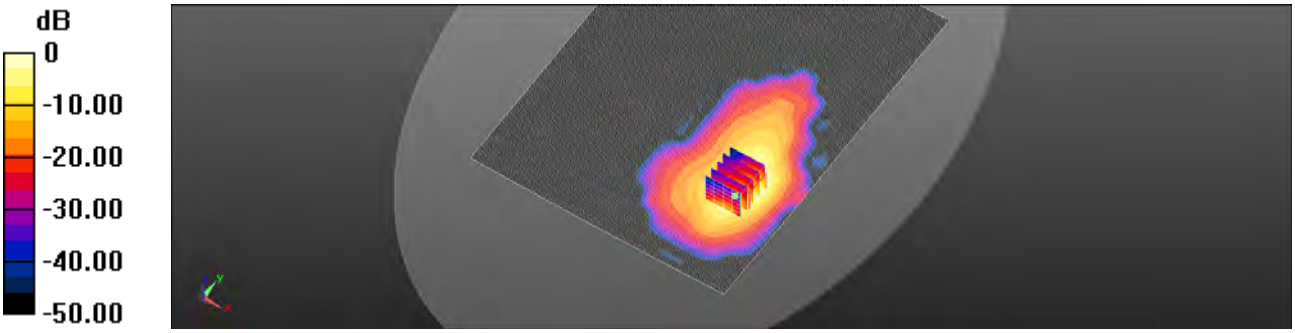
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.101 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 2.199 mW/g

SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.474 mW/g

Maximum value of SAR (measured) = 1.45 mW/g



0 dB = 1.33 mW/g = 2.47 dB mW/g

Date: 2012/9/9

Lap-held_CH20350_0mm_Test Case 8

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.902 mW/g

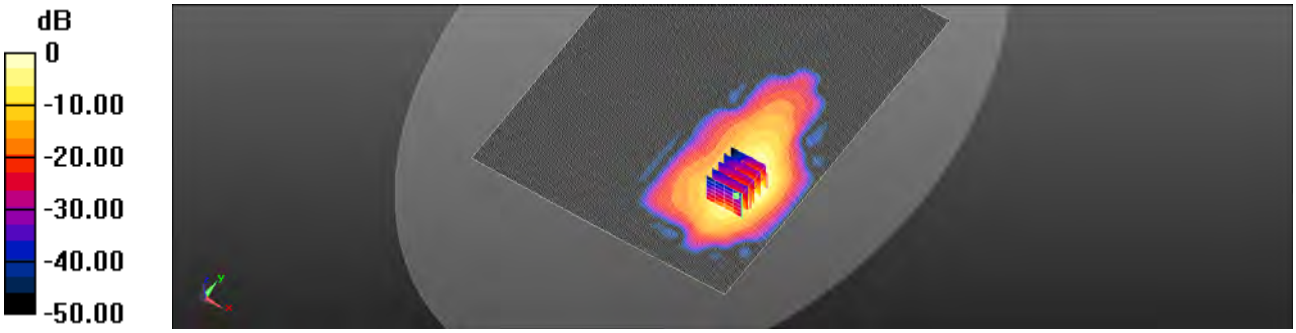
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.049 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 1.503 mW/g

SAR(1 g) = 0.733 mW/g; SAR(10 g) = 0.324 mW/g

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



0 dB = 0.902 mW/g = -0.89 dB mW/g

Date: 2012/9/9

Lap-held_CH20350_0mm_Test Case 5

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.14 mW/g

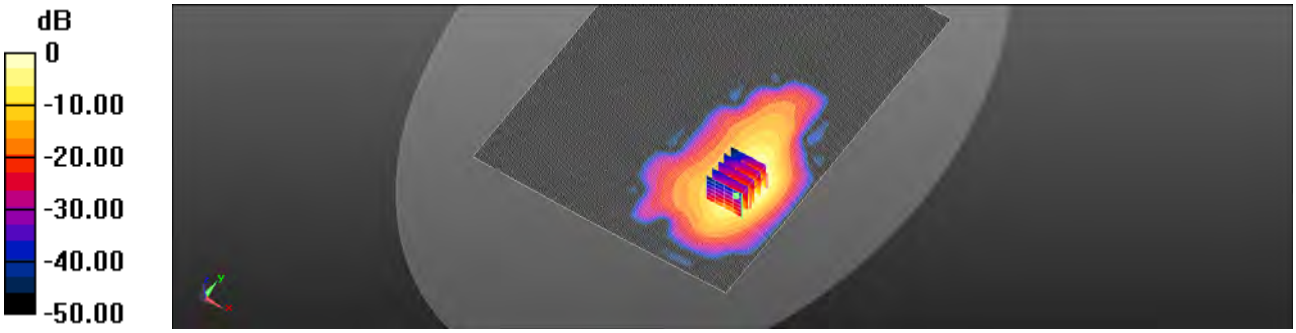
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.063 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.795 mW/g

SAR(1 g) = 0.878 mW/g; SAR(10 g) = 0.390 mW/g

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



0 dB = 1.14 mW/g = 1.14 dB mW/g

Date: 2012/9/8

Secondary Landscape_CH20000_0mm_Test Case 3

Communication System: LTE; Frequency: 1715 MHz

Medium parameters used: f = 1715 MHz; σ = 1.416 mho/m; ε_r = 53.945; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.12 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

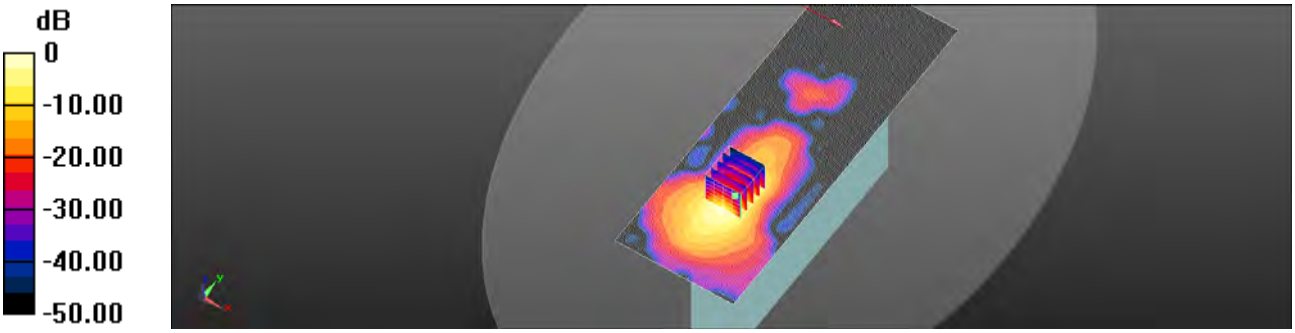
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.898 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.518 mW/g

SAR(1 g) = 0.751 mW/g; SAR(10 g) = 0.363 mW/g

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



0 dB = 1.12 mW/g = 0.97 dB mW/g

Date: 2012/9/8

Secondary Landscape_CH20175_0mm_Test Case 4

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used: f = 1732.5 MHz; σ = 1.435 mho/m; ε_r = 53.908; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.805 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

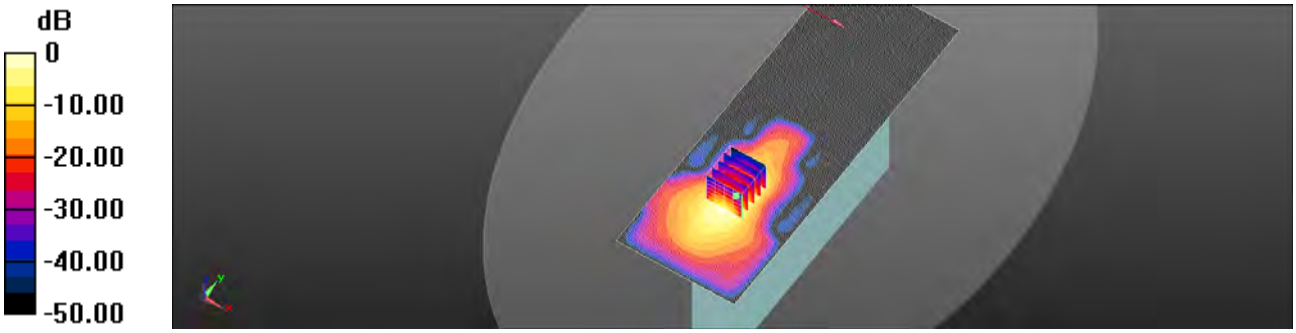
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.029 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 1.043 mW/g

SAR(1 g) = 0.518 mW/g; SAR(10 g) = 0.250 mW/g

Maximum value of SAR (measured) = 0.790 mW/g



0 dB = 0.805 mW/g = -1.89 dB mW/g

Date: 2012/9/8

Secondary Landscape_CH20175_0mm_Test Case 1

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used: f = 1732.5 MHz; σ = 1.435 mho/m; ε_r = 53.908; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.698 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

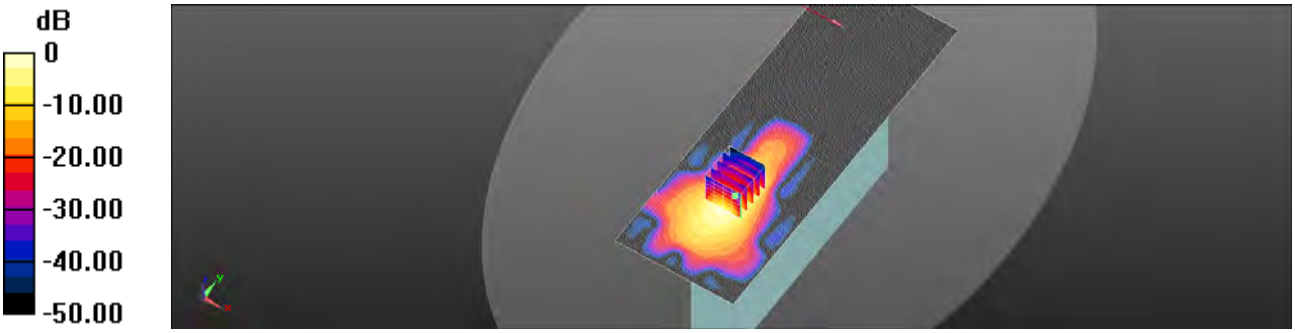
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.648 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.875 mW/g

SAR(1 g) = 0.436 mW/g; SAR(10 g) = 0.210 mW/g

Maximum value of SAR (measured) = 0.667 mW/g



0 dB = 0.698 mW/g = -3.13 dB mW/g

Date: 2012/9/8

Secondary Landscape_CH20350_0mm_Test Case 3

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.10 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

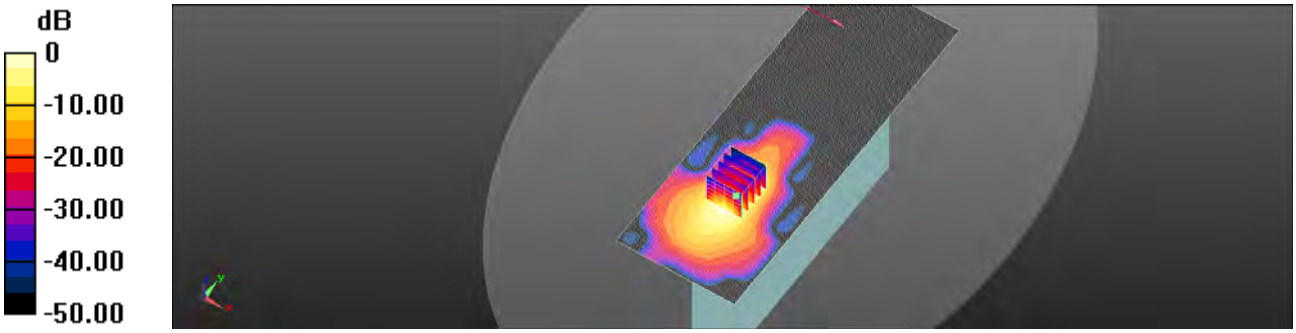
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.824 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.473 mW/g

SAR(1 g) = 0.729 mW/g; SAR(10 g) = 0.350 mW/g

Maximum value of SAR (measured) = 1.14 mW/g



0 dB = 1.10 mW/g = 0.84 dB mW/g

Date: 2012/9/8

Secondary Landscape_CH20350_0mm_Test Case 4

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.822 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

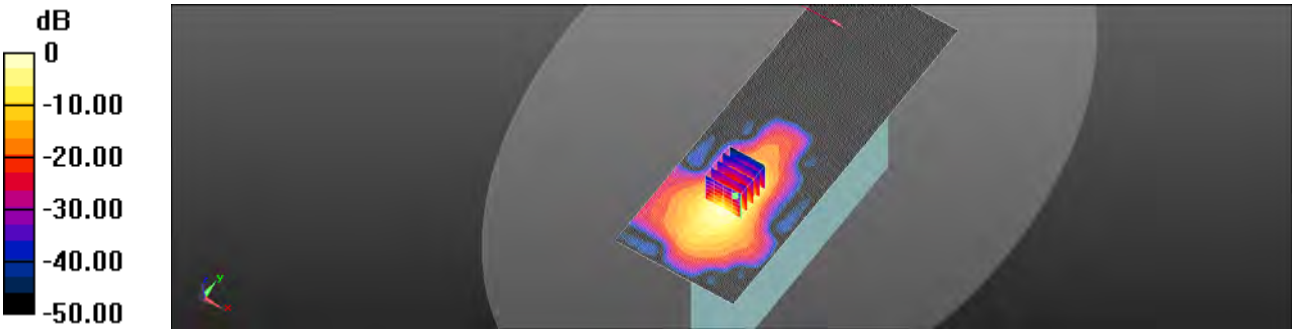
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.723 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.066 mW/g

SAR(1 g) = 0.527 mW/g; SAR(10 g) = 0.255 mW/g

Maximum value of SAR (measured) = 0.826 mW/g



0 dB = 0.822 mW/g = -1.70 dB mW/g

Date: 2012/9/9

Secondary Landscape_CH20000_0mm_Test Case 7

Communication System: LTE; Frequency: 1715 MHz

Medium parameters used: f = 1715 MHz; σ = 1.413 mho/m; εr = 54.083; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.933 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

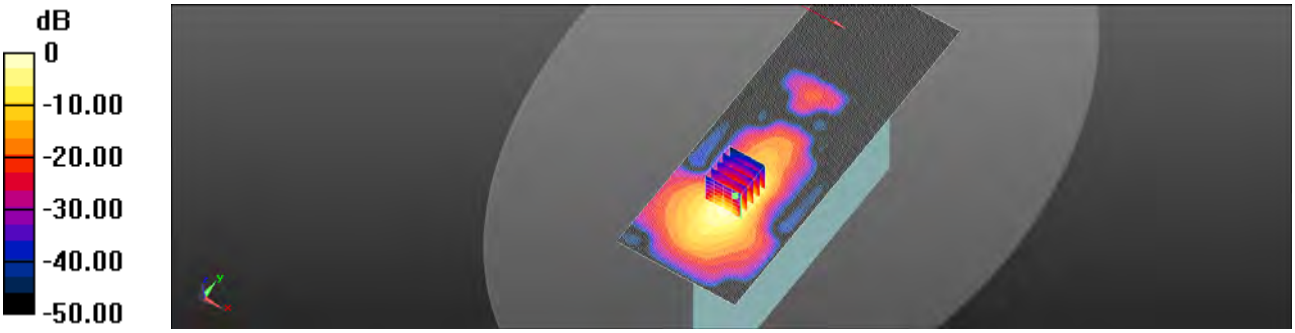
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.508 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 1.306 mW/g

SAR(1 g) = 0.645 mW/g; SAR(10 g) = 0.311 mW/g

Maximum value of SAR (measured) = 0.938 mW/g



0 dB = 0.933 mW/g = -0.61 dB mW/g

Date: 2012/9/9

Secondary Landscape_CH20175_0mm_Test Case 8

Communication System: LTE; Frequency: 1732.5 MHz

Medium parameters used: f = 1732.5 MHz; σ = 1.431 mho/m; εr = 54.045; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.688 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

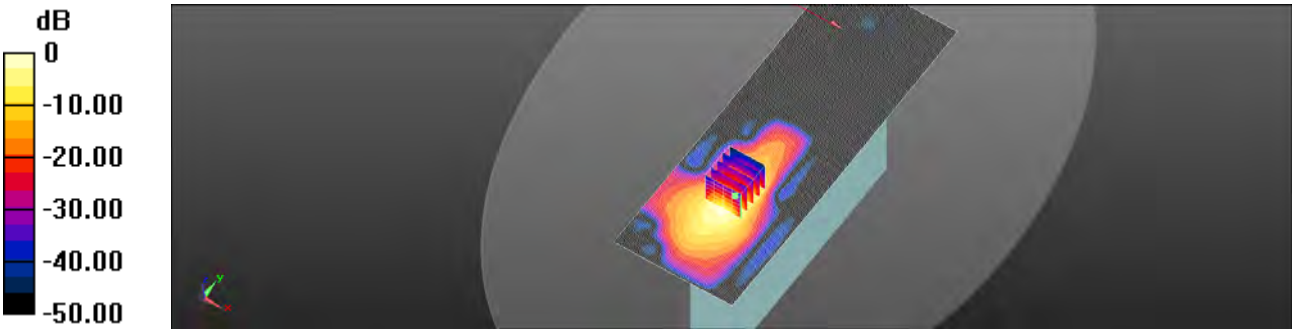
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.811 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.875 mW/g

SAR(1 g) = 0.437 mW/g; SAR(10 g) = 0.211 mW/g

Maximum value of SAR (measured) = 0.678 mW/g



0 dB = 0.688 mW/g = -3.25 dB mW/g

Date: 2012/9/9

Secondary Landscape_CH20350_0mm_Test Case 7

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.961 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

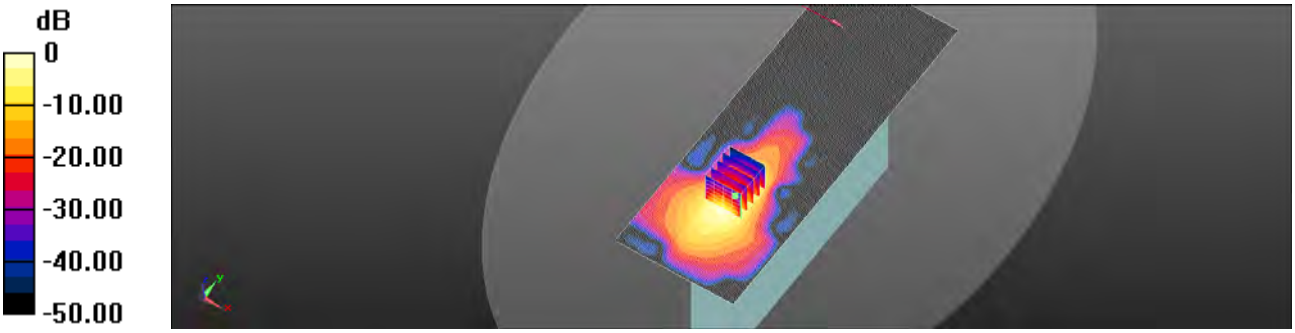
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.644 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.215 mW/g

SAR(1 g) = 0.609 mW/g; SAR(10 g) = 0.294 mW/g

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



0 dB = 0.961 mW/g = -0.35 dB mW/g

Date: 2012/9/9

Secondary Landscape_CH20350_0mm_Test Case 8

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.704 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

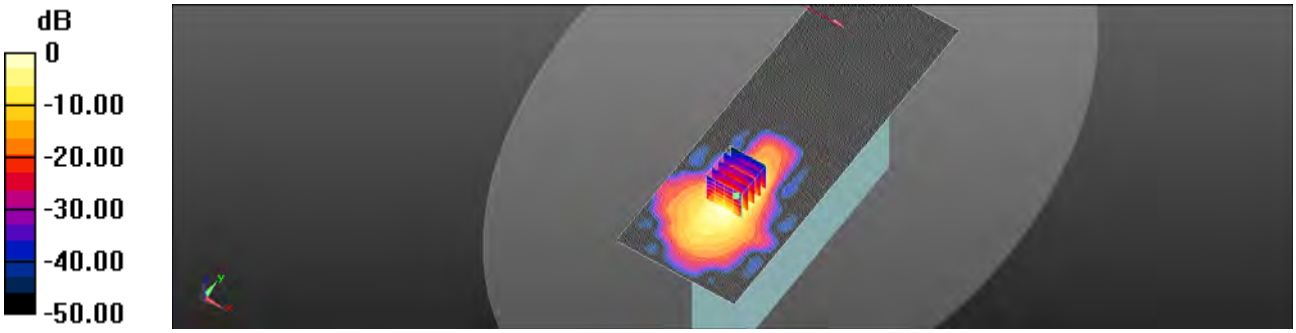
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.450 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.853 mW/g

SAR(1 g) = 0.426 mW/g; SAR(10 g) = 0.205 mW/g

Maximum value of SAR (measured) = 0.653 mW/g



0 dB = 0.704 mW/g = -3.05 dB mW/g

Date: 2012/9/9

Secondary Landscape_CH20350_0mm_Test Case 5

Communication System: LTE; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; εr = 53.993; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.916 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

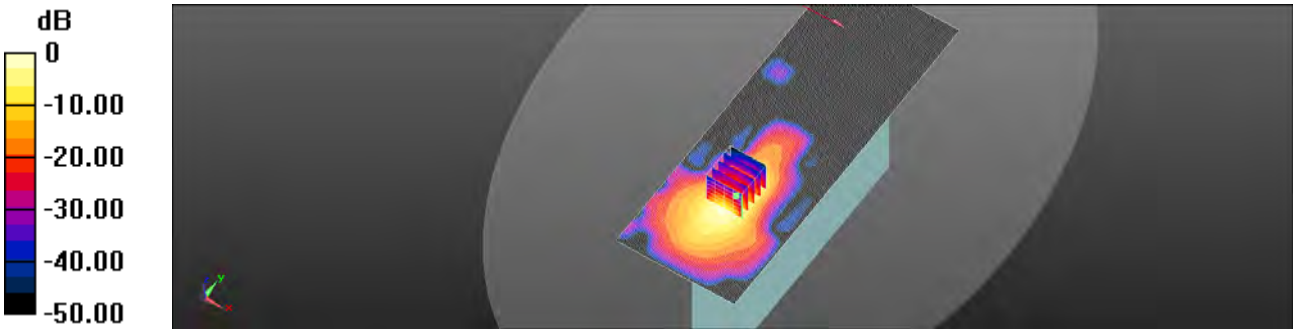
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.705 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 1.167 mW/g

SAR(1 g) = 0.582 mW/g; SAR(10 g) = 0.281 mW/g

Maximum value of SAR (measured) = 0.891 mW/g



0 dB = 0.916 mW/g = -0.76 dB mW/g

Date: 2012/9/11

Primary Portrait_CH23790_0mm_Test Case 1

Communication System: LTE; Frequency: 710 MHz

Medium parameters used: f = 710 MHz; σ = 0.974 mho/m; ε_r = 56.108; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.164 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

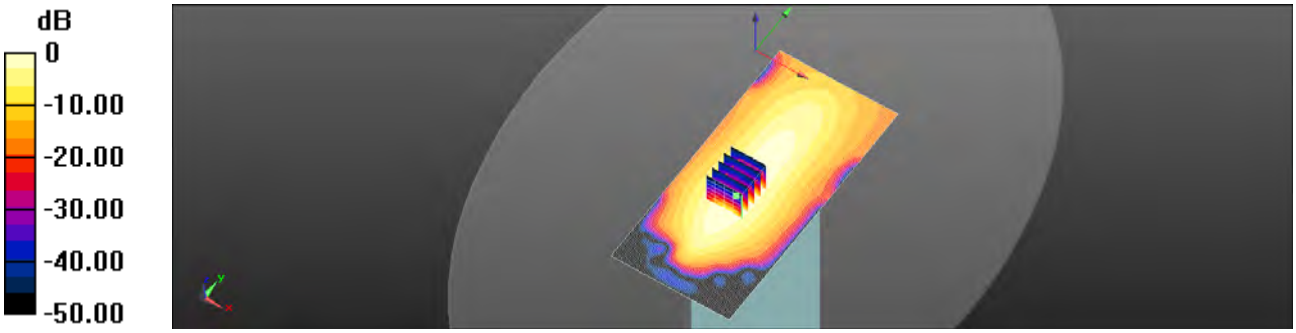
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.427 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.254 mW/g

SAR(1 g) = 0.137 mW/g; SAR(10 g) = 0.082 mW/g

Maximum value of SAR (measured) = 0.183 mW/g



0 dB = 0.164 mW/g = -15.70 dB mW/g

Date: 2012/9/11

Primary Portrait_CH23800_0mm_Test Case 3

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.975 mho/m; ε_r = 56.098; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0329 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

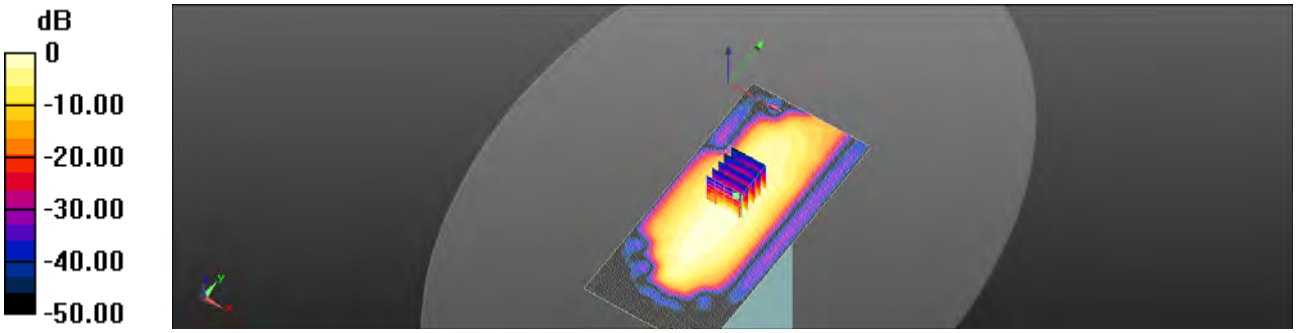
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.981 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.055 mW/g

SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.015 mW/g

Maximum value of SAR (measured) = 0.0343 mW/g



0 dB = 0.0329 mW/g = -29.66 dB mW/g

Date: 2012/9/11

Primary Portrait_CH23800_0mm_Test Case 4

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.975 mho/m; ε_r = 56.098; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0855 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

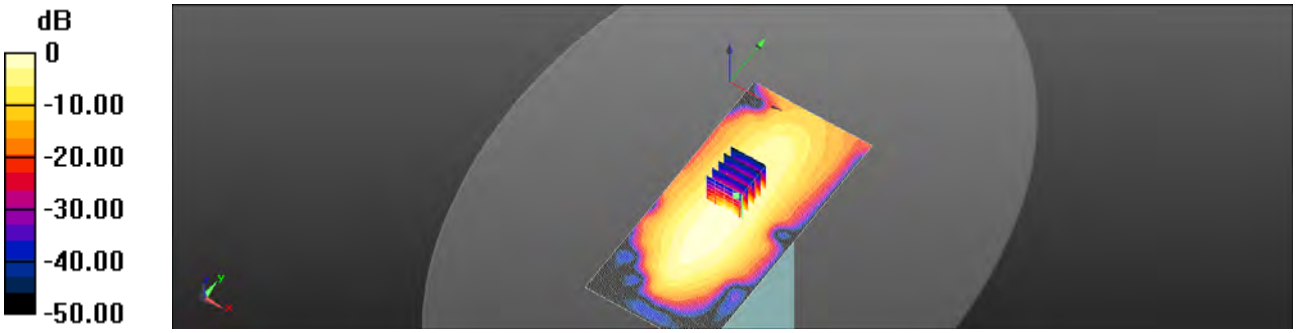
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.493 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.144 mW/g

SAR(1 g) = 0.073 mW/g; SAR(10 g) = 0.042 mW/g

Maximum value of SAR (measured) = 0.0946 mW/g



0 dB = 0.0855 mW/g = -21.36 dB mW/g

Date: 2012/9/12

Primary Portrait_CH23800_0mm_Test Case 7

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0583 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

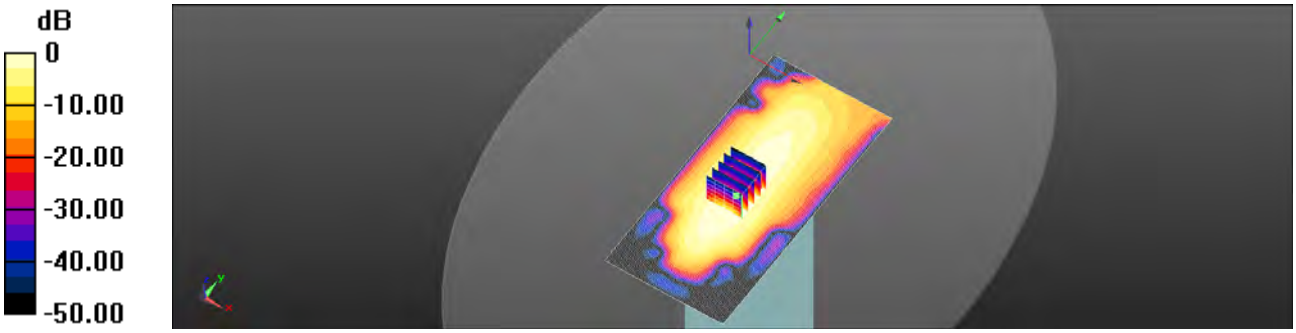
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.723 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.099 mW/g

SAR(1 g) = 0.052 mW/g; SAR(10 g) = 0.030 mW/g

Maximum value of SAR (measured) = 0.0712 mW/g



0 dB = 0.0583 mW/g = -24.68 dB mW/g

Date: 2012/9/12

Primary Portrait_CH23800_0mm_Test Case 8

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0603 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

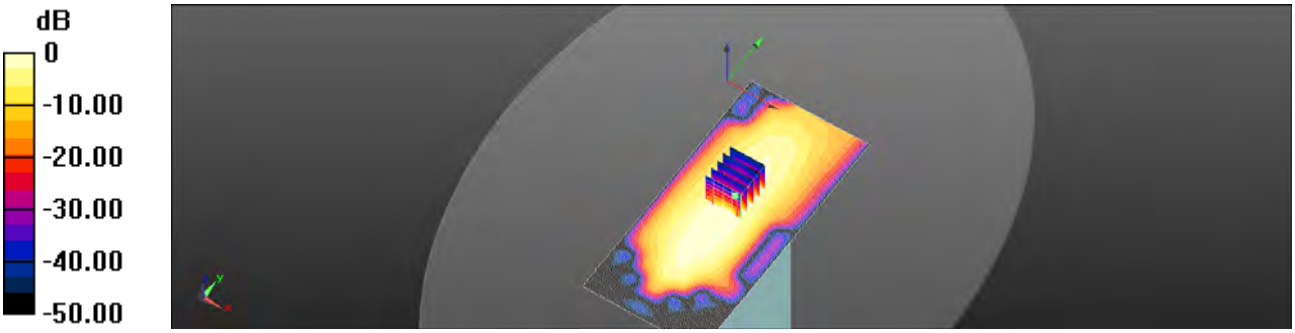
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.774 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.113 mW/g

SAR(1 g) = 0.057 mW/g; SAR(10 g) = 0.032 mW/g

Maximum value of SAR (measured) = 0.0786 mW/g



0 dB = 0.0603 mW/g = -24.40 dB mW/g

Date: 2012/9/12

Primary Portrait_CH23800_0mm_Test Case 5

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Primary Portrait/Area Scan (71x151x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0900 mW/g

Configuration/Primary Portrait/Zoom Scan (5x5x7)/Cube 0:

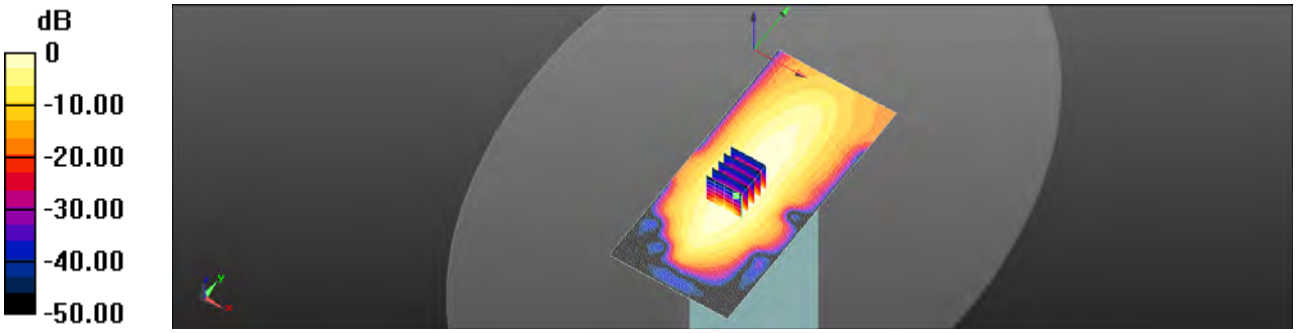
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.651 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.141 mW/g

SAR(1 g) = 0.078 mW/g; SAR(10 g) = 0.046 mW/g

Maximum value of SAR (measured) = 0.107 mW/g



0 dB = 0.0900 mW/g = -20.91 dB mW/g

Date: 2012/9/11

Lap-held_CH23790_10.5mm_Test Case 1

Communication System: LTE; Frequency: 710 MHz

Medium parameters used: f = 710 MHz; σ = 0.974 mho/m; ε_r = 56.108; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.348 mW/g

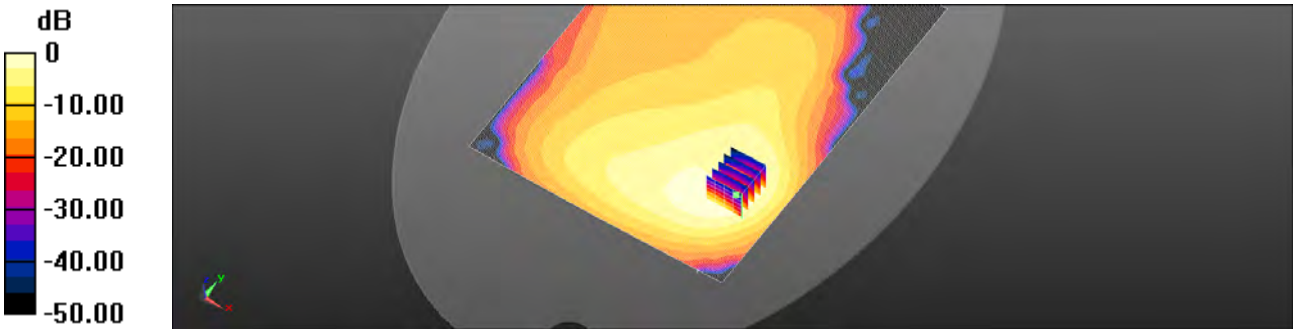
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.735 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.447 mW/g

SAR(1 g) = 0.278 mW/g; SAR(10 g) = 0.172 mW/g

Maximum value of SAR (measured) = 0.368 mW/g



0 dB = 0.348 mW/g = -9.17 dB mW/g

Date: 2012/9/11

Lap-held_CH23800_10.5mm_Test Case 3

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.975 mho/m; ε_r = 56.098; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.193 mW/g

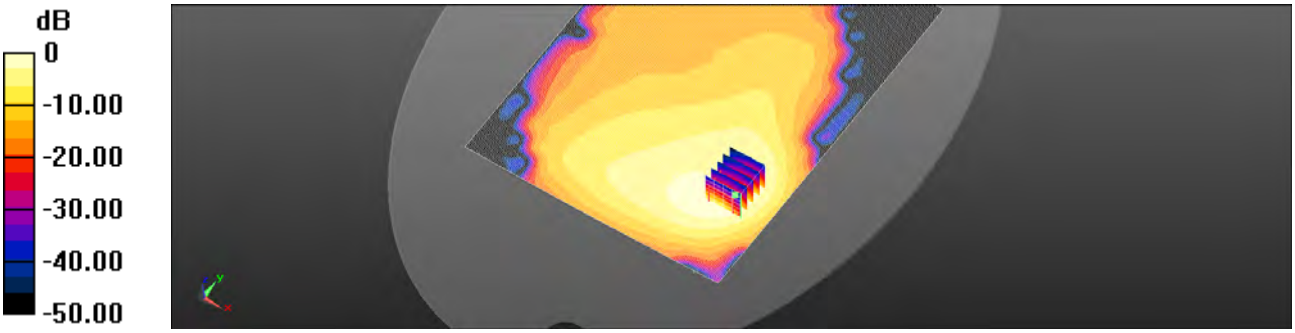
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.364 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.243 mW/g

SAR(1 g) = 0.151 mW/g; SAR(10 g) = 0.094 mW/g

Maximum value of SAR (measured) = 0.199 mW/g



0 dB = 0.193 mW/g = -14.27 dB mW/g

Date: 2012/9/11

Lap-held_CH23800_10.5mm_Test Case 4

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.975 mho/m; ε_r = 56.098; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.191 mW/g

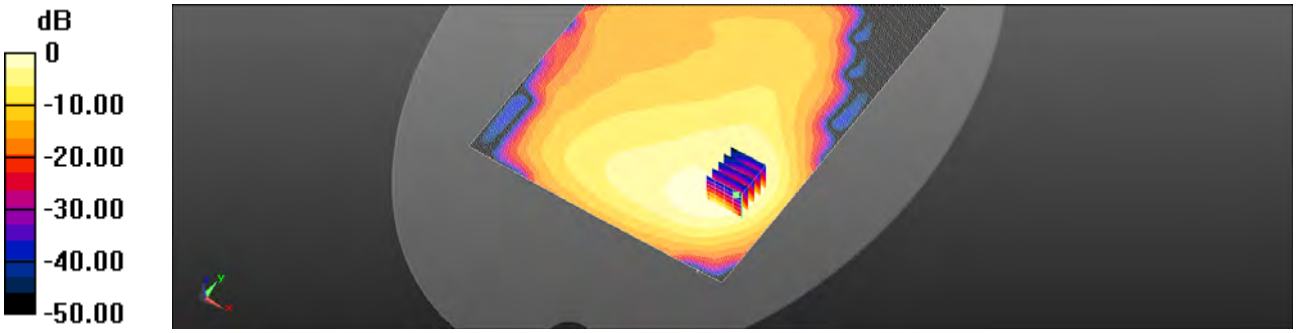
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.445 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.253 mW/g

SAR(1 g) = 0.157 mW/g; SAR(10 g) = 0.097 mW/g

Maximum value of SAR (measured) = 0.209 mW/g



0 dB = 0.191 mW/g = -14.37 dB mW/g

Date: 2012/9/12

Lap-held_CH23800_10.5mm_Test Case 7

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.159 mW/g

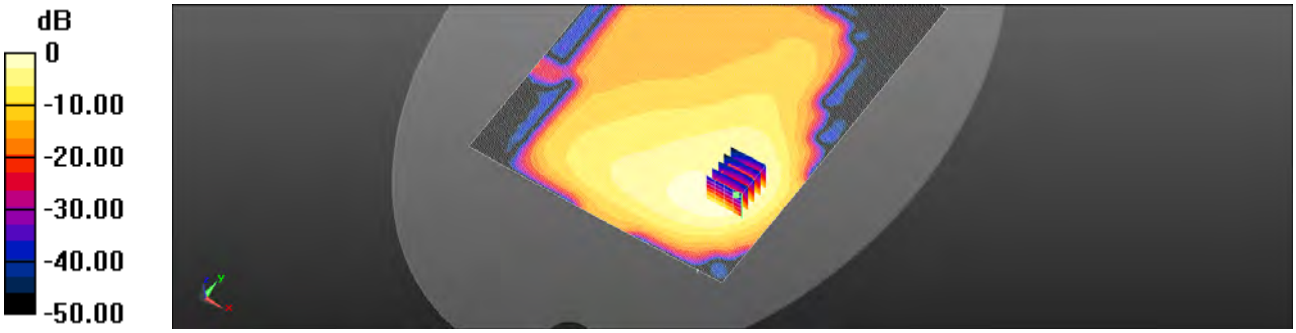
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.908 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.206 mW/g

SAR(1 g) = 0.127 mW/g; SAR(10 g) = 0.078 mW/g

Maximum value of SAR (measured) = 0.168 mW/g



0 dB = 0.159 mW/g = -15.96 dB mW/g

Date: 2012/9/12

Lap-held_CH23800_10.5mm_Test Case 8

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.175 mW/g

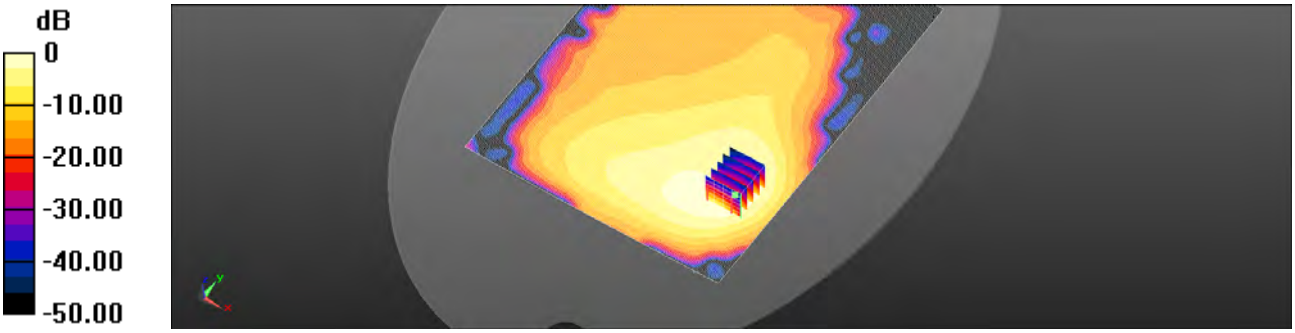
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.011 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.224 mW/g

SAR(1 g) = 0.140 mW/g; SAR(10 g) = 0.087 mW/g

Maximum value of SAR (measured) = 0.185 mW/g



0 dB = 0.175 mW/g = -15.16 dB mW/g

Date: 2012/9/12

Lap-held_CH23800_10.5mm_Test Case 5

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

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

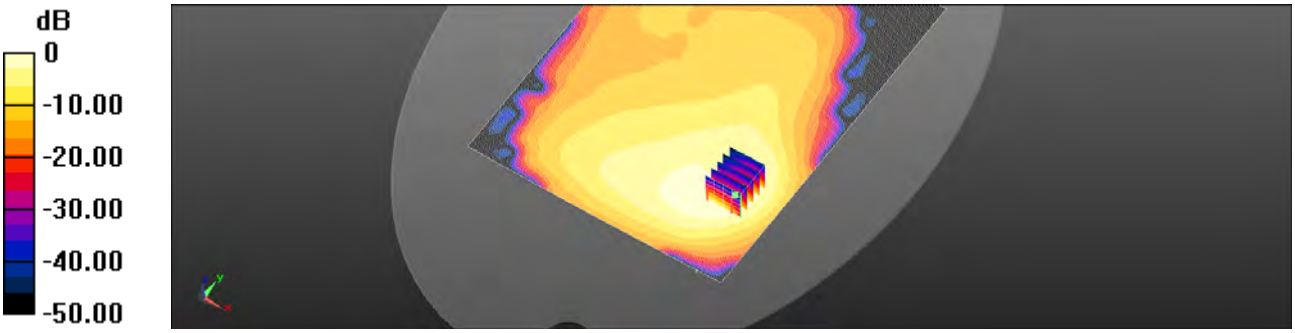
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.125 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.337 mW/g

SAR(1 g) = 0.211 mW/g; SAR(10 g) = 0.132 mW/g

Maximum value of SAR (measured) = 0.276 mW/g



0 dB = 0.262 mW/g = -11.63 dB mW/g

Date: 2012/9/11

Secondary Landscape_CH23790_11mm_Test Case 1

Communication System: LTE; Frequency: 710 MHz

Medium parameters used: f = 710 MHz; σ = 0.974 mho/m; ε_r = 56.108; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.179 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

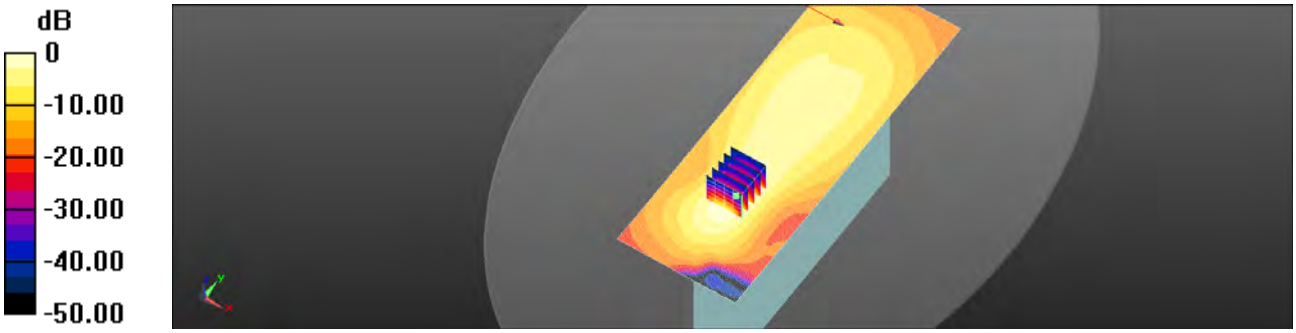
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.600 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.218 mW/g

SAR(1 g) = 0.138 mW/g; SAR(10 g) = 0.084 mW/g

Maximum value of SAR (measured) = 0.180 mW/g



0 dB = 0.179 mW/g = -14.95 dB mW/g

Date: 2012/9/11

Secondary Landscape_CH23800_11mm_Test Case 3

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.975 mho/m; ε_r = 56.098; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.103 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

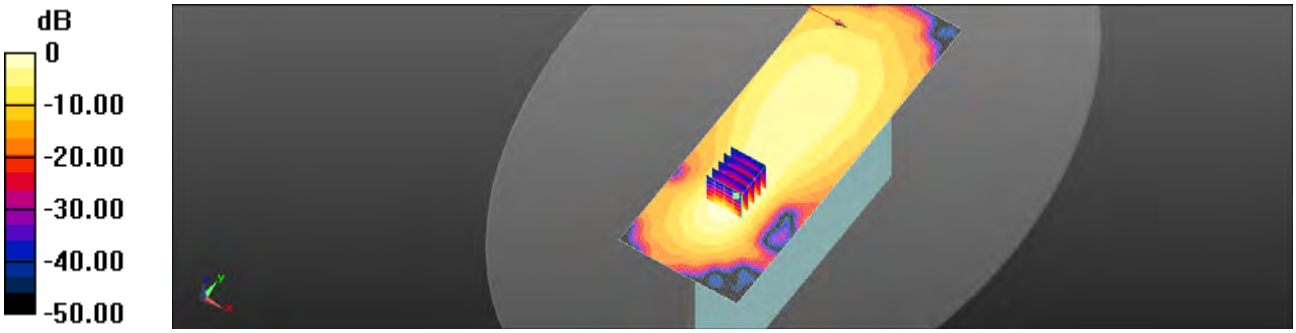
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.280 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.123 mW/g

SAR(1 g) = 0.076 mW/g; SAR(10 g) = 0.046 mW/g

Maximum value of SAR (measured) = 0.101 mW/g



0 dB = 0.103 mW/g = -19.78 dB mW/g

Date: 2012/9/11

Secondary Landscape_CH23800_11mm_Test Case 4

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.975 mho/m; ε_r = 56.098; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.103 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

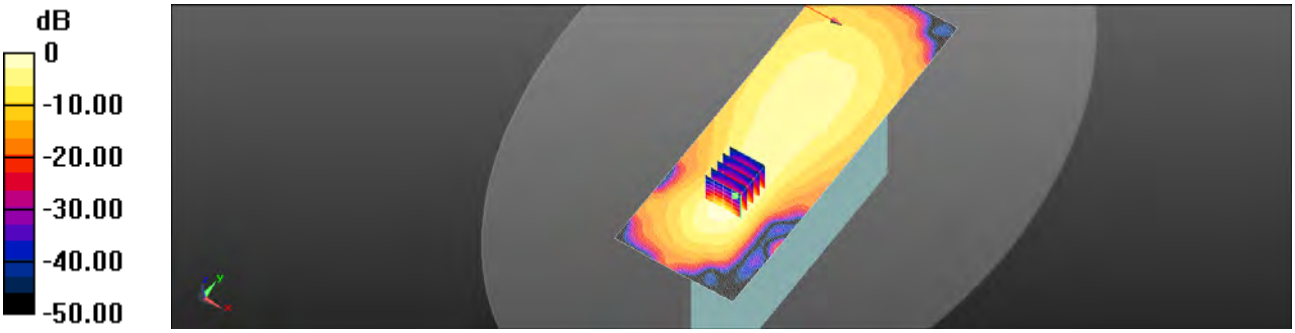
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.194 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.122 mW/g

SAR(1 g) = 0.076 mW/g; SAR(10 g) = 0.046 mW/g

Maximum value of SAR (measured) = 0.100 mW/g



0 dB = 0.103 mW/g = -19.78 dB mW/g

Date: 2012/9/12

Secondary Landscape_CH23800_11mm_Test Case 7

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0873 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

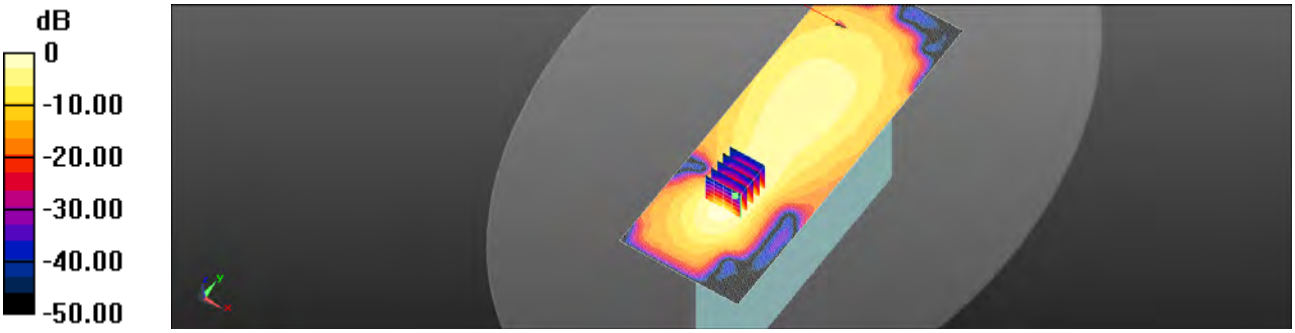
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.559 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.102 mW/g

SAR(1 g) = 0.064 mW/g; SAR(10 g) = 0.038 mW/g

Maximum value of SAR (measured) = 0.0843 mW/g



0 dB = 0.0873 mW/g = -21.18 dB mW/g

Date: 2012/9/12

Secondary Landscape_CH23800_11mm_Test Case 8

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0842 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

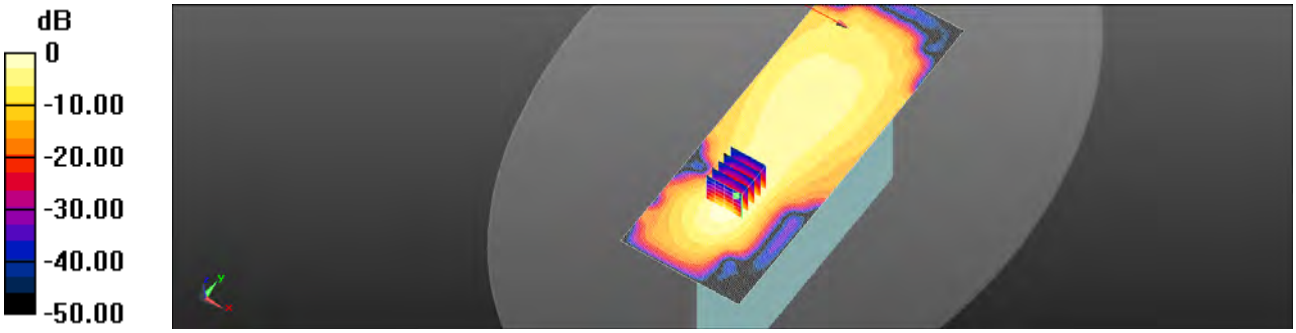
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.345 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.101 mW/g

SAR(1 g) = 0.063 mW/g; SAR(10 g) = 0.037 mW/g

Maximum value of SAR (measured) = 0.0820 mW/g



0 dB = 0.0842 mW/g = -21.50 dB mW/g

Date: 2012/9/12

Secondary Landscape_CH23800_11mm_Test Case 5

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.159 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

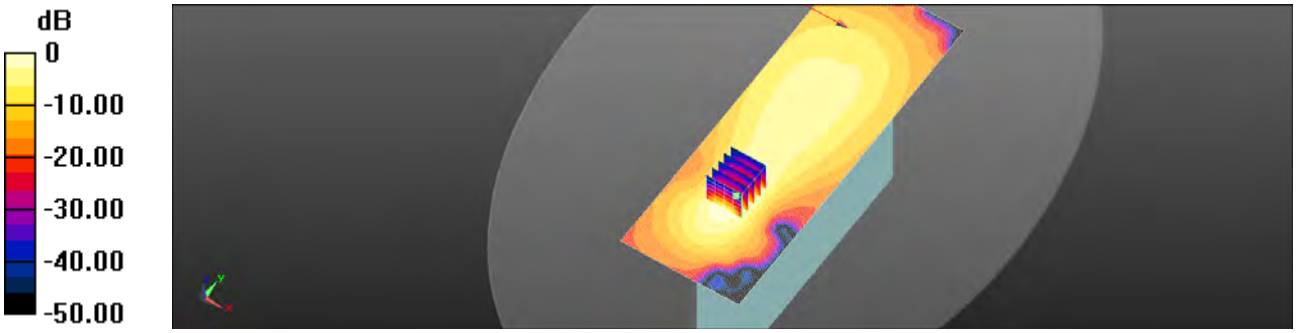
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.499 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.176 mW/g

SAR(1 g) = 0.113 mW/g; SAR(10 g) = 0.068 mW/g

Maximum value of SAR (measured) = 0.146 mW/g



0 dB = 0.159 mW/g = -15.96 dB mW/g

Date: 2012/9/11

Lap-held_CH23780_0mm_Test Case 3

Communication System: LTE; Frequency: 709 MHz

Medium parameters used: f = 709 MHz; σ = 0.973 mho/m; ε_r = 56.126; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.14 mW/g

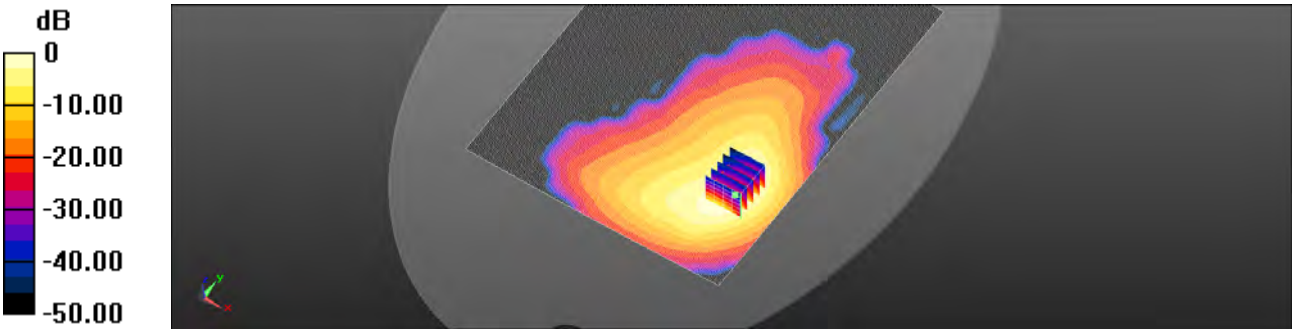
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.650 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.761 mW/g

SAR(1 g) = 0.917 mW/g; SAR(10 g) = 0.498 mW/g

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



0 dB = 1.14 mW/g = 1.10 dB mW/g

Date: 2012/9/11

Lap-held_CH23780_0mm_Test Case 1

Communication System: LTE; Frequency: 709 MHz

Medium parameters used: f = 709 MHz; σ = 0.973 mho/m; ε_r = 56.126; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.05 mW/g

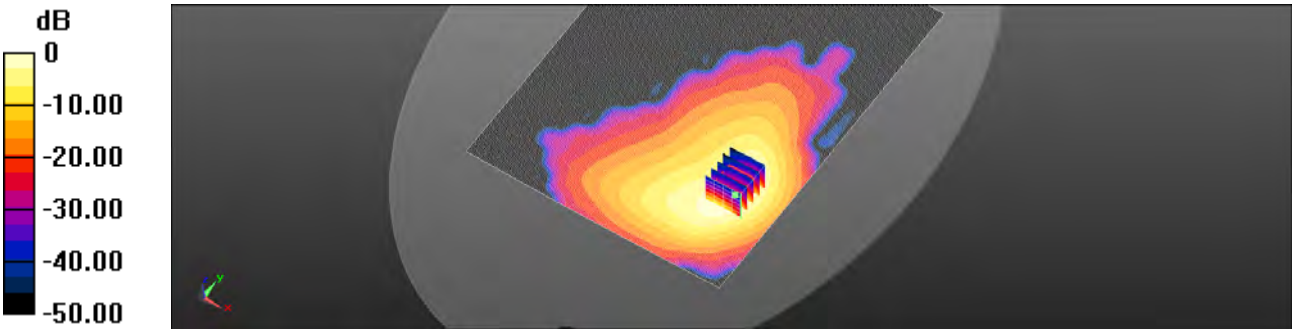
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.427 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.638 mW/g

SAR(1 g) = 0.842 mW/g; SAR(10 g) = 0.455 mW/g

Maximum value of SAR (measured) = 1.26 mW/g



0 dB = 1.05 mW/g = 0.42 dB mW/g

Date: 2012/9/11

Lap-held_CH23790_0mm_Test Case 1

Communication System: LTE; Frequency: 710 MHz

Medium parameters used: f = 710 MHz; σ = 0.974 mho/m; ε_r = 56.108; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.10 mW/g

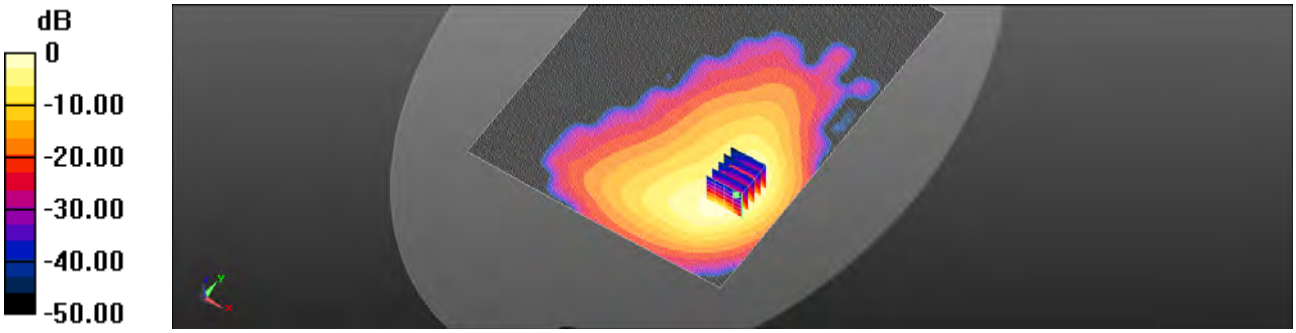
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.583 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.728 mW/g

SAR(1 g) = 0.888 mW/g; SAR(10 g) = 0.479 mW/g

Maximum value of SAR (measured) = 1.33 mW/g



0 dB = 1.10 mW/g = 0.79 dB mW/g

Date: 2012/9/11

Lap-held_CH23800_0mm_Test Case 4

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.975 mho/m; ε_r = 56.098; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.586 mW/g

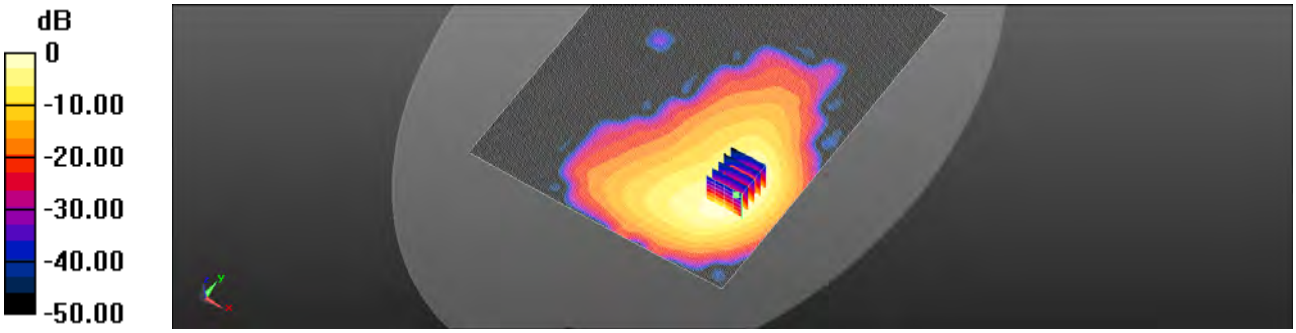
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.041 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.926 mW/g

SAR(1 g) = 0.478 mW/g; SAR(10 g) = 0.257 mW/g

Maximum value of SAR (measured) = 0.701 mW/g



0 dB = 0.586 mW/g = -4.64 dB mW/g

Date: 2012/9/11

Lap-held_CH23800_0mm_Test Case 1

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.975 mho/m; ε_r = 56.098; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.10 mW/g

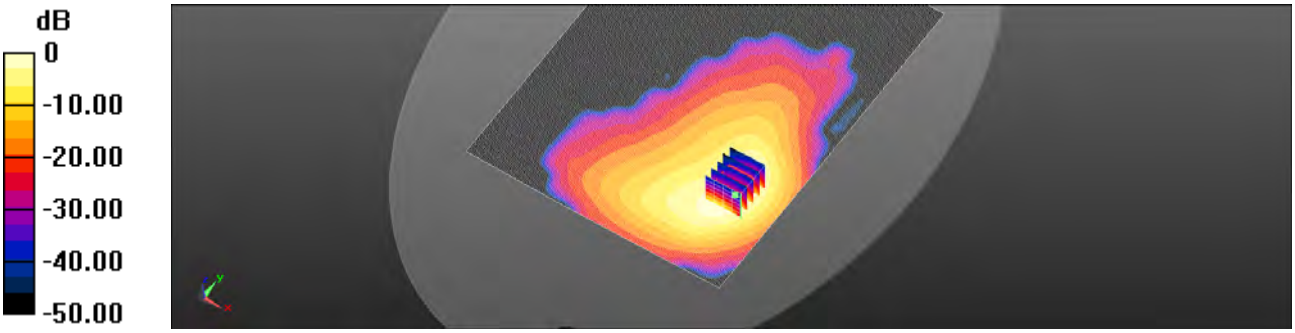
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.554 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.753 mW/g

SAR(1 g) = 0.902 mW/g; SAR(10 g) = 0.486 mW/g

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



0 dB = 1.10 mW/g = 0.80 dB mW/g

Date: 2012/9/12

Lap-held_CH23780_0mm_Test Case 7

Communication System: LTE; Frequency: 709 MHz

Medium parameters used: f = 711 MHz; σ = 0.977 mho/m; εr = 56.154; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.925 mW/g

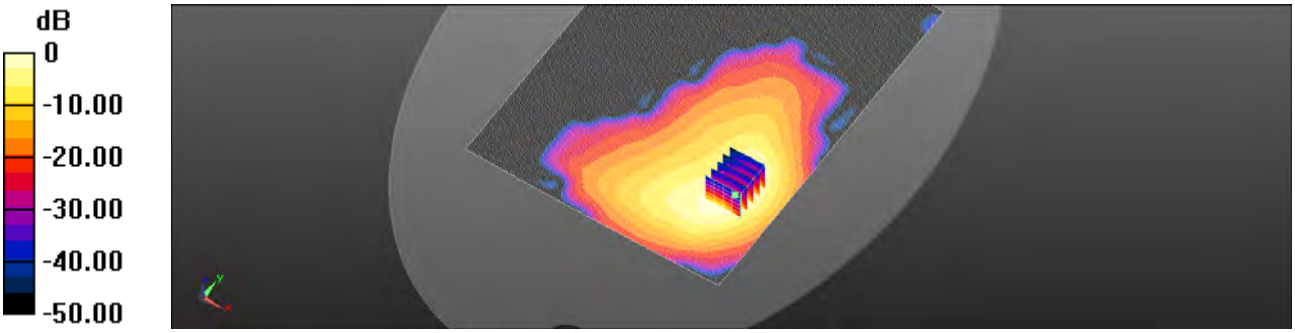
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.438 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 1.481 mW/g

SAR(1 g) = 0.771 mW/g; SAR(10 g) = 0.417 mW/g

Maximum value of SAR (measured) = 1.14 mW/g



0 dB = 0.925 mW/g = -0.68 dB mW/g

Date: 2012/9/12

Lap-held_CH23800_0mm_Test Case 8

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.483 mW/g

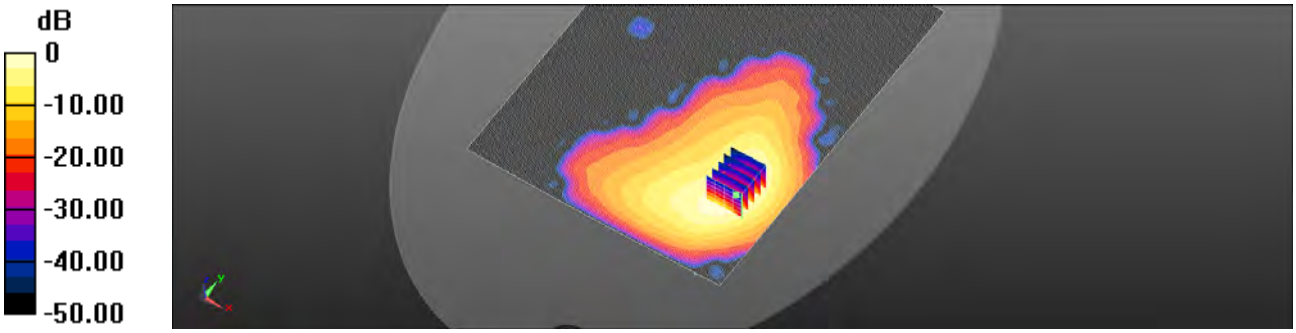
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.378 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.784 mW/g

SAR(1 g) = 0.405 mW/g; SAR(10 g) = 0.219 mW/g

Maximum value of SAR (measured) = 0.607 mW/g



0 dB = 0.483 mW/g = -6.31 dB mW/g

Date: 2012/9/12

Lap-held_CH23800_0mm_Test Case 5

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.829 mW/g

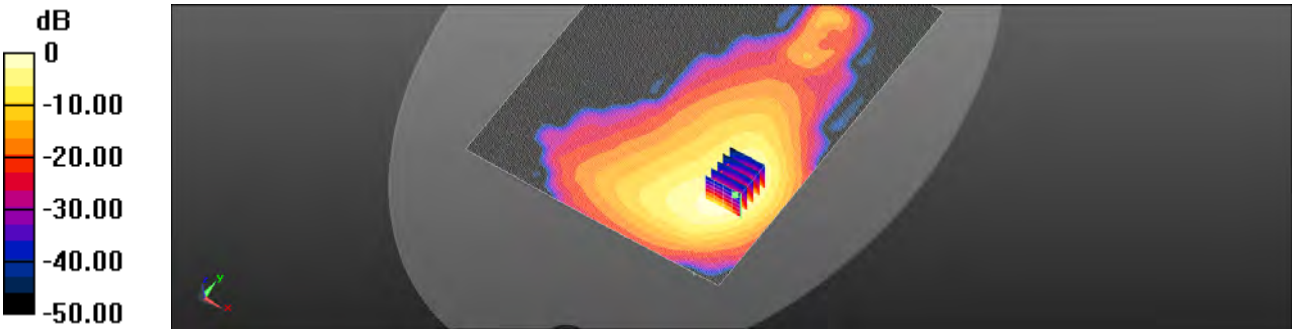
Configuration/Lap-held/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.682 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 1.346 mW/g

SAR(1 g) = 0.700 mW/g; SAR(10 g) = 0.380 mW/g

Maximum value of SAR (measured) = 1.04 mW/g



0 dB = 0.829 mW/g = -1.63 dB mW/g

Date: 2012/9/11

Secondary Landscape_CH23780_0mm_Test Case 3

Communication System: LTE; Frequency: 709 MHz

Medium parameters used: f = 709 MHz; σ = 0.973 mho/m; ε_r = 56.126; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0460 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

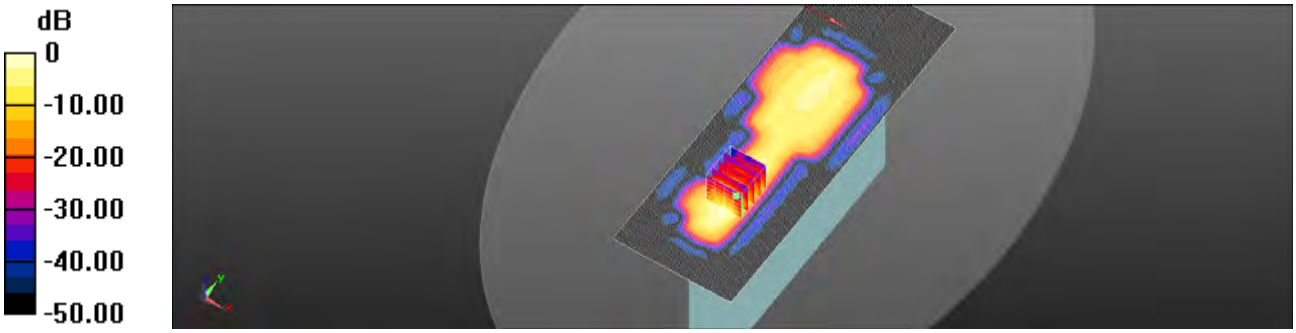
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.863 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.056 mW/g

SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.011 mW/g

Maximum value of SAR (measured) = 0.0401 mW/g



0 dB = 0.0460 mW/g = -26.74 dB mW/g

Date: 2012/9/11

Secondary Landscape_CH23790_0mm_Test Case 1

Communication System: LTE; Frequency: 710 MHz

Medium parameters used: f = 710 MHz; σ = 0.974 mho/m; ε_r = 56.108; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.571 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

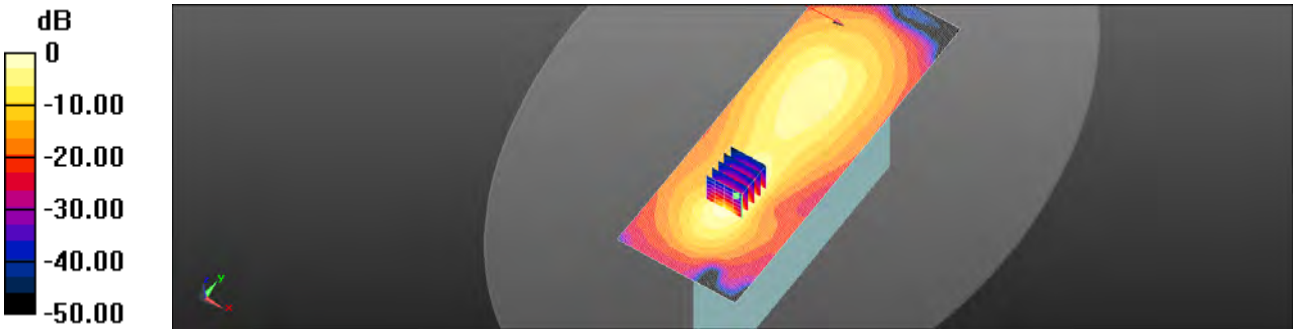
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.065 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.069 mW/g

SAR(1 g) = 0.487 mW/g; SAR(10 g) = 0.235 mW/g

Maximum value of SAR (measured) = 0.785 mW/g



0 dB = 0.571 mW/g = -4.87 dB mW/g

Date: 2012/9/11

Secondary Landscape_CH23800_0mm_Test Case 4

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.975 mho/m; ε_r = 56.098; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.340 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

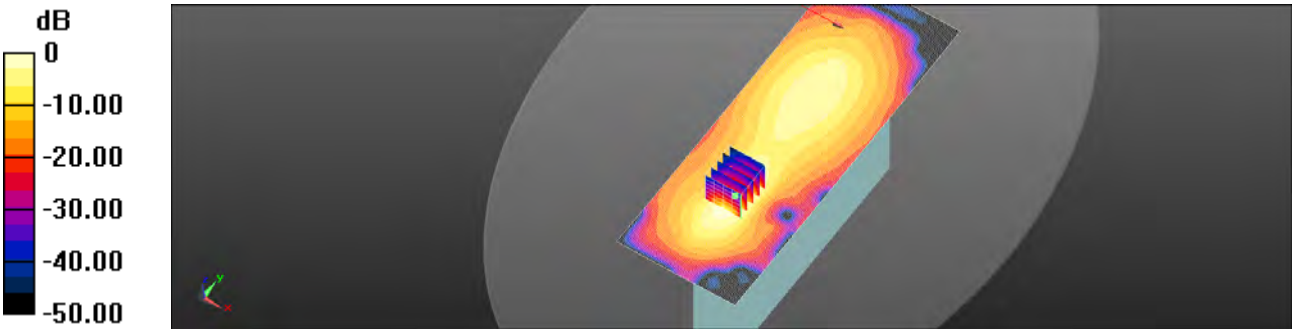
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.127 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.574 mW/g

SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.129 mW/g

Maximum value of SAR (measured) = 0.408 mW/g



0 dB = 0.340 mW/g = -9.37 dB mW/g

Date: 2012/9/12

Secondary Landscape_CH23780_0mm_Test Case 7

Communication System: LTE; Frequency: 709 MHz

Medium parameters used: f = 711 MHz; σ = 0.977 mho/m; εr = 56.154; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0508 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

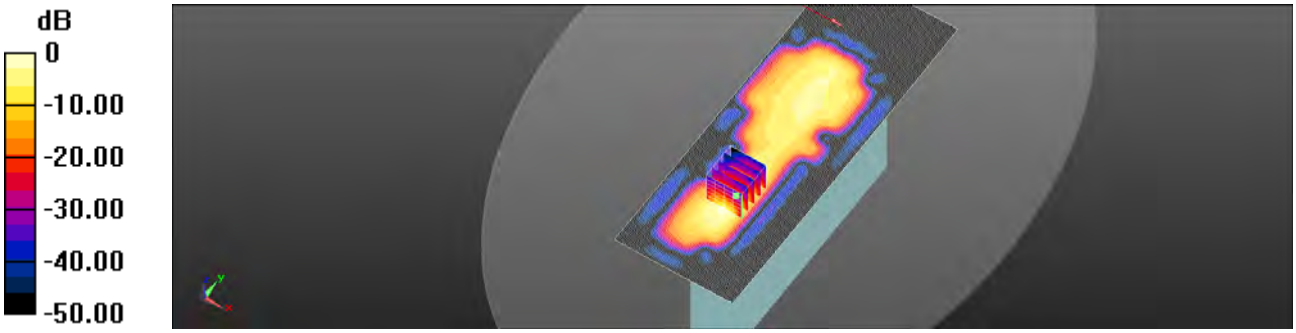
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.893 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.059 mW/g

SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.012 mW/g

Maximum value of SAR (measured) = 0.0431 mW/g



0 dB = 0.0508 mW/g = -25.88 dB mW/g

Date: 2012/9/12

Secondary Landscape_CH23800_0mm_Test Case 8

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.216 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

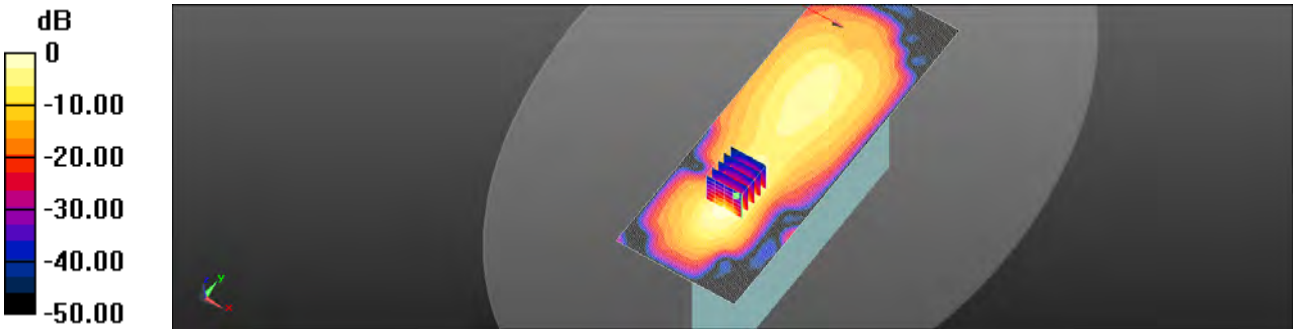
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.104 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.362 mW/g

SAR(1 g) = 0.165 mW/g; SAR(10 g) = 0.080 mW/g

Maximum value of SAR (measured) = 0.267 mW/g



0 dB = 0.216 mW/g = -13.31 dB mW/g

Date: 2012/9/12

Secondary Landscape_CH23800_0mm_Test Case 5

Communication System: LTE; Frequency: 711 MHz

Medium parameters used: f = 711 MHz; σ = 0.979 mho/m; εr = 56.113; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.507 mW/g

Configuration/Secondary Landscape/Zoom Scan (5x5x7)/Cube 0:

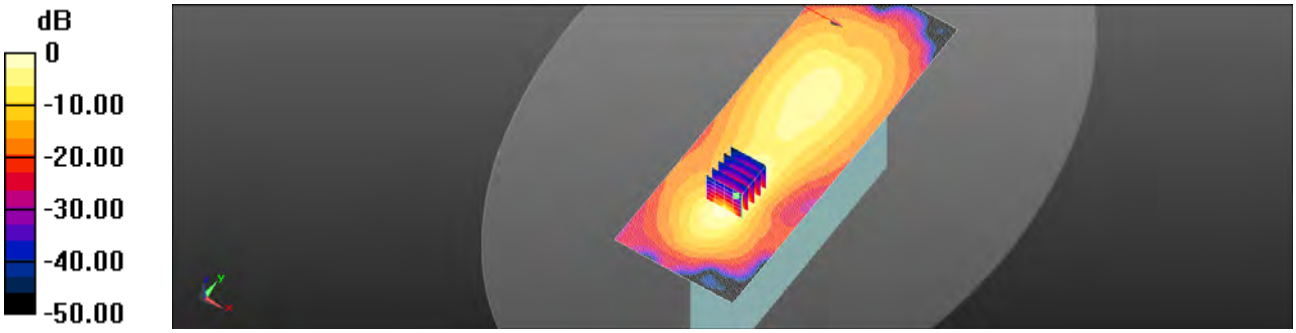
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.256 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.926 mW/g

SAR(1 g) = 0.425 mW/g; SAR(10 g) = 0.205 mW/g

Maximum value of SAR (measured) = 0.693 mW/g



0 dB = 0.507 mW/g = -5.90 dB mW/g

Date: 2012/9/12

Lap-held_WLAN802.11b_CH1

Communication System: WLAN 2.45G (FCC); Frequency: 2412 MHz

Medium parameters used: f = 2412 MHz; σ = 1.89 mho/m; ε_r = 53.074; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(6.95, 6.95, 6.95); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.214 mW/g

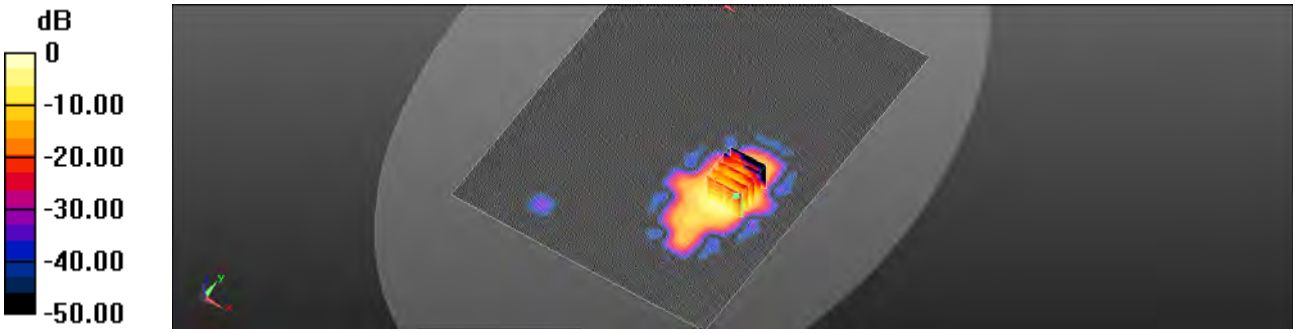
Configuration/Lap-held/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.684 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.269 mW/g

SAR(1 g) = 0.116 mW/g; SAR(10 g) = 0.046 mW/g

Maximum value of SAR (measured) = 0.169 mW/g



0 dB = 0.214 mW/g = -13.39 dB mW/g

Date: 2012/9/12

Lap-held_WLAN802.11b_CH6

Communication System: WLAN 2.45G (FCC); Frequency: 2437 MHz

Medium parameters used: f = 2437 MHz; σ = 1.931 mho/m; ε_r = 52.999; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(6.95, 6.95, 6.95); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.268 mW/g

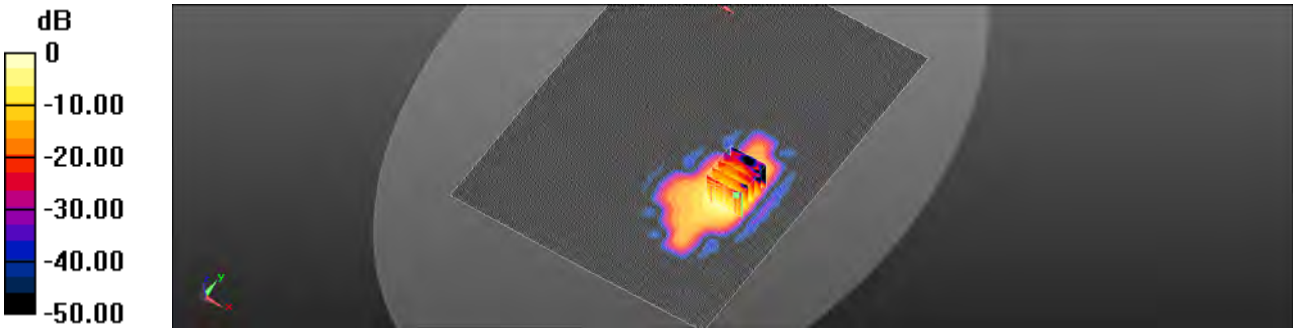
Configuration/Lap-held/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.060 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.290 mW/g

SAR(1 g) = 0.124 mW/g; SAR(10 g) = 0.049 mW/g

Maximum value of SAR (measured) = 0.182 mW/g



0 dB = 0.268 mW/g = -11.45 dB mW/g

Date: 2012/9/12

Lap-held_WLAN802.11b_CH11

Communication System: WLAN 2.45G (FCC); Frequency: 2462 MHz

Medium parameters used: f = 2462 MHz; σ = 1.968 mho/m; ε_r = 52.969; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(6.95, 6.95, 6.95); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Lap-held/Area Scan (151x201x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.239 mW/g

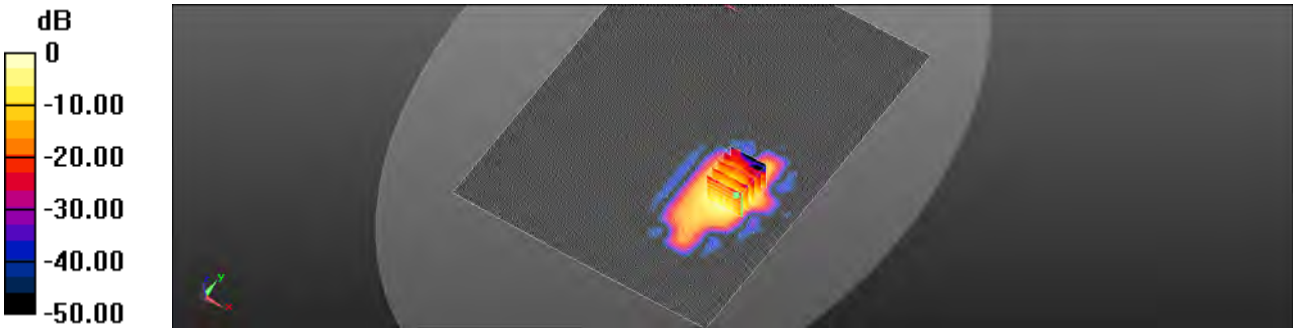
Configuration/Lap-held/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.590 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.305 mW/g

SAR(1 g) = 0.129 mW/g; SAR(10 g) = 0.051 mW/g

Maximum value of SAR (measured) = 0.183 mW/g



0 dB = 0.239 mW/g = -12.43 dB mW/g

Date: 2012/9/12

Secondary Landscape_WLAN802.11b_CH6

Communication System: WLAN 2.45G (FCC); Frequency: 2437 MHz

Medium parameters used: f = 2437 MHz; σ = 1.931 mho/m; ε_r = 52.999; ρ = 1000 kg/m^3

Phantom section: Flat Section

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

DASY Configuration:

- Probe: EX3DV4 - SN3848; ConvF(6.95, 6.95, 6.95); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Configuration/Secondary Landscape/Area Scan (71x201x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0432 mW/g

Configuration/Secondary Landscape/Zoom Scan (7x7x7)/Cube 0:

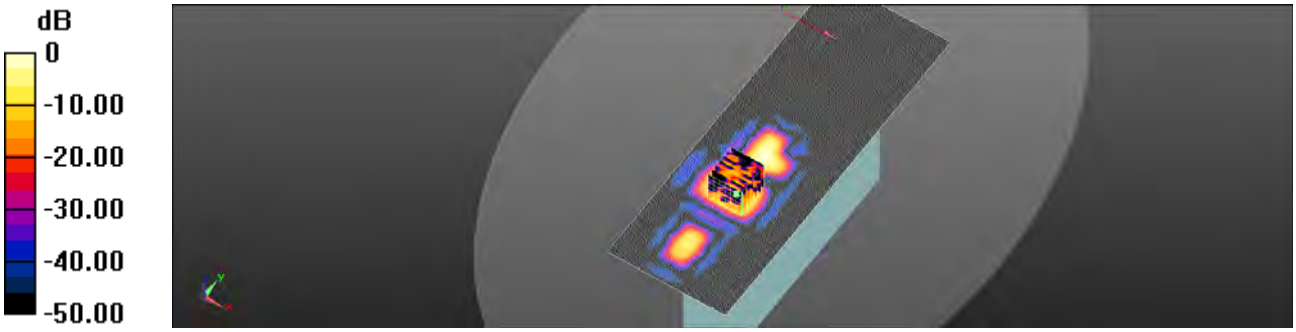
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.661 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.028 mW/g

SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00567 mW/g

Maximum value of SAR (measured) = 0.0223 mW/g



0 dB = 0.0432 mW/g = -27.29 dB mW/g

5. SAR System Performance Verification

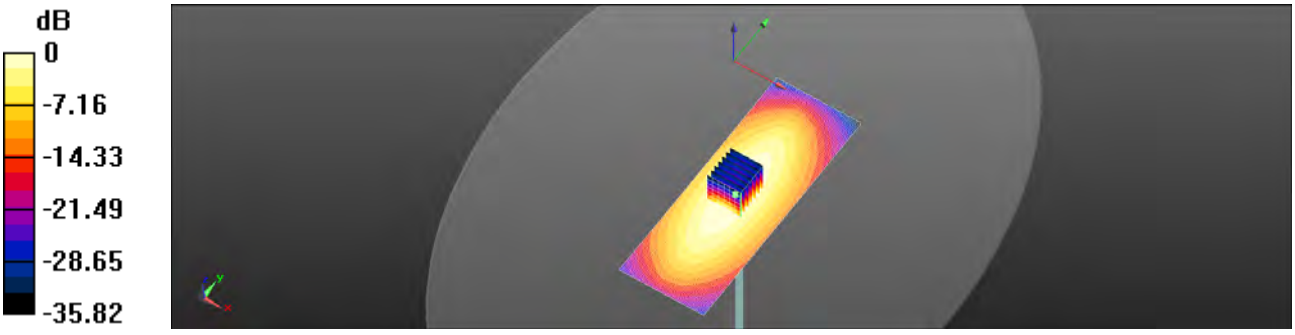
Date: 2012/9/11

Dipole_750 MHz (Body)

Communication System: CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.993 mho/m; ε_r = 55.875; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Dipole Calibration for Body Tissue:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.60 mW/g
Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.517 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 3.132 mW/g
SAR(1 g) = 2.14 mW/g; SAR(10 g) = 1.4 mW/g
Maximum value of SAR (measured) = 2.66 mW/g



0 dB = 2.68 mW/g = 8.56 dB mW/g

Date: 2012/9/12

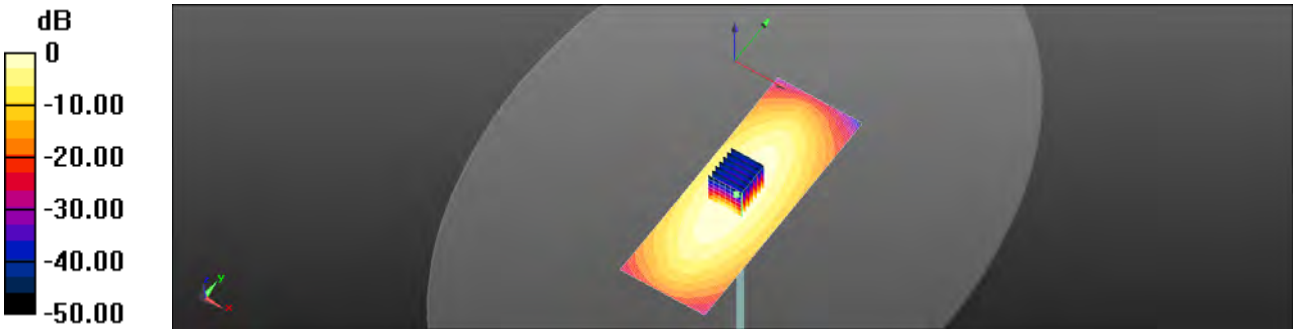
Dipole_750 MHz (Body)

Communication System: CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.996 mho/m; ε_r = 55.902; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Dipole Calibration for Body Tissue:

- Probe: EX3DV4 - SN3848; ConvF(9.24, 9.24, 9.24); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Area Scan (51x141x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.71 mW/g

Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.061 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 3.235 mW/g
SAR(1 g) = 2.16 mW/g; SAR(10 g) = 1.42 mW/g
Maximum value of SAR (measured) = 2.74 mW/g



0 dB = 2.71 mW/g = 8.67 dB mW/g

Date: 2012/9/6

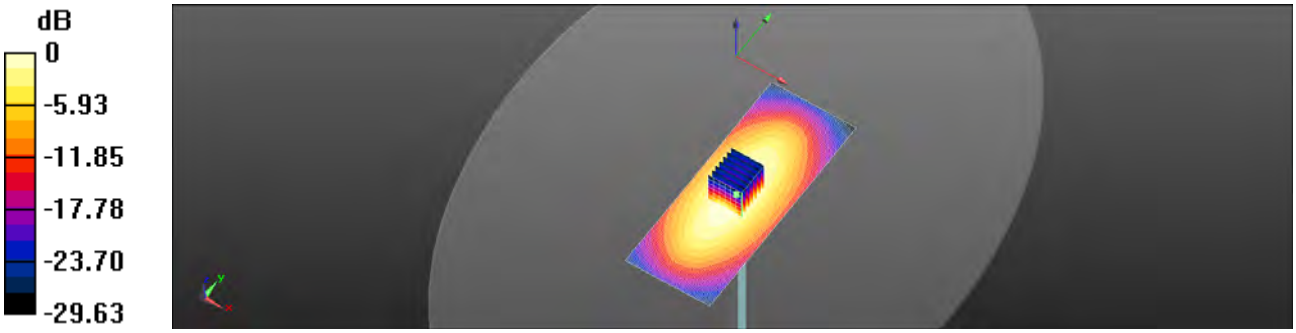
Dipole_835 MHz (Body)

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.006 mho/m; ε_r = 54.652; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Dipole Calibration for Body Tissue:

- Probe: EX3DV4 - SN3848; ConvF(9.11, 9.11, 9.11); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Area Scan (51x131x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.30 mW/g

Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.498 V/m; Power Drift = -0.30 dB
Peak SAR (extrapolated) = 3.706 mW/g
SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.54 mW/g
Maximum value of SAR (measured) = 3.09 mW/g



0 dB = 3.30 mW/g = 10.38 dB mW/g

Date: 2012/9/8

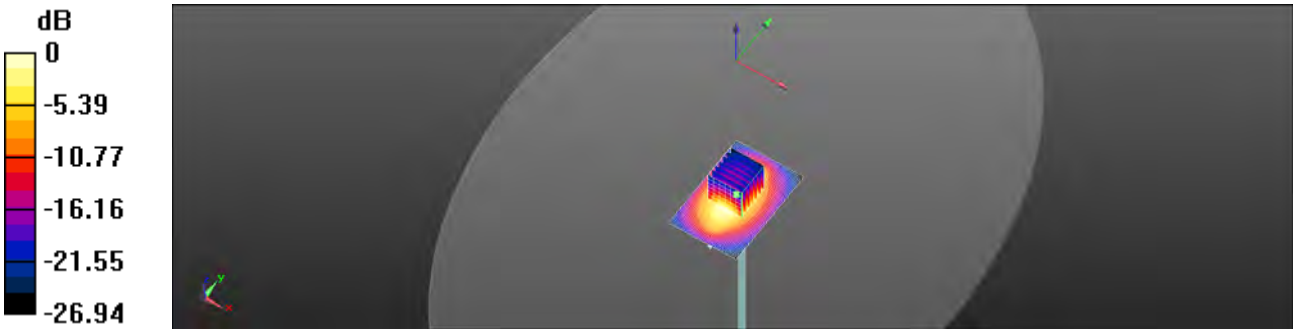
Dipole_1750 MHz (Body)

Communication System: CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.456 mho/m; ε_r = 53.881; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Dipole Calibration for Body Tissue:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250mW, d=10mm/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 13.3 mW/g

Dipole Calibration for Body Tissue/Pin=250mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.301 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 16.383 mW/g
SAR(1 g) = 9.3 mW/g; SAR(10 g) = 4.97 mW/g
Maximum value of SAR (measured) = 13.1 mW/g



0 dB = 13.3 mW/g = 22.47 dB mW/g

Date: 2012/9/9

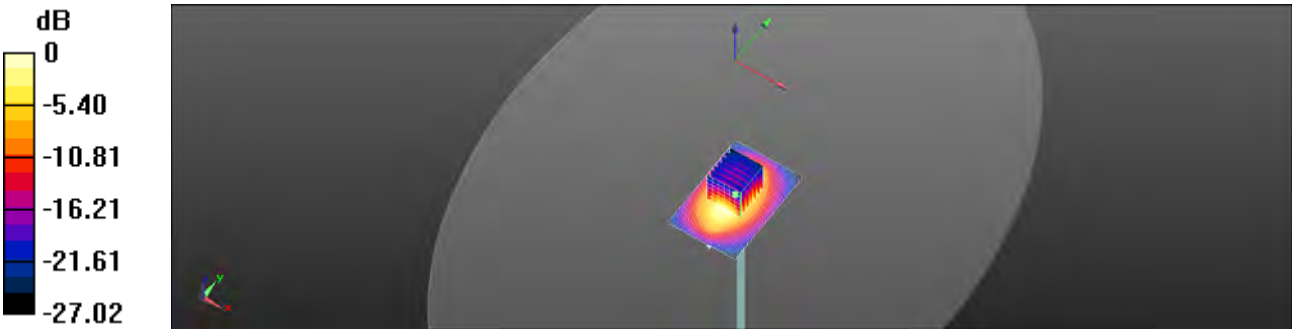
Dipole_1750 MHz (Body)

Communication System: CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.451 mho/m; ε_r = 53.993; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Dipole Calibration for Body Tissue:

- Probe: EX3DV4 - SN3848; ConvF(7.48, 7.48, 7.48); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250mW, d=10mm/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 13.1 mW/g

Dipole Calibration for Body Tissue/Pin=250mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.880 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 16.258 mW/g
SAR(1 g) = 9.26 mW/g; SAR(10 g) = 4.93 mW/g
Maximum value of SAR (measured) = 12.9 mW/g



0 dB = 13.1 mW/g = 22.34 dB mW/g

Date: 2012/9/7

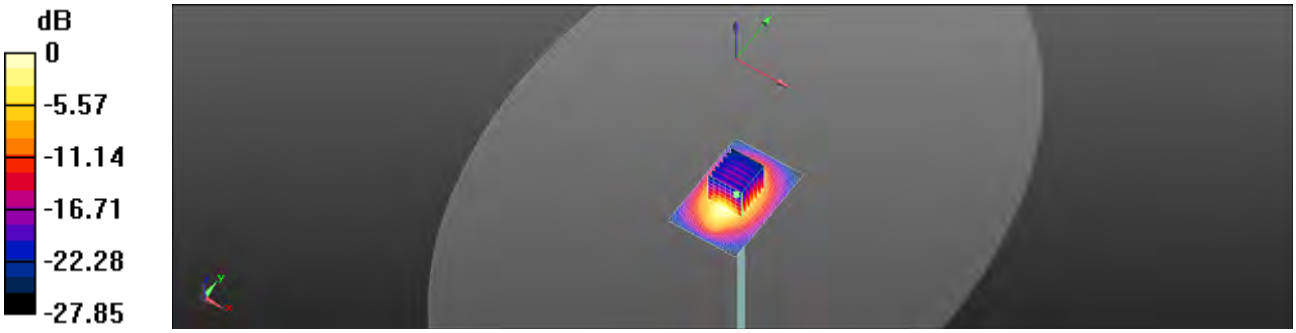
Dipole_1900 MHz (Body)

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.488 mho/m; ε_r = 52.445; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Dipole Calibration for Body Tissue:

- Probe: EX3DV4 - SN3848; ConvF(7.28, 7.28, 7.28); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250mW, d=10mm/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 14.8 mW/g

Dipole Calibration for Body Tissue/Pin=250mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.4 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 18.667 mW/g
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.37 mW/g
Maximum value of SAR (measured) = 14.7 mW/g



0 dB = 14.8 mW/g = 23.39 dB mW/g

Date: 2012/9/12

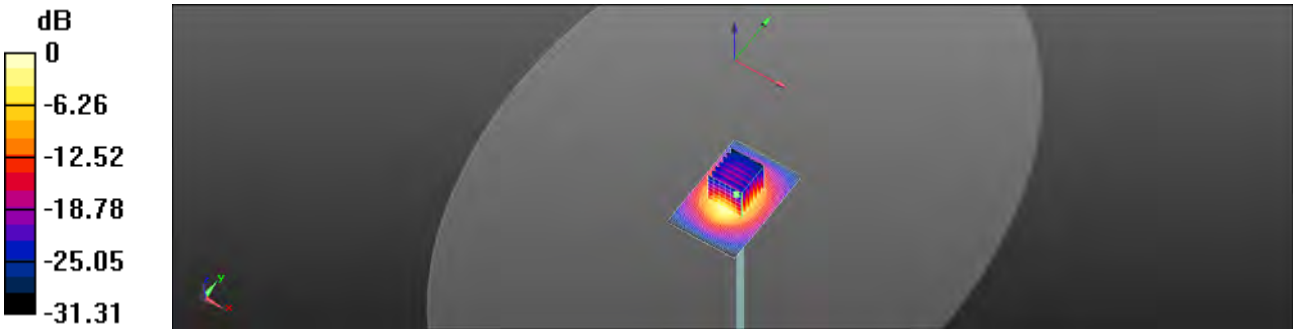
Dipole_2450 MHz (Body)

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.951 mho/m; ε_r = 52.986; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Dipole Calibration for Body Tissue:

- Probe: EX3DV4 - SN3848; ConvF(6.95, 6.95, 6.95); Calibrated: 2012/6/4;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1336; Calibrated: 2012/6/5
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1141
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250mW, d=10mm/Area Scan (41x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 19.9 mW/g

Dipole Calibration for Body Tissue/Pin=250mW, d=10mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.799 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 26.434 mW/g
SAR(1 g) = 12.5 mW/g; SAR(10 g) = 5.72 mW/g
Maximum value of SAR (measured) = 19.1 mW/g



0 dB = 19.9 mW/g = 25.96 dB mW/g

6. DAE & Probe Calibration Certificate

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

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

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

Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: DAE4-1336_Jun12

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 1336
Calibration procedure(s)	QA CAL-06.v24 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	June 05, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: June 5, 2012

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

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

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

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

Accreditation No.: SCS 108

Glossary

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

Methods Applied and Interpretation of Parameters

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

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	403.371 ± 0.1% (k=2)	403.127 ± 0.1% (k=2)	403.194 ± 0.1% (k=2)
Low Range	3.96695 ± 0.7% (k=2)	3.96890 ± 0.7% (k=2)	3.99405 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	122.5 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199994.11	-3.29	-0.00
Channel X	+ Input	20001.83	0.90	0.00
Channel X	- Input	-19999.76	0.45	-0.00
Channel Y	+ Input	199997.52	0.39	0.00
Channel Y	+ Input	19998.61	-2.15	-0.01
Channel Y	- Input	-20001.36	-1.00	0.00
Channel Z	+ Input	199993.95	-3.37	-0.00
Channel Z	+ Input	19998.98	-1.78	-0.01
Channel Z	- Input	-20001.47	-0.97	0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2002.07	0.90	0.04
Channel X	+ Input	202.26	0.62	0.31
Channel X	- Input	-197.79	0.45	-0.23
Channel Y	+ Input	2001.57	0.59	0.03
Channel Y	+ Input	201.46	-0.01	-0.01
Channel Y	- Input	-198.80	-0.34	0.17
Channel Z	+ Input	2001.54	0.51	0.03
Channel Z	+ Input	200.53	-1.00	-0.50
Channel Z	- Input	-199.57	-1.21	0.61

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	5.99	4.73
	- 200	-3.24	-5.13
Channel Y	200	4.30	4.27
	- 200	-5.85	-5.85
Channel Z	200	8.94	9.05
	- 200	-12.06	-12.09

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	6.36	-0.99
Channel Y	200	9.20	-	7.23
Channel Z	200	8.41	6.54	-

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4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	15917	15922
Channel Y	15876	15535
Channel Z	15842	16395

5. Input Offset Measurement

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

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	1.30	-0.23	2.19	0.37
Channel Y	-0.29	-1.58	1.23	0.56
Channel Z	-2.08	-3.18	-0.96	0.49

6. Input Offset Current

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

7. Input Resistance (Typical values for information)

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

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

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

9. Power Consumption (Typical values for information)

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

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S Schweizerischer Kalibrierdienst
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Accreditation No.: **SCS 108**

Client **SGS-TW (Auden)** Certificate No: **EX3-3848_Jun12**

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3848

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

Calibration date: June 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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	10-Jan-12 (No. DAE4-660_Jan12)	Jan-13
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

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

Issued: June 5, 2012

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Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3848

Manufactured: October 25, 2011
Calibrated: June 4, 2012

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3848

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.35	0.40	0.45	± 10.1 %
DCP (mV)[B]	105.4	102.1	99.4	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.00	0.00	1.00	177.0	±3.5 %
			Y	0.00	0.00	1.00	188.5	
			Z	0.00	0.00	1.00	199.4	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3848

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	9.19	9.19	9.19	0.38	0.93	± 12.0 %
835	41.5	0.90	8.90	8.90	8.90	0.35	1.03	± 12.0 %
900	41.5	0.97	8.73	8.73	8.73	0.28	1.15	± 12.0 %
1750	40.1	1.37	7.82	7.82	7.82	0.80	0.55	± 12.0 %
1900	40.0	1.40	7.55	7.55	7.55	0.29	0.88	± 12.0 %
2000	40.0	1.40	7.54	7.54	7.54	0.41	0.74	± 12.0 %
2300	39.5	1.67	7.15	7.15	7.15	0.35	0.75	± 12.0 %
2450	39.2	1.80	6.78	6.78	6.78	0.53	0.66	± 12.0 %
2600	39.0	1.96	6.62	6.62	6.62	0.29	0.99	± 12.0 %
5200	36.0	4.66	5.24	5.24	5.24	0.30	1.80	± 13.1 %
5300	35.9	4.76	4.99	4.99	4.99	0.32	1.80	± 13.1 %
5600	35.5	5.07	4.85	4.85	4.85	0.30	1.80	± 13.1 %
5800	35.3	5.27	4.65	4.65	4.65	0.40	1.80	± 13.1 %

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

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DASY/EASY - Parameters of Probe: EX3DV4 - SN:3848

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	9.24	9.24	9.24	0.34	0.99	± 12.0 %
835	55.2	0.97	9.11	9.11	9.11	0.54	0.76	± 12.0 %
900	55.0	1.05	8.99	8.99	8.99	0.29	1.13	± 12.0 %
1750	53.4	1.49	7.48	7.48	7.48	0.38	0.88	± 12.0 %
1900	53.3	1.52	7.28	7.28	7.28	0.39	0.83	± 12.0 %
2000	53.3	1.52	7.42	7.42	7.42	0.28	1.01	± 12.0 %
2300	52.9	1.81	7.10	7.10	7.10	0.46	0.74	± 12.0 %
2450	52.7	1.95	6.95	6.95	6.95	0.80	0.50	± 12.0 %
2600	52.5	2.16	6.74	6.74	6.74	0.80	0.54	± 12.0 %
5200	49.0	5.30	4.40	4.40	4.40	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.17	4.17	4.17	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.88	3.88	3.88	0.50	1.90	± 13.1 %
5800	48.2	6.00	3.87	3.87	3.87	0.60	1.90	± 13.1 %

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

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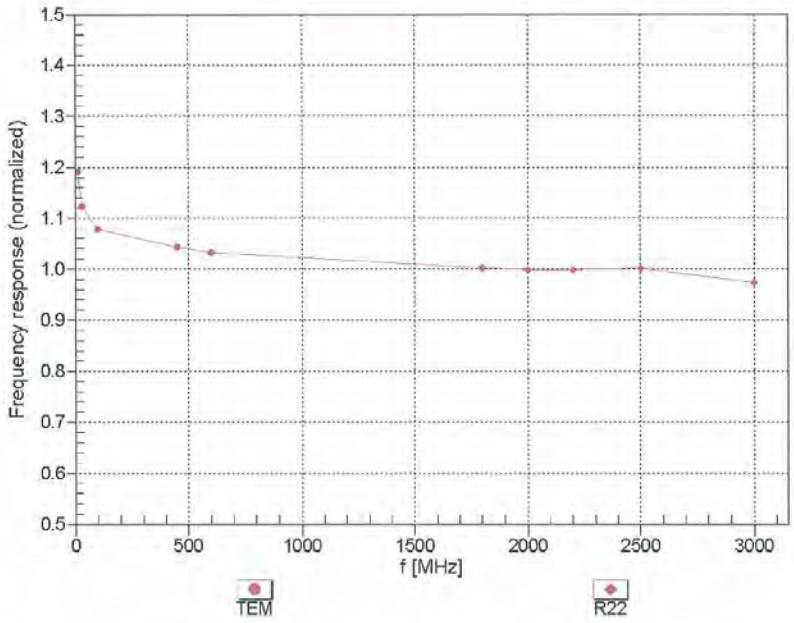
EX3DV4– SN:3848 June 4, 2012

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



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

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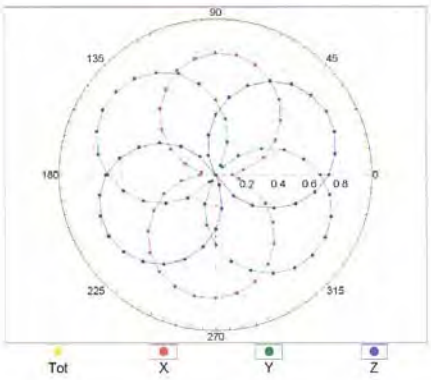
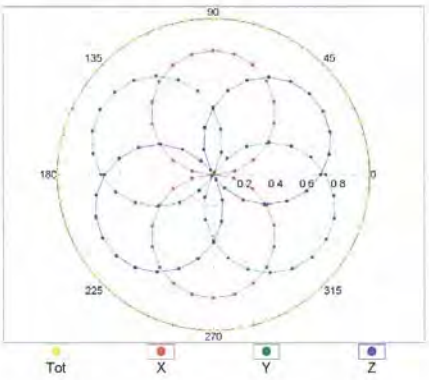
EX3DV4– SN:3848 June 4, 2012

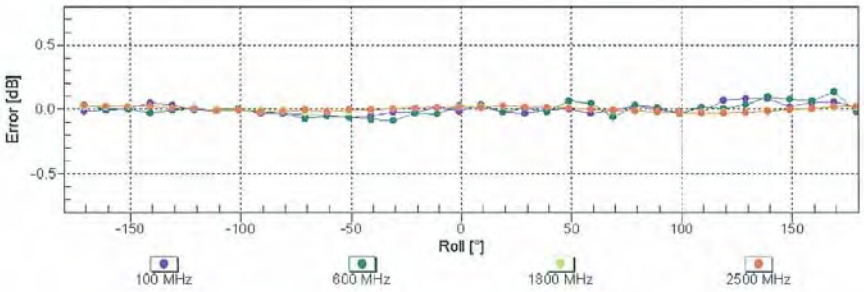
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22





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

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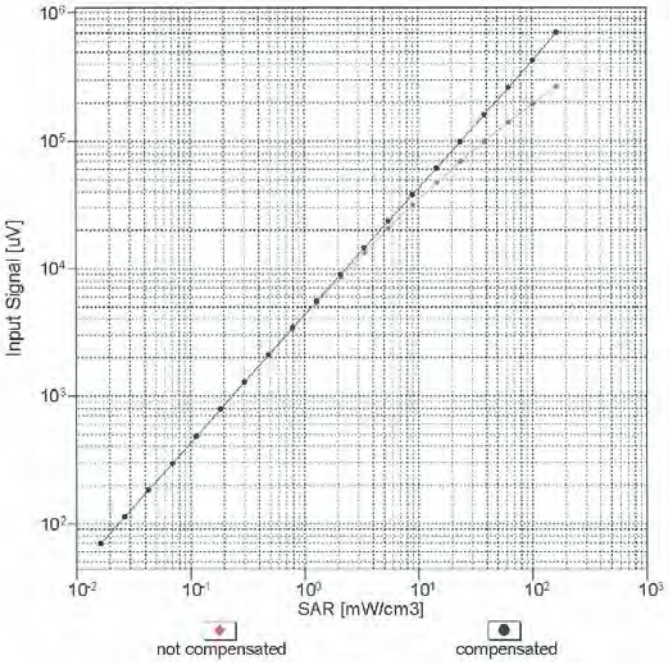
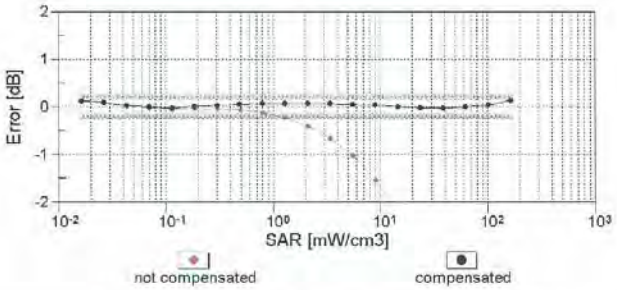
Dynamic Range f(SAR$_{head}$)
(TEM cell , f = 900 MHz)





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

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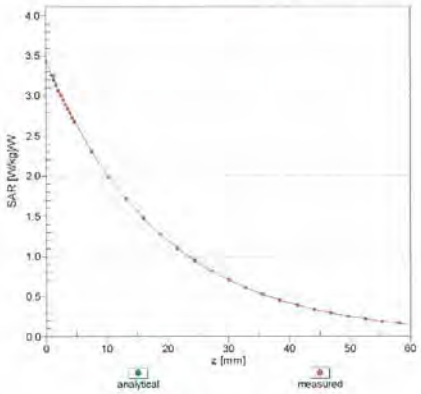
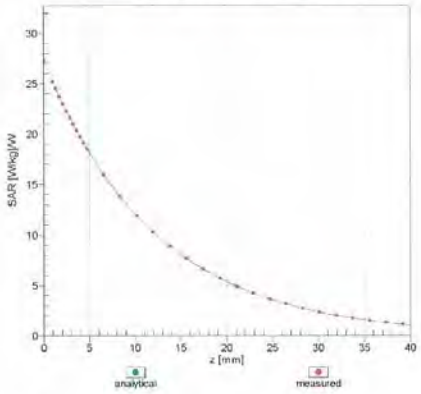
EX3DV4– SN:3848 June 4, 2012

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

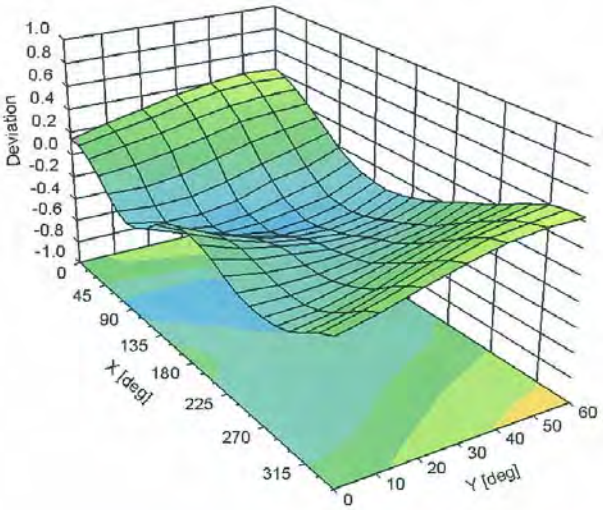


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

Certificate No: EX3-3848_Jun12 Page 10 of 11

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3848

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	59
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

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/ Uncertaint	Probabilit y	Div	Div Value	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
Measurement system									
Probe calibration(under	6.00%	N	1	1	1	1	6.00%	6.00%	∞
Isotropy , Axial	3.50%	R	√3	1.732	1	1	2.02%	2.02%	∞
Isotropy, Hemispherical	9.60%	R	√3	1.732	1	1	5.54%	5.54%	∞
Boundary Effect	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Linearity	4.70%	R	√3	1.732	1	1	2.71%	2.71%	∞
Detection Limits	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Readout Electronics	0.30%	N	1	1	1	1	0.30%	0.30%	∞
Response time	0.80%	R	√3	1.732	1	1	0.46%	0.46%	∞
Integration Time	2.60%	R	√3	1.732	1	1	1.50%	1.50%	∞
Measurement drift (class A	1.75%	R	√3	1.732	1	1	1.01%	1.01%	∞
RF ambient condition - noise	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
RF ambient conditions -	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
Probe positioner Mechanical	0.40%	R	√3	1.732	1	1	0.23%	0.23%	∞
Probe Positioning with respect to	2.90%	R	√3	1.732	1	1	1.67%	1.67%	∞
Post-processing	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Max SAR Eval	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Test Sample related									
Test sample positioning	2.90%	N	1	1	1	1	2.90%	2.90%	M-1
Device Holder Uncertainty	3.60%	N	1	1	1	1	3.60%	3.60%	M-1
Drift of output power	5.00%	R	√3	1.732	1	1	2.89%	2.89%	∞
Phantom and Setup									
Phantom Uncertainty	4.00%	R	√3	1.732	1	1	2.31%	2.31%	∞
Liquid conductivity(meas.	4.60%	N	1	1	0.64	0.43	2.94%	1.98%	M
Liquid permitivity(meas.)	2.17%	N	1	1	0.6	0.49	1.30%	1.06%	M
Combined standard		RSS					11.72%	11.49%	
Expant uncertainty (95% confidence							23.44%	22.98%	

8. Phantom Description

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

Certificate of Conformity / First Article Inspection

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

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

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

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

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

Date 07.07.2005

Signature / Stamp

Schmid & Partner Engineering AG
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Doc No 841 – QD 000 P40 C – F Page 1 (1)

9. System Validation from Original Equipment Supplier

Calibration Laboratory of
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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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

Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: D750V3-1015_Aug12

CALIBRATION CERTIFICATE

Object	D750V3 - SN: 1015
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 24, 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	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

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

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

Issued: August 24, 2012

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

Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY5	V52.8.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.4 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.11 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**8.37 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.38 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**5.49 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.4 ± 6 %	0.95 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.20 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**8.83 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.45 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**5.82 mW / g ± 16.5 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.9 Ω + 0.4 jΩ
Return Loss	- 26.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.9 Ω - 2.8 jΩ
Return Loss	- 31.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.009 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 22, 2010

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DASY5 Validation Report for Head TSL

Date: 24.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1015

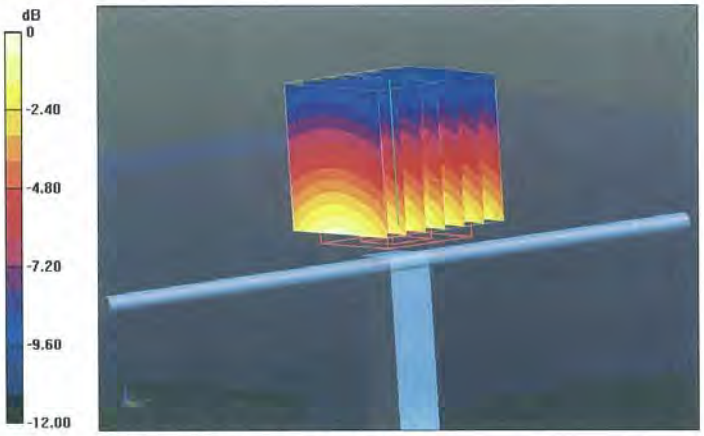
Communication System: CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.89 mho/m; ε_r = 40.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.33, 6.33, 6.33); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

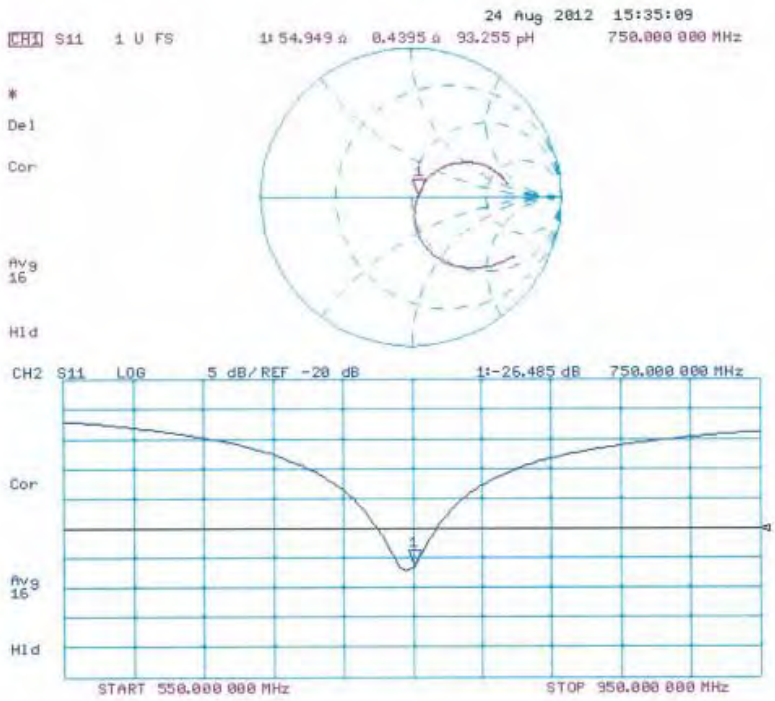
Dipole Calibration for Head Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.057 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.197 mW/g
SAR(1 g) = 2.11 mW/g; SAR(10 g) = 1.38 mW/g
Maximum value of SAR (measured) = 2.46 W/kg



0 dB = 2.46 W/kg = 7.82 dB W/kg

Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 24.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1015

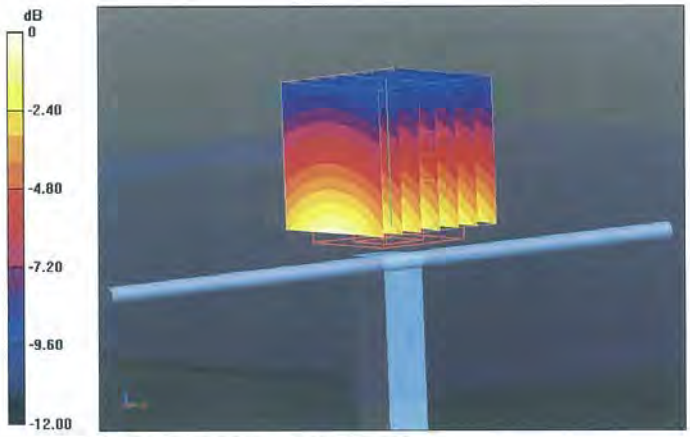
Communication System: CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.95 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.12, 6.12, 6.12); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

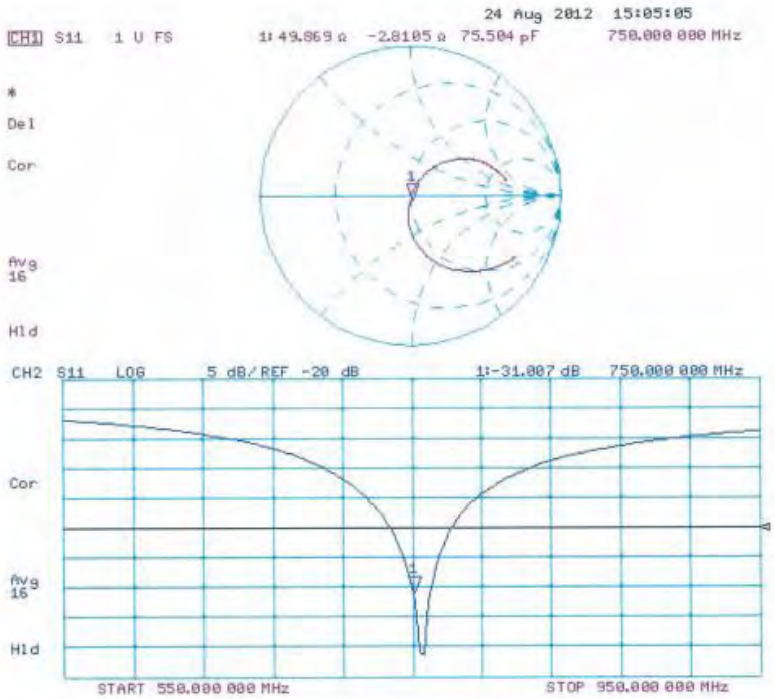
Dipole Calibration for Body Tissue/Pin=250mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.057 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.288 mW/g
SAR(1 g) = 2.2 mW/g; SAR(10 g) = 1.45 mW/g
Maximum value of SAR (measured) = 2.57 W/kg



0 dB = 2.57 W/kg = 8.20 dB W/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client **SGS-TW (Auden)**

Certificate No: **D835V2-4d063_May12**

CALIBRATION CERTIFICATE

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

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: May 25, 2012

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Accredited by the Swiss Accreditation Service (SAS)
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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.36 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.47 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.18 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	1.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.46 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.58 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.62 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.35 mW / g ± 16.5 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.6 Ω + 0.3 jΩ
Return Loss	- 29.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.0 Ω - 2.9 jΩ
Return Loss	- 28.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.390 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 27, 2006

DASY5 Validation Report for Head TSL

Date: 25.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

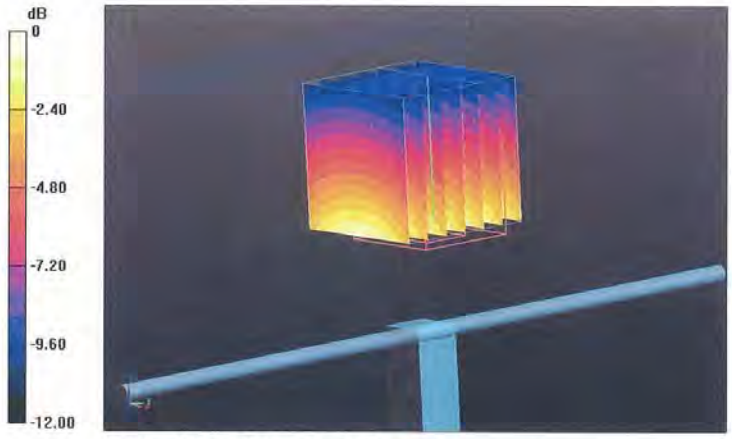
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d063

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

DASY52 Configuration:

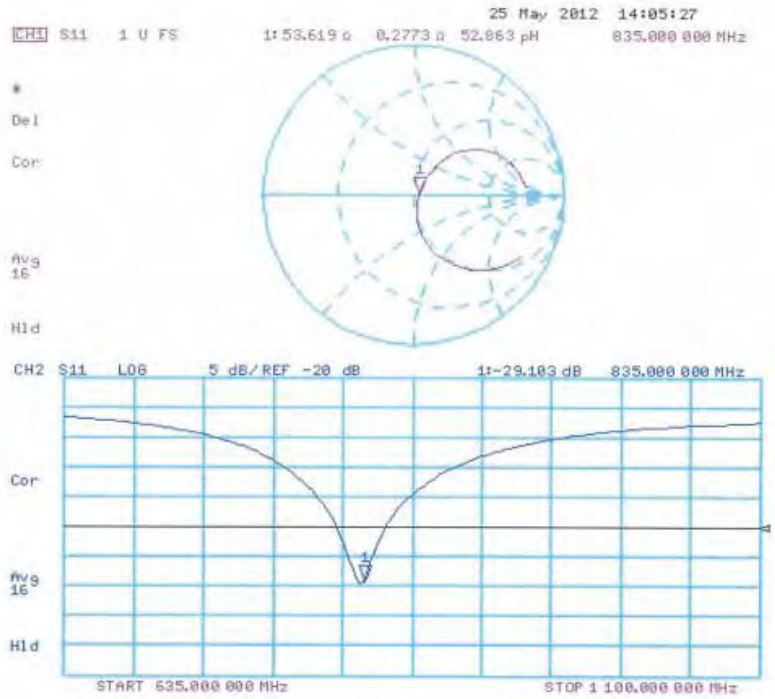
- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm 2/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.199 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.481 mW/g
SAR(1 g) = 2.36 mW/g; SAR(10 g) = 1.54 mW/g
Maximum value of SAR (measured) = 2.75 mW/g



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

Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 25.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

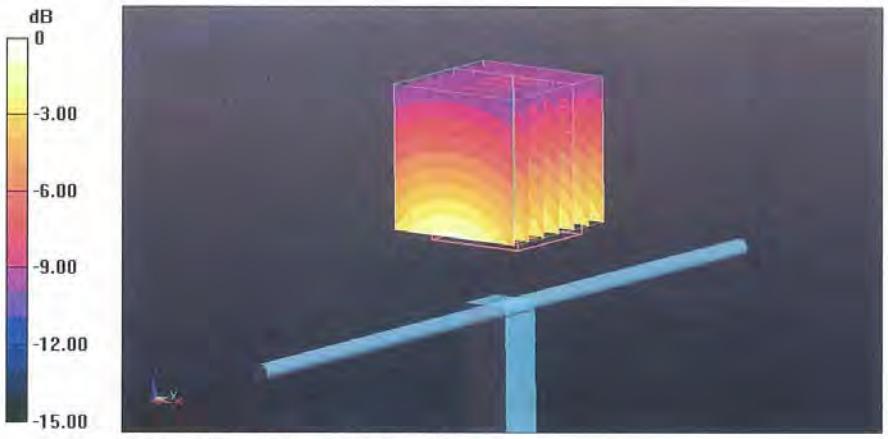
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

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

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



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

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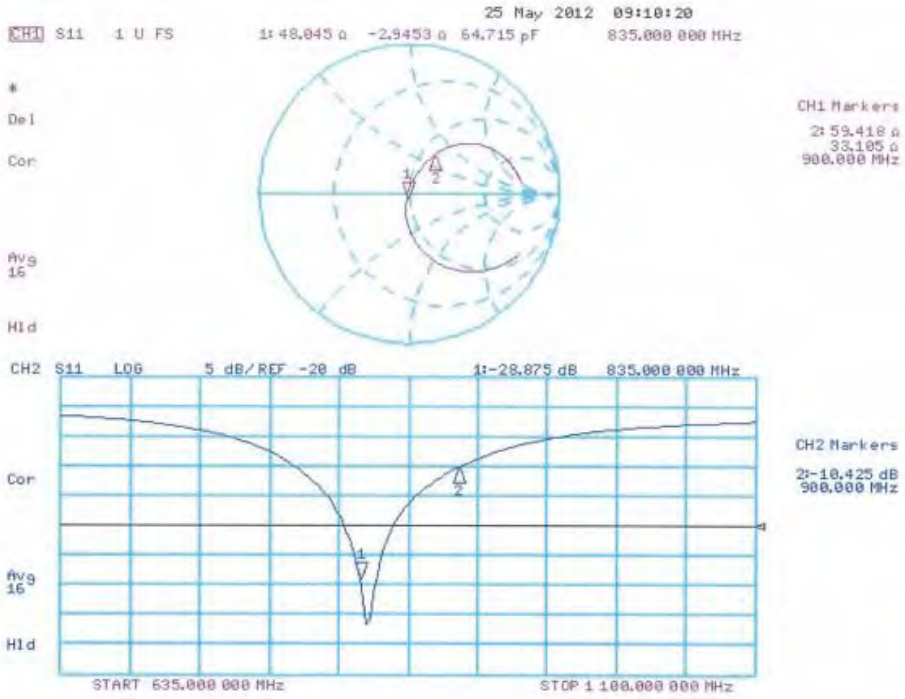
Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: D1750V2-1008_May12

CALIBRATION CERTIFICATE

Object	D1750V2 - SN: 1008
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	May 29, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: May 29, 2012

Calibration Laboratory of
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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.5 ± 6 %	1.34 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.76 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**35.6 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.69 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**19.0 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.9 ± 6 %	1.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.03 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**36.5 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.88 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**19.7 mW / g ± 16.5 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.1 Ω - 0.5 jΩ
Return Loss	- 45.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.0 Ω - 0.3 jΩ
Return Loss	- 27.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.222 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	February 11, 2009

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DASY5 Validation Report for Head TSL

Date: 29.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1008

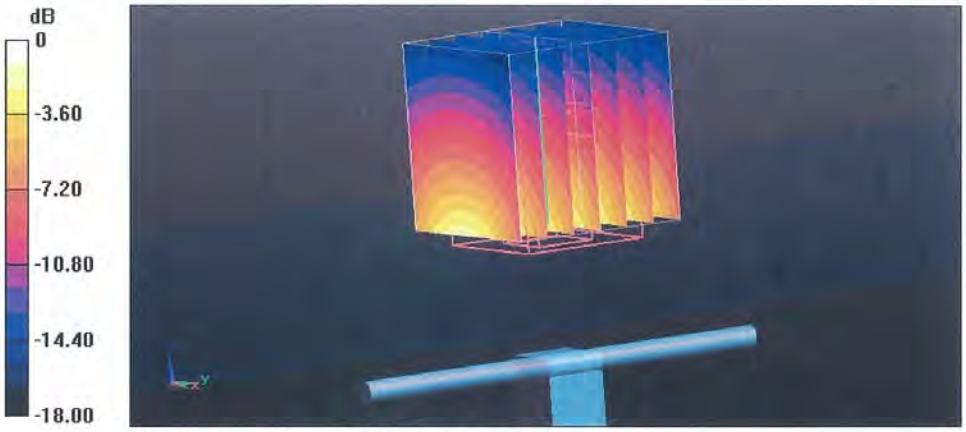
Communication System: CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.34 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.22, 5.22, 5.22); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

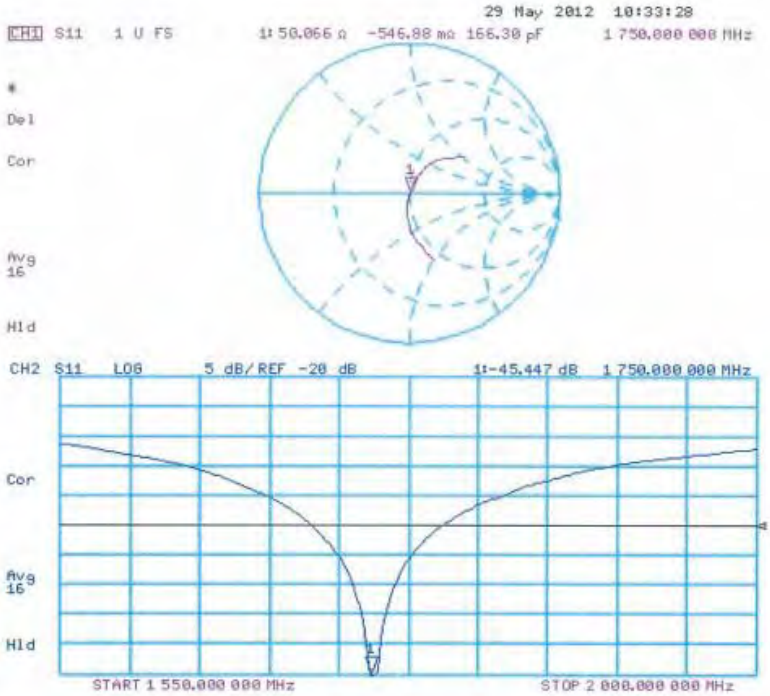
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.240 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 15.463 mW/g
SAR(1 g) = 8.76 mW/g; SAR(10 g) = 4.69 mW/g
Maximum value of SAR (measured) = 10.9 mW/g



0 dB = 10.9 mW/g = 20.75 dB mW/g

Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 29.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1008

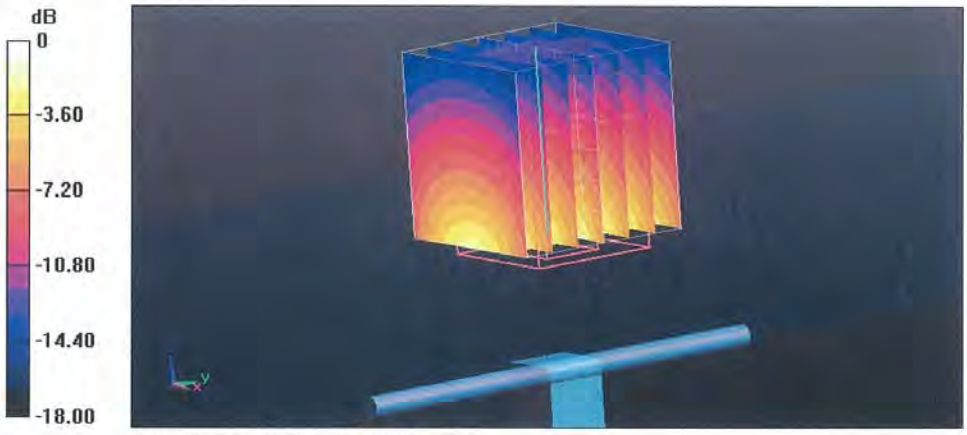
Communication System: CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.46 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.85, 4.85, 4.85); 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 = 92.190 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 15.359 mW/g
SAR(1 g) = 9.03 mW/g; SAR(10 g) = 4.88 mW/g
Maximum value of SAR (measured) = 11.4 mW/g



0 dB = 11.4 mW/g = 21.14 dB mW/g

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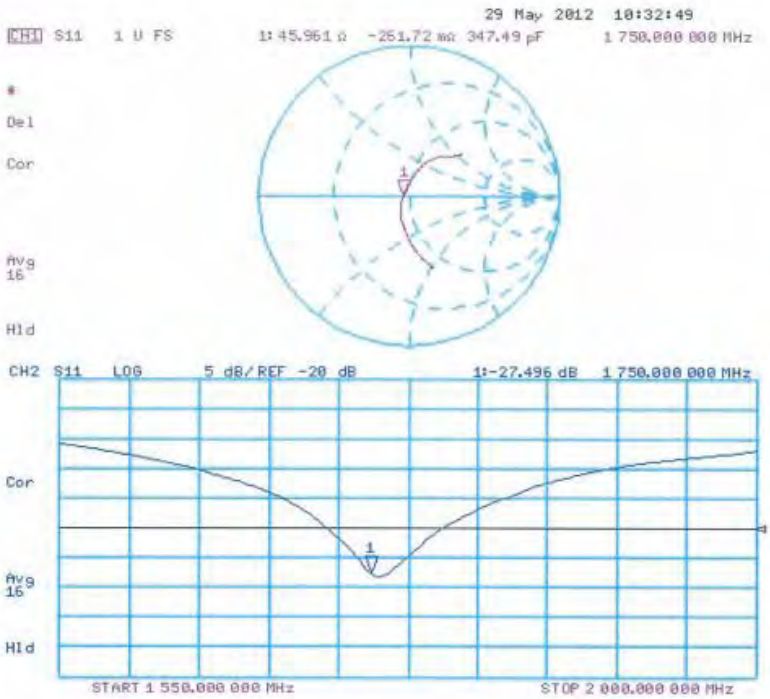
Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: D1900V2-5d027_Apr12

CALIBRATION CERTIFICATE

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

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: April 26, 2012

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Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

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Measurement Conditions

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

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.8 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.43 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**38.4 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.96 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.1 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.3 ± 6 %	1.51 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**40.2 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.30 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.3 mW / g ± 16.5 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.5 Ω + 4.5 jΩ
Return Loss	- 26.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.2 Ω + 4.5 jΩ
Return Loss	- 24.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 17, 2002

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DASY5 Validation Report for Head TSL

Date: 26.04.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

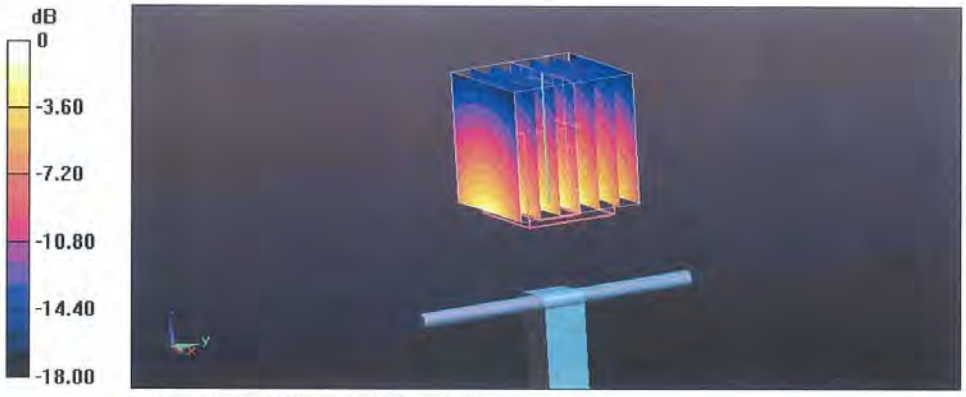
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.37 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

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

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



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

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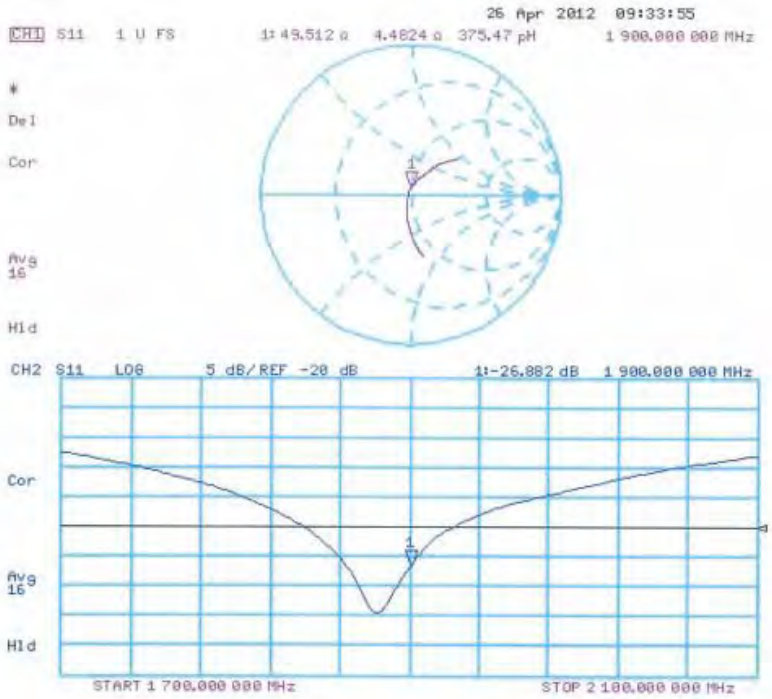
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 26.04.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

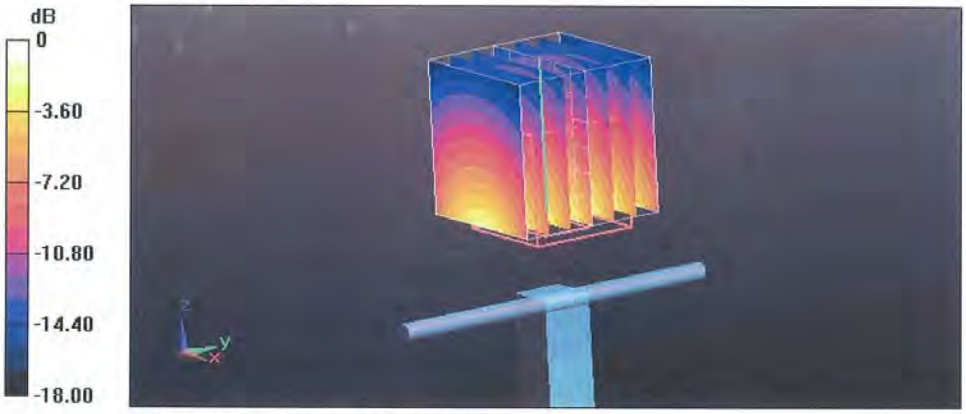
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.51 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

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

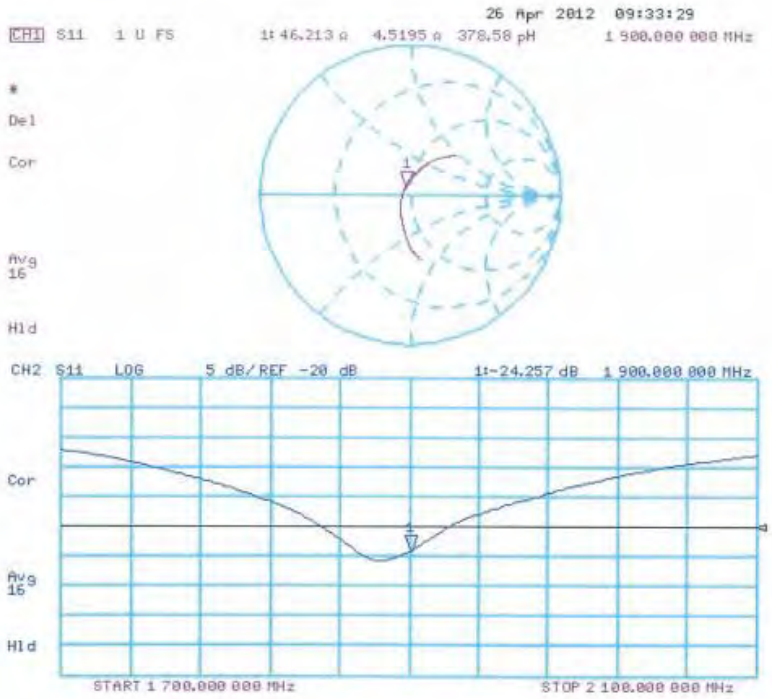
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

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



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

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client SGS-TW (Auden)

Certificate No: D2450V2-727_Apr12

CALIBRATION CERTIFICATE

Object D2450V2 - SN: 727

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

Calibration date: April 25, 2012

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

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

Calibration Equipment used (M&TE critical for calibration)

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

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

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

Issued: April 25, 2012

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

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.6 ± 6 %	1.81 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.8 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**51.2 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.95 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**23.8 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.4 ± 6 %	1.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.7 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**50.4 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.92 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**23.6 mW / g ± 16.5 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.6 Ω + 2.8 jΩ
Return Loss	- 27.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.3 Ω + 3.9 jΩ
Return Loss	- 27.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.149 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 09, 2003

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DASY5 Validation Report for Head TSL

Date: 25.04.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

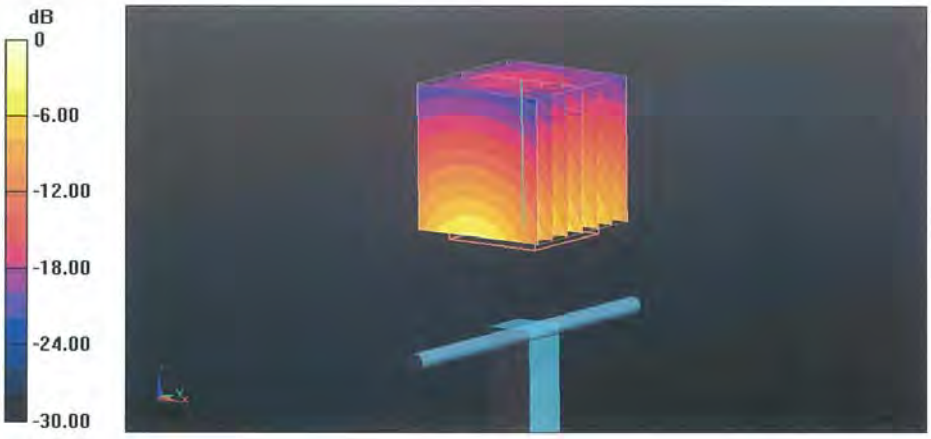
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.81 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

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

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.712 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 26.388 mW/g
SAR(1 g) = 12.8 mW/g; SAR(10 g) = 5.95 mW/g
Maximum value of SAR (measured) = 16.4 mW/g



0 dB = 16.4 mW/g = 24.30 dB mW/g

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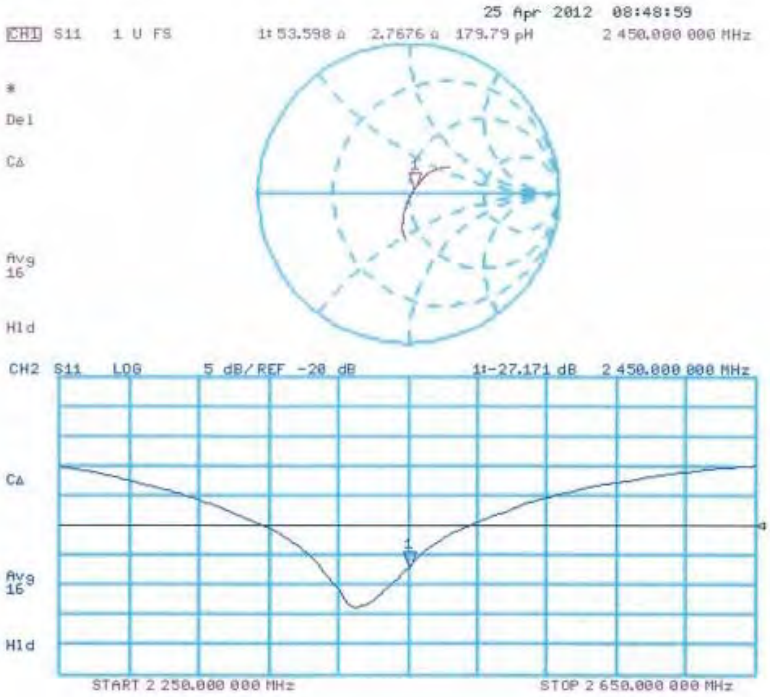
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 25.04.2012

Test Laboratory: SPEAG, Zurich, Switzerland

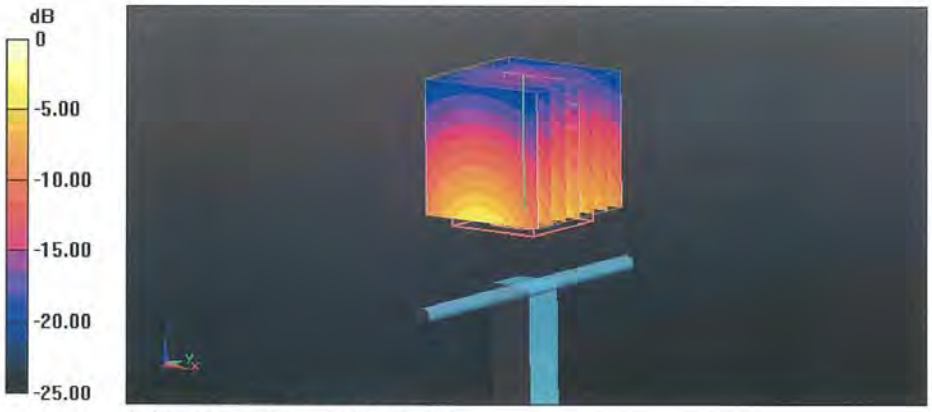
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 727

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

DASY52 Configuration:

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

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



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

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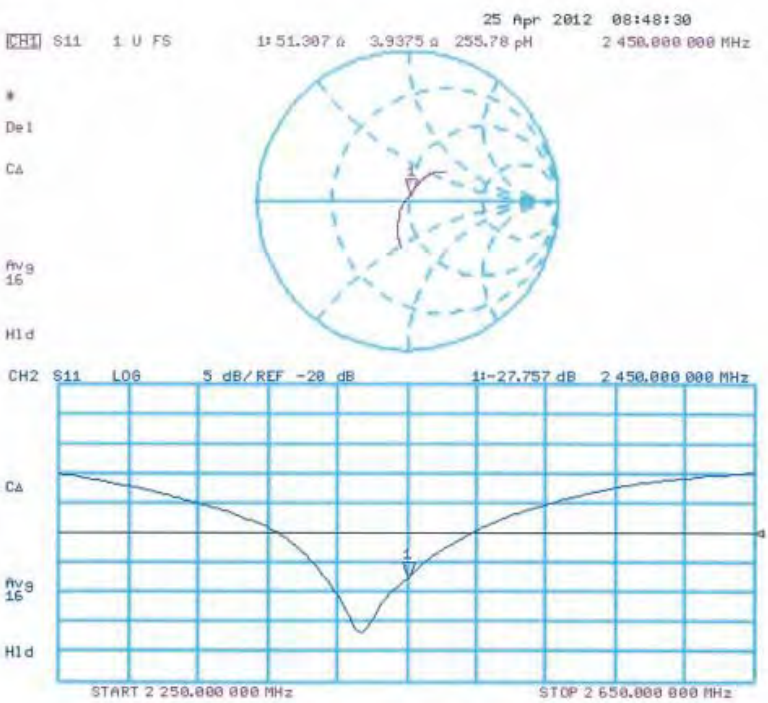
Impedance Measurement Plot for Body TSL



- End of 1st part of report -

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