

Intermec Technologies Corporation

Model: 1000CP03S

Evaluated to the following SAR Specifications:

FCC 2.1093: 2012
Health Safety Code 6:2009

Report No. INMC0746

Report Prepared By



www.nwemc.com
1-888-EMI-CERT

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SAR Evaluation Report

Certificate of Evaluation

Last Date of Test: January 13, 2012
Intermec Technologies Corporation
Model: 1000CP03S

Applicable Standards			
Test Description	Specification	Test Method	Pass/Fail
SAR Evaluation	FCC 2.1093:2012 FCC 15.247:2012 FCC 15.407:2012	FCC OET 65C:2001	Pass
		IEEE Std 1528:2003	
		FCC KDB 447498 D01 v04	
		FCC KDB 248227 D01 v01r02	
		FCC KDB 648474 D01 v01r05	
	FCC 865664		
	Health Safety Code 6:2009	RSS-102, Issue 4:2010	Pass

Highest SAR Values				
Frequency Band (GHz)	Head 1g (W/kg)	Body 1g (W/kg)	Limit 1g (W/kg)	Exposure Environment
2.4	0.048	0.207	1.6	General Population Uncontrolled
5 .2, 5.3, 5.5. & 5.8	0.069	0.296		

Modifications made to the product
See the Modifications section of this report

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124

Phone: (503) 844-4066 Fax: 844-3826

Approved By:



Don Facticeau, IS Manager



NVLAP Lab Code: 200630-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
00			

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.



Accreditations and Authorizations

FCC

Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

NVLAP

Northwest EMC, Inc. is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. NVLAP is administered by the National Institute of Standards and Technology (NIST), an agency of the U.S. Commerce Department. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

Industry Canada

Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-Gen, Issue 2 and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1*)

CAB

Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

Australia/New Zealand

The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).



Accreditations and Authorizations

VCCI

Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (*Registration Numbers. - Hillsboro: C-1071, R-1025, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-1784, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634.*)

BSMI

Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement (US0017).

GOST

Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (*Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157, Brooklyn Park: US0175*)

VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.

SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>



Northwest EMC Locations



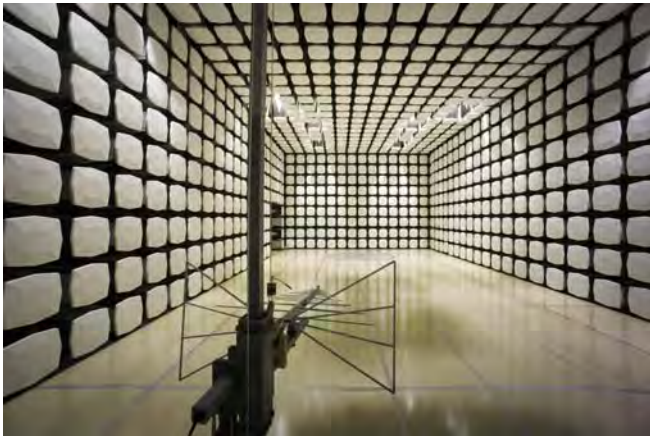
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
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Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796



Party Requesting the Test

Company Name:	Intermec Technologies Corporation
Address:	550 Second St. SE
City, State, Zip:	Cedar Rapids, IA 52401-2023
Test Requested By:	Stu Adams
Model:	1000CP03S
First Date of Test:	January 5, 2012
Last Date of Test:	January 13, 2012
Receipt Date of Samples:	December 21, 2011
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test)

The EUT is the Model 1000CP03S handheld computer containing two radio modules, the Intermec Model RC12 and the Sierra Wireless MC8355, each with their own integral antenna.

The Intermec Model RC12 radio module is an 802.11a/b/g/n – Bluetooth radio. It is not capable of 40 MHz channel operation. The 802.11a/b/g/n and Bluetooth radios share the same antenna, but cannot transmit simultaneously. The frequency range of the 802.11a/b/g/n radio:

- 2412 – 2462 MHz
- 5180 – 5320 MHz
- 5500 – 5700 MHz
- 5745 – 5825 MHz

The frequency range of the Bluetooth radio:

- 2402 – 2480 MHz

The Sierra Wireless MC8355 radio module is a WWAN radio supporting both UMTS and CDMA operation. Its frequency range:

UMTS

- 824.2 – 848.8 MHz (GPRS, EDGE)
- 826.4 – 846.6 MHz (WCDMA, HSDPA, HSUPA)
- 1850.2 – 1909.8 MHz (GPRS, EDGE)
- 1852.4 – 1907.5 MHz (WCDMA, HSDPA, HSUPA)
- 1712.4 – 1752.6 MHz (WCDMA)

CDMA (EVDO Rev A)

- 824.7 – 848.31 MHz
- 1851.25 – 1908.8 MHz

The closest spacing between the WWAN antenna and the 802.11a/b/g/n antenna is 3.7cm. The 802.11a/b/g/n antenna is on the right side of the handheld computer and the WWAN antenna is on the left side.

In normal operation, the EUT can be held in the hand, or next to the head like a cellular handset, or worn on the wrist/arm in a holster. The wrist holster is specially designed for airline baggage handlers to have their hands free, but still be able to scan bar-codes. The only Intermec approved accessory for body worn operation for the EUT is this wrist holster. The EUT can only fit in the holster with the top end of the unit pointing towards the hand and the keypad facing up away from the arm. The wrist holster is constructed

with a 12mm spacer on the left side to provide greater spacing between the WWAN antenna and the body.

No snap-on accessories can be connected to the EUT while it is in the wrist holster.

The EUT is powered by a lithium-ion battery, Model 1000AB01.

Overview of the SAR Evaluation

Objective

To demonstrate compliance with the SAR requirements of FCC 2.1093 and Canada's Health Safety Code 6. This evaluation will be used to support a Class 2 Permissive Change authorization of FCC ID: EHA-1000CP01SX1. The following changes have been made: the barcode scanner in the previously certified Model 1000CP01S has been slightly repositioned so that it points straight out, instead of tilted downward, resulting in the new Model 1000CP03S (subject of this SAR evaluation). A new holster has been developed for use with Model 1000CP03S that is worn on the wrist / forearm.

Prior to the SAR evaluation of the wrist holster, a non-PBA KDB inquiry was made to the FCC to confirm that a body phantom and body tissue equivalent liquids could be used. The FCC agreed with the proposal (see KDB tracking #758326). SAR measurements of the head configurations that produced the highest SAR in the original filing were also made (see KDB 178919 D01 Permissive Change Policy v05r01, Item #5b).

Scope

The WWAN radio was evaluated under a separate SAR evaluation reports.

Regarding the 802.11a/b/g/n-Bluetooth radio:

KDB 648474 D01 is the FCC's Policy for SAR evaluation of handsets with multiple transmitters and antennas. It states:

"When the output of an unlicensed transmitter is $\leq P_{ref}$, and its antenna(s) is ≥ 2.5 cm from other antennas, stand – alone SAR evaluation is not required for that unlicensed transmitter."

The power threshold P_{ref} is defined as the maximum conducted power available at the antenna according to source-based time averaging. P_{ref} is derived from $\frac{1}{2} * (60/f_{GHz})$

	2.45	5.15 - 5.35	5.47 - 5.85	GHz
P_{Ref}	12	6	5	mW

Device output power should be rounded to the nearest mW to compare with values specified in this table.

Since the output power of Bluetooth is 7mW, and the antenna spacing is 3.7 cm, the Bluetooth radio does not require SAR evaluation.

However the output power of the 802.11a/b/g/n radio is greater than $2 * P_{ref}$ for all bands, so it does require stand-alone SAR evaluation.

The SAR evaluation documented in this report is for the 802.11a/b/g/n portion of the EUT.

CONFIGURATION 1 INMC0746

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Handheld Computer	Intermec Technologies Corporation	1000CP03S	187U1191613
Wrist Holster	Taylor Made	TM-CCN70-WS-SW - T5, Revision B	None
Battery	Intermec Technologies Corporation	1000AB01	09861106238
Battery	Intermec Technologies Corporation	1000AB01	15961103148
Battery	Intermec Technologies Corporation	1000AB01	07561106119

CONFIGURATION 2 INMC0746

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Handheld Computer	Intermec Technologies Corporation	1000CP03S	187U1191613
Battery	Intermec Technologies Corporation	1000AB01	09861106238
Battery	Intermec Technologies Corporation	1000AB01	15961103148
Battery	Intermec Technologies Corporation	1000AB01	07561106119

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	1/5/2012	SAR Evaluation	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	1/13/2012	SAR Evaluation	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

2.4 and 5 GHz Bands

Per FCC KDB 248227, the conducted output power was measured at the “default test channels” and at the “required test channels” in each band. Measurements were made while the EUT transmitted at the lowest, middle and the highest data rates for each channel.

Per KDB 648474, among the channels required for normal testing, SAR must be measured on the highest output channel (highlighted). When the SAR measured on the highest output channel is < 0.8 W/kg, SAR evaluation for the other required channels is unnecessary.

Output power measurements are on the following pages.

EUT: 1000CP03S	Work Order: INMC0746
Serial Number: 187U1191613	Date: 01/05/12
Customer: Intermec Technologies Corporation	Temperature: 23.4
Attendees: None	Humidity: 42%
Project:	Barometric Pres.: 1029
Tested by: Rod Peloquin	Job Site: EV08
EUT Power	Battery
TEST SPECIFICATIONS	
FCC 2.1093:2012	Test Method
	FCC OET 65C:2001
COMMENTS	
Conducted output power	
DEVIATIONS FROM TEST STANDARD	
None	
Configuration #	2
	<i>Rod Peloquin</i> Signature

Channel	Frequency (MHz)	Data Rate (Mbps)	Modulation	Conducted Power (Average)	
				dBm	W
1	2412	1	BPSK	17.2	0.053
		11	CCK	17.1	0.052
		6	OFDM	13.6	0.023
		36	OFDM	13.3	0.021
		54	OFDM	13.4	0.022
		7.2 (MCS0)	OFDM	13.6	0.023
		72.2 (MCS7)	OFDM	12.9	0.020
6	2437	1	BPSK	17.5	0.056
		11	CCK	17.4	0.055
		6	OFDM	13.9	0.025
		36	OFDM	13.7	0.023
		54	OFDM	13.7	0.023
		7.2 (MCS0)	OFDM	13.9	0.025
		72.2 (MCS7)	OFDM	13.2	0.021
11	2462	1	BPSK	17.9	0.061
		11	CCK	17.7	0.059
		6	OFDM	14.2	0.026
		36	OFDM	14.2	0.026
		54	OFDM	14.0	0.025
		7.2 (MCS0)	OFDM	14.2	0.026
		72.2 (MCS7)	OFDM	13.6	0.023

EUT: 1000CP03S		Work Order: INMC0746
Serial Number: 187U1191613		Date: 01/05/12
Customer: Intermec Technologies Corporation		Temperature: 23.4
Attendees: None		Humidity: 42%
Project:		Barometric Pres.: 1029
Tested by: Rod Peloquin	EUT Power	Battery
Job Site: EV08		
TEST SPECIFICATIONS		
FCC 2.1093:2012		Test Method
		FCC OET 65C:2001
COMMENTS		
Conducted output power		
DEVIATIONS FROM TEST STANDARD		
None		
Configuration #	2	<i>Rod Peloquin</i> Signature

Channel	Frequency (MHz)	Data Rate (Mbps)	Modulation	Conducted Power (Average)	
				dBm	W
36	5180	6	OFDM	12.7	0.019
		54	OFDM	11.9	0.015
		7.2 (MCS0)	OFDM	12.6	0.018
		72.2 (MCS7)	OFDM	10.5	0.011
40	5200	6	OFDM	12.7	0.019
		54	OFDM	11.8	0.015
		7.2 (MCS0)	OFDM	12.6	0.018
		72.2 (MCS7)	OFDM	10.4	0.011
44	5220	6	OFDM	12.6	0.018
		54	OFDM	11.8	0.015
		7.2 (MCS0)	OFDM	12.6	0.018
		72.2 (MCS7)	OFDM	10.4	0.011
48	5240	6	OFDM	12.6	0.018
		54	OFDM	11.8	0.015
		7.2 (MCS0)	OFDM	12.5	0.018
		72.2 (MCS7)	OFDM	10.3	0.011
52	5260	6	OFDM	12.6	0.018
		54	OFDM	11.8	0.015
		7.2 (MCS0)	OFDM	12.6	0.018
		72.2 (MCS7)	OFDM	10.4	0.011
56	5280	6	OFDM	12.5	0.018
		54	OFDM	11.7	0.015
		7.2 (MCS0)	OFDM	12.4	0.017
		72.2 (MCS7)	OFDM	10.3	0.011
60	5300	6	OFDM	12.3	0.017
		54	OFDM	11.6	0.014
		7.2 (MCS0)	OFDM	12.3	0.017
		72.2 (MCS7)	OFDM	10.1	0.010
64	5320	6	OFDM	12.2	0.016
		54	OFDM	11.4	0.014
		7.2 (MCS0)	OFDM	12.1	0.016
		72.2 (MCS7)	OFDM	10.0	0.010
100	5500	6	OFDM	11.8	0.015
		7.2 (MCS0)	OFDM	11.9	0.016
104	5520	6	OFDM	11.9	0.016
		7.2 (MCS0)	OFDM	12.0	0.016
108	5540	6	OFDM	12.0	0.016
		7.2 (MCS0)	OFDM	12.0	0.016
112	5560	6	OFDM	12.1	0.016
		7.2 (MCS0)	OFDM	12.1	0.016
116	5580	6	OFDM	12.1	0.016
		7.2 (MCS0)	OFDM	12.1	0.016
120	5600	6	OFDM	12.4	0.017
		7.2 (MCS0)	OFDM	12.4	0.017
124	5620	6	OFDM	12.3	0.017
		7.2 (MCS0)	OFDM	12.2	0.017
128	5640	6	OFDM	12.2	0.017
		7.2 (MCS0)	OFDM	12.1	0.016
132	5660	6	OFDM	12.0	0.016
		7.2 (MCS0)	OFDM	11.9	0.016
136	5680	6	OFDM	11.8	0.015
		7.2 (MCS0)	OFDM	11.8	0.015
140	5700	6	OFDM	11.5	0.014
		7.2 (MCS0)	OFDM	11.6	0.014
149	5745	6	OFDM	10.9	0.012
		7.2 (MCS0)	OFDM	10.9	0.012
153	5765	6	OFDM	10.7	0.012
		7.2 (MCS0)	OFDM	10.7	0.012
157	5785	6	OFDM	10.6	0.012
		7.2 (MCS0)	OFDM	10.6	0.011
161	5805	6	OFDM	10.6	0.011
		7.2 (MCS0)	OFDM	10.5	0.011
165	5825	6	OFDM	10.6	0.011
		7.2 (MCS0)	OFDM	10.4	0.011

Characterization of tissue-equivalent liquid dielectric properties

Per IEEE 1528: 2003, Section 5.2.2, the permittivity and conductivity of the tissue material should be measured at least within 24 hours of any full-compliance test. The measured values must be within +/- 5% of the target values. The temperature variation in the liquid during SAR measurements must be within +/- 2 degrees C of that recorded when the dielectric properties were measured.

The dielectric parameters of the tissue-equivalent liquids were measured within 24 hours of testing using the HP85070E dielectric probe kit. The dielectric measurements were made at 50 MHz intervals. The attached data sheets show that the dielectric parameters of the liquid were within the required 5% tolerances.

Target values of dielectric parameters

Per FCC OET 65C, Appendix C:

“The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations and extrapolated according to the head parameters specified in P1528.”

Target Frequency (MHz)	Head		Body	
	ϵ_r	σ (S/m)	ϵ_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(ϵ_r = relative permittivity, σ = conductivity and $\rho = 1000 \text{ kg/m}^3$)

Composition of Ingredients for Liquid Tissue Phantoms

Northwest EMC uses tissue-equivalent liquids prepared by SPEAG and confirmed by them to be within +/- 5% from the target values. Their recipes are based upon the following formulations as found in FCC OET 65C, Appendix C:

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

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99⁺% Pure Sodium Chloride

Sugar: 98⁺% Pure Sucrose


Water: De-ionized, 16 M Ω ⁺ resistivity

HEC: Hydroxyethyl Cellulose

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

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


EMC**Tissue - Equivalent Liquid**

EUT: MSL501	Work Order: INMC0746
Serial Number: SAV	Date: 01/05/2012
Customer: Intermec Technologies Corporation	Temperature (°C): 22.1
Attendees: None	Humidity: 38.1
Project: None	Barometric Pres. (mb): 1030.40
Tested by: Ethan Schoonover	Power: None
Job Site: Cal Lab	
TEST SPECIFICATIONS	
FCC 2.1093:2011	Test Method: FCC OET 65C:2001
COMMENTS	
None	
DEVIATIONS FROM TEST STANDARD	
None	
Configuration #	None
Signature 	
Tissue: MSL501 Liquid Temperature (°C): 21.6	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
5800	46.413	5.962	48.200	6.000	3.71	0.63


3400.0	50.1	3.121
3500.0	50.0	3.217
3600.0	49.9	3.319
3700.0	49.8	3.431
3800.0	49.6	3.535
3900.0	49.5	3.632
4000.0	49.4	3.740
4100.0	49.2	3.849
4200.0	49.1	3.968
4300.0	48.9	4.081
4400.0	48.8	4.213
4500.0	48.8	4.334
4600.0	48.5	4.460
4700.0	48.4	4.588
4800.0	48.2	4.713
4850.0	48.1	4.776
4900.0	48.1	4.836
4950.0	48.0	4.889
5000.0	47.9	4.954
5050.0	47.8	5.014
5100.0	47.6	5.073
5150.0	47.6	5.143
5200.0	47.5	5.205
5250.0	47.4	5.265
5300.0	47.3	5.315
5350.0	47.2	5.383
5400.0	47.1	5.442
5450.0	47.0	5.510
5500.0	47.0	5.574
5550.0	46.9	5.636
5600.0	46.8	5.694
5650.0	46.7	5.759
5700.0	46.6	5.823
5750.0	46.5	5.886
5800.0	46.4	5.962
5850.0	46.3	6.025
5900.0	46.3	6.099

EMC**Tissue - Equivalent Liquid**

EUT: MSL501	Work Order: INMC0746
Serial Number: SAV	Date: 01/11/2012
Customer: Intermec Technologies Corporation	Temperature (°C): 21.6
Attendees: None	Humidity: 28%
Project: None	Barometric Pres. (mb): 1031
Tested by: Ethan Schoonover	Power: None
Job Site: Cal Lab	
TEST SPECIFICATIONS	
FCC 2.1093:2011	Test Method
	FCC OET 65C:2001
COMMENTS	
None	
DEVIATIONS FROM TEST STANDARD	
None	
Configuration #	None
Signature 	
Tissue: MSL501	
Liquid Temperature (°C): 21.8	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
5800	46.244	5.980	48.200	6.000	4.06	0.34
3400.0	50.1	3.124				
3500.0	49.9	3.205				
3600.0	49.8	3.291				
3700.0	49.7	3.405				
3800.0	49.4	3.505				
3900.0	49.3	3.604				
4000.0	49.2	3.717				
4100.0	49.0	3.830				
4200.0	48.9	3.955				
4300.0	48.7	4.084				
4400.0	48.6	4.222				
4500.0	48.7	4.344				
4600.0	48.5	4.463				
4700.0	48.4	4.571				
4800.0	48.2	4.670				
4850.0	48.1	4.721				
4900.0	48.1	4.770				
4950.0	48.0	4.813				
5000.0	47.8	4.877				
5050.0	47.7	4.939				
5100.0	47.5	4.990				
5150.0	47.5	5.063				
5200.0	47.4	5.132				
5250.0	47.3	5.190				
5300.0	47.2	5.232				
5350.0	47.1	5.309				
5400.0	46.9	5.369				
5450.0	46.8	5.449				
5500.0	46.8	5.518				
5550.0	46.7	5.591				
5600.0	46.6	5.655				
5650.0	46.5	5.738				
5700.0	46.4	5.812				
5750.0	46.3	5.881				
5800.0	46.2	5.980				
5850.0	46.3	6.045				
5900.0	46.3	6.108				


EMC**Tissue - Equivalent Liquid**

EUT: HSL501	Work Order: INMC0746
Serial Number: SAU	Date: 01/11/2012
Customer: Intermec Technologies Corporation	Temperature (°C): 21.6
Attendees: none	Humidity: 28%
Project: None	Barometric Pres. (mb): 1031
Tested by: Ethan Schoonover	Power: None
	Job Site: Cal Lab
TEST SPECIFICATIONS	
FCC 2.1093:2011	Test Method FCC OET 65C:2001
COMMENTS	
None	
DEVIATIONS FROM TEST STANDARD	
None	
Configuration #	None
	Signature 
Tissue: HSL501	
Liquid Temperature (°C): 21.9	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
5800	34.229	5.351	35.300	5.270	3.03	-1.54

3400.0	37.9	2.915
3450.0	37.8	2.943
3500.0	37.7	2.979
3550.0	37.7	3.018
3600.0	37.6	3.049
3650.0	37.5	3.086
3700.0	37.5	3.128
3750.0	37.4	3.168
3800.0	37.3	3.212
3850.0	37.3	3.258
3900.0	37.2	3.300
3950.0	37.2	3.345
4000.0	37.1	3.394
4050.0	37.0	3.445
4100.0	36.9	3.496
4150.0	36.9	3.554
4200.0	36.8	3.607
4250.0	36.8	3.664
4300.0	36.7	3.721
4350.0	36.6	3.777
4400.0	36.6	3.839
4450.0	36.5	3.898
4500.0	36.5	3.945
4550.0	36.5	3.992
4600.0	36.4	4.048
4650.0	36.4	4.096
4700.0	36.3	4.142
4750.0	36.3	4.185
4800.0	36.2	4.229
4850.0	36.1	4.275
4900.0	36.0	4.319
4950.0	35.9	4.361
5000.0	35.8	4.409
5050.0	35.7	4.465
5100.0	35.6	4.512
5150.0	35.5	4.566
5200.0	35.4	4.624
5250.0	35.3	4.673
5300.0	35.2	4.714
5350.0	35.1	4.771
5400.0	35.0	4.828
5450.0	34.9	4.887
5500.0	34.7	4.953
5550.0	34.7	5.020
5600.0	34.6	5.079
5650.0	34.5	5.143
5700.0	34.4	5.211
5750.0	34.3	5.278
5800.0	34.2	5.351
5850.0	34.2	5.411
5900.0	34.2	5.460


EMC**Tissue - Equivalent Liquid**

EUT: MSL2450	Work Order: INMC0746
Serial Number: SAM	Date: 01/13/2012
Customer: Intermec Technologies Corporation	Temperature (°C): 22.1
Attendees: none	Humidity: 26%
Project: None	Barometric Pres. (mb): 1026.3
Tested by: Ethan Schoonover	Power: None
	Job Site: Cal Lab
TEST SPECIFICATIONS	
FCC 2.1093:2011	Test Method FCC OET 65C:2001
COMMENTS	
None	
DEVIATIONS FROM TEST STANDARD	
None	
Configuration #	None
	Signature 
Tissue: MSL2450	
Liquid Temperature (°C): 22.4	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
2450	50.227	1.915	52.700	1.950	4.69	1.80

1900.0	52.1	1.245
1925.0	52.0	1.274
1950.0	51.9	1.303
1975.0	51.8	1.332
2000.0	51.7	1.361
2025.0	51.7	1.391
2050.0	51.6	1.421
2075.0	51.5	1.451
2100.0	51.4	1.480
2125.0	51.3	1.511
2150.0	51.2	1.541
2175.0	51.1	1.572
2200.0	51.1	1.602
2225.0	51.0	1.633
2250.0	50.9	1.664
2275.0	50.8	1.694
2300.0	50.7	1.725
2325.0	50.6	1.755
2350.0	50.6	1.786
2375.0	50.5	1.817
2400.0	50.4	1.849
2425.0	50.3	1.882
2450.0	50.2	1.915
2475.0	50.1	1.947
2500.0	50.1	1.980
2525.0	50.0	2.012
2550.0	49.9	2.046
2575.0	49.8	2.080
2600.0	49.7	2.114
2625.0	49.6	2.148
2650.0	49.5	2.183
2675.0	49.4	2.218
2700.0	49.3	2.251

EMC**Tissue - Equivalent Liquid**

EUT: HSL2450	Work Order: INMC0746
Serial Number: SAL	Date: 01/13/2012
Customer: Intermec Technologies Corporation	Temperature (°C): 22.1
Attendees: none	Humidity: 26%
Project: None	Barometric Pres. (mb): 1026.3
Tested by: Ethan Schoonover	Power: None
	Job Site: Cal Lab
TEST SPECIFICATIONS	
FCC 2.1093:2011	Test Method FCC OET 65C:2001
COMMENTS	
None	
DEVIATIONS FROM TEST STANDARD	
None	
Configuration #	None
	Signature 
Tissue: HSL2450 Liquid Temperature (°C): 23.8	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
2450	38.617	1.821	39.200	1.800	1.49	-1.14
1900.0	40.7	1.223				
1925.0	40.6	1.249				
1950.0	40.5	1.275				
1975.0	40.4	1.302				
2000.0	40.3	1.328				
2025.0	40.2	1.355				
2050.0	40.1	1.383				
2075.0	40.0	1.410				
2100.0	39.9	1.436				
2125.0	39.8	1.463				
2150.0	39.7	1.491				
2175.0	39.6	1.518				
2200.0	39.5	1.544				
2225.0	39.4	1.572				
2250.0	39.3	1.599				
2275.0	39.3	1.626				
2300.0	39.2	1.652				
2325.0	39.1	1.679				
2350.0	39.0	1.706				
2375.0	38.9	1.734				
2400.0	38.8	1.762				
2425.0	38.7	1.791				
2450.0	38.6	1.821				
2475.0	38.5	1.848				
2500.0	38.4	1.877				
2525.0	38.3	1.904				
2550.0	38.2	1.933				
2575.0	38.2	1.963				
2600.0	38.0	1.993				
2625.0	38.0	2.021				
2650.0	37.9	2.052				
2675.0	37.8	2.082				
2700.0	37.7	2.112				

Requirement

Per IEEE 1528, Section 8.2.1, "System checks are performed prior to compliance tests and the results must always be within $\pm 10\%$ of the target value corresponding to the test frequency, liquid, and the source used. The target values are 1 g or 10 g averaged SAR values measured on systems having current system validation and calibration status, and using the system check setup as shown in Figure 14. These target values should be determined using a standard source."

Test Description

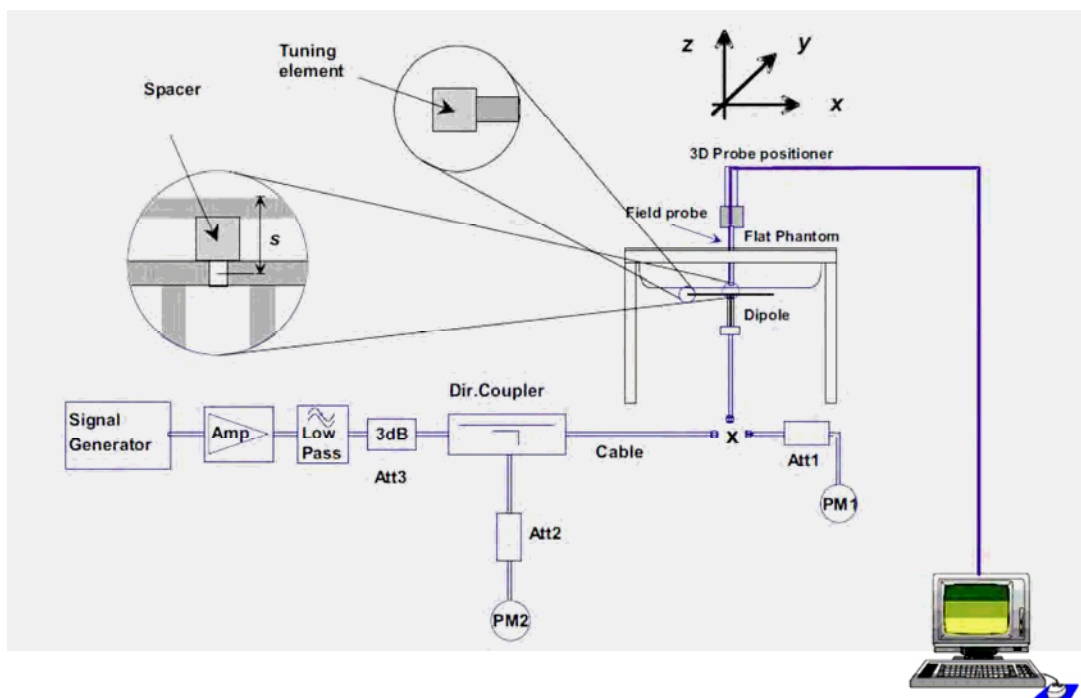
Within 24 hours of a measurement, Northwest EMC used the system validation kit (calibrated reference dipole) to test whether the system was operating within its specifications. The validation was performed in the indicated bands by making SAR measurements of the reference dipole with the phantom filled with the tissue-equivalent liquid. First, a signal generator and power amplifier were used to produce a 100mW level as measured with a power meter at the antenna terminals of the dipole. Then, the reference dipole was positioned below the bottom of the phantom and centered with its axis parallel to the longest side of the phantom. A low loss and low relative permittivity spacer was used to establish the correct distance between the center axis of the reference dipole and the liquid.


For the reference dipoles, the spacing distance s is given by:

$s = 15\text{mm}, \pm 0.2\text{mm}$ for $300\text{MHz} \leq f \leq 1000 \text{ MHz}$:

$s = 10\text{mm}, \pm 0.2\text{mm}$ for $1000\text{MHz} \leq f \leq 6000\text{MHz}$

The measured 1 g and 10 g spatial average SAR values were normalized to a 1W dipole input power for comparison to the calibration data. The results are summarized in the attached table. The deviation is less than 10% in all cases, indicating that the system performance check was within tolerance.



EUT: System Verifications		Work Order: INMC0746
Serial Number: Various		Date: See Data Sheets
Customer: Intermec Technologies Corporation		Temperature: See Data Sheets
Attendees: None		Humidity: See Data Sheets
Project: INMC0746		Barometric Pres.: See Data Sheets
Tested by: Ethan Schoonover		Job Site: EV08
TEST SPECIFICATIONS		Test Method
FCC 2.1093:2011		FCC OET 65C:2001
FCC 15.247:2011		IEEE Std 1528:2003
FCC 15.407:2001		FCC KDB 447498 D01 v04
		FCC KDB 248227 D01 V01r02
		FCC KDB 648474 D01 V01r05
		FCC 865664
Health Safety Code 6:2009		RSS-102, Issue 4:2010
COMMENTS		
None		
DEVIATIONS FROM TEST STANDARD		
No Deviations		
Configuration #	NA	Signature 

Date	Liquid part number and frequency	Conducted Power into the Dipole (dBm)	Correction Factor	1g Measured	10g Measured	1g Normalized to 1W	10g Normalized to 1W	Target 1g (Normalized to 1W) - Get from Dipole cal cert	Target 10g (Normalized to 1W) - Get from Dipole cal cert	% difference 1g	% difference 10 g	Comments
1/6/2012	MSL501 5800MHz	18.33	14.69	4.82	1.37	70.80	20.12	78.00	21.90	-9.23	-8.11	
1/6/2012	MSL501 5200MHz	19.91	10.21	7.24	2.08	73.92	21.24	76.50	21.60	-3.38	-1.69	
1/6/2012	MSL501 5500MHz	19.49	11.25	7.41	2.09	83.33	23.50	83.30	23.40	0.04	0.45	
1/11/2012	MSL501 5500MHz	19.41	11.46	6.88	1.95	78.81	22.34	83.30	23.40	-5.39	-4.54	
1/11/2012	HSL501 5200MHz	19.74	10.62	7.63	2.20	81.01	23.36	81.30	23.20	-0.36	0.68	
1/11/2012	HSL501 5500MHz	19.47	11.30	7.60	2.16	85.86	24.40	85.30	24.10	0.66	1.26	
1/11/2012	HSL501 5900MHz	19.41	11.46	6.54	1.88	74.92	21.54	78.50	22.20	-4.56	-2.99	
1/13/2012	MSL2450 2450MHz	20.00	10.00	5.06	2.40	50.60	24.00	50.40	23.70	0.40	1.27	
1/13/2012	HSL2450 2450MHz	20.00	10.00	5.59	2.58	55.90	25.80	53.90	25.30	3.71	1.98	

Room Temperature (°C):	23.1	Humidity (%):	38.4	Test Date:	01/06/12
Liquid Temperature (°C):	23.1	Barometric Pressure (mb):	1027.3	Tested by:	Jennifer Herrett

MSL501 System Check_5800MHz 1-6-12

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1066

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5800 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.962$ mho/m; $\epsilon = 46.413$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.96201$ mho/m, $\epsilon = 46.4133$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

System Check/System Check - High Channel/Area Scan (51x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 10.603 mW/g

System Check/System Check - High Channel/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 14.727 V/m

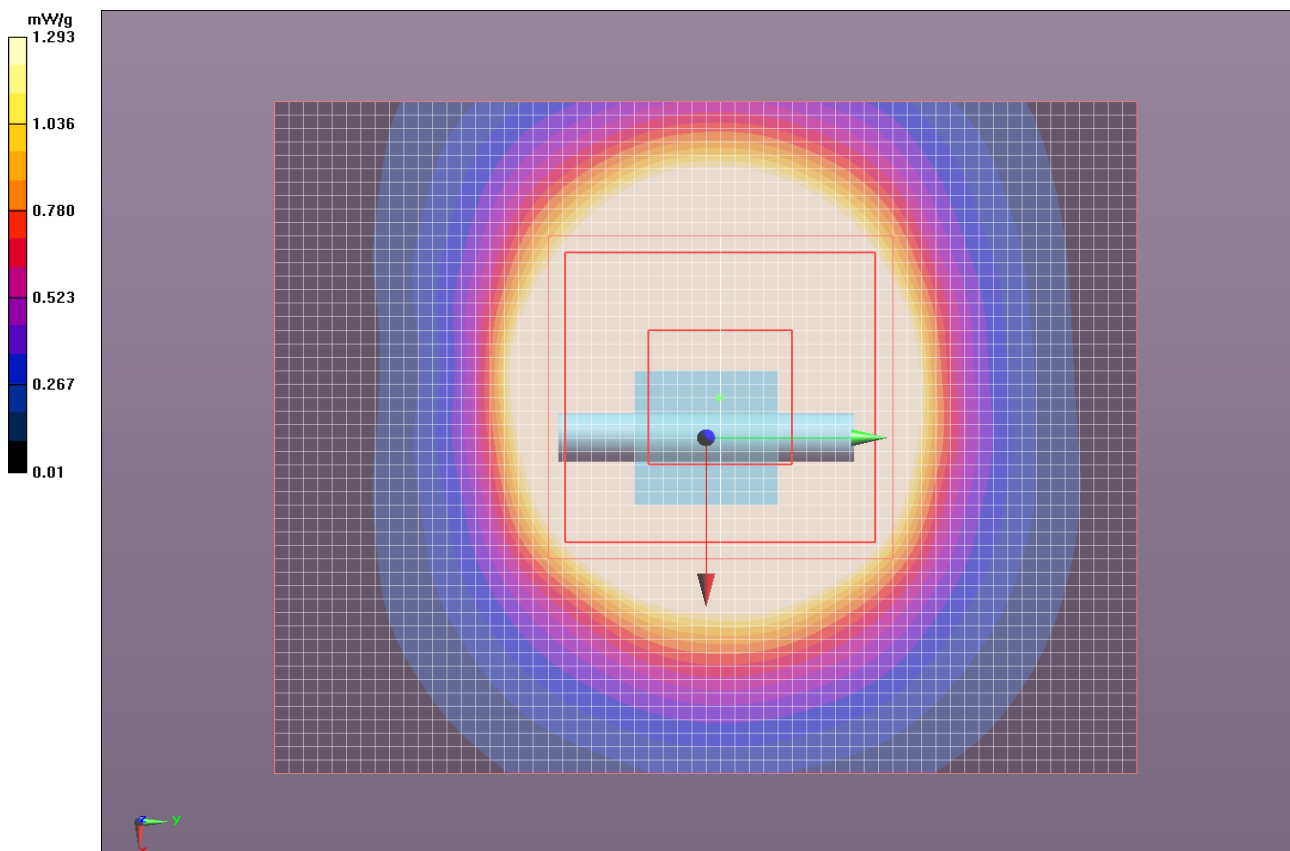
System Check/System Check - High Channel/Zoom Scan (7x9x7) (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 34.916 V/m; Power Drift = 0.23 dB

Peak SAR (extrapolated) = 18.893 W/kg

SAR(1 g) = 4.82 mW/g; SAR(10 g) = 1.37 mW/g

Maximum value of SAR (measured) = 10.365 mW/g



Room Temperature (°C):	23.3	Humidity (%):	38.6	Test Date:	01/06/12
Liquid Temperature (°C):	22.8	Barometric Pressure (mb):	1027.3	Tested by:	Jennifer Herrett

MSL501 System Check_5200MHz 1-6-12

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1066

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5200 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5200$ MHz; $\sigma = 5.205$ mho/m; $\epsilon = 47.483$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.20478$ mho/m, $\epsilon = 47.4828$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

System Check/System Check - Low Channel/Zoom Scan (7x9x7) (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 54.826 V/m; Power Drift = 0.28 dB

Peak SAR (extrapolated) = 26.650 W/kg

SAR(1 g) = 7.24 mW/g; SAR(10 g) = 2.08 mW/g

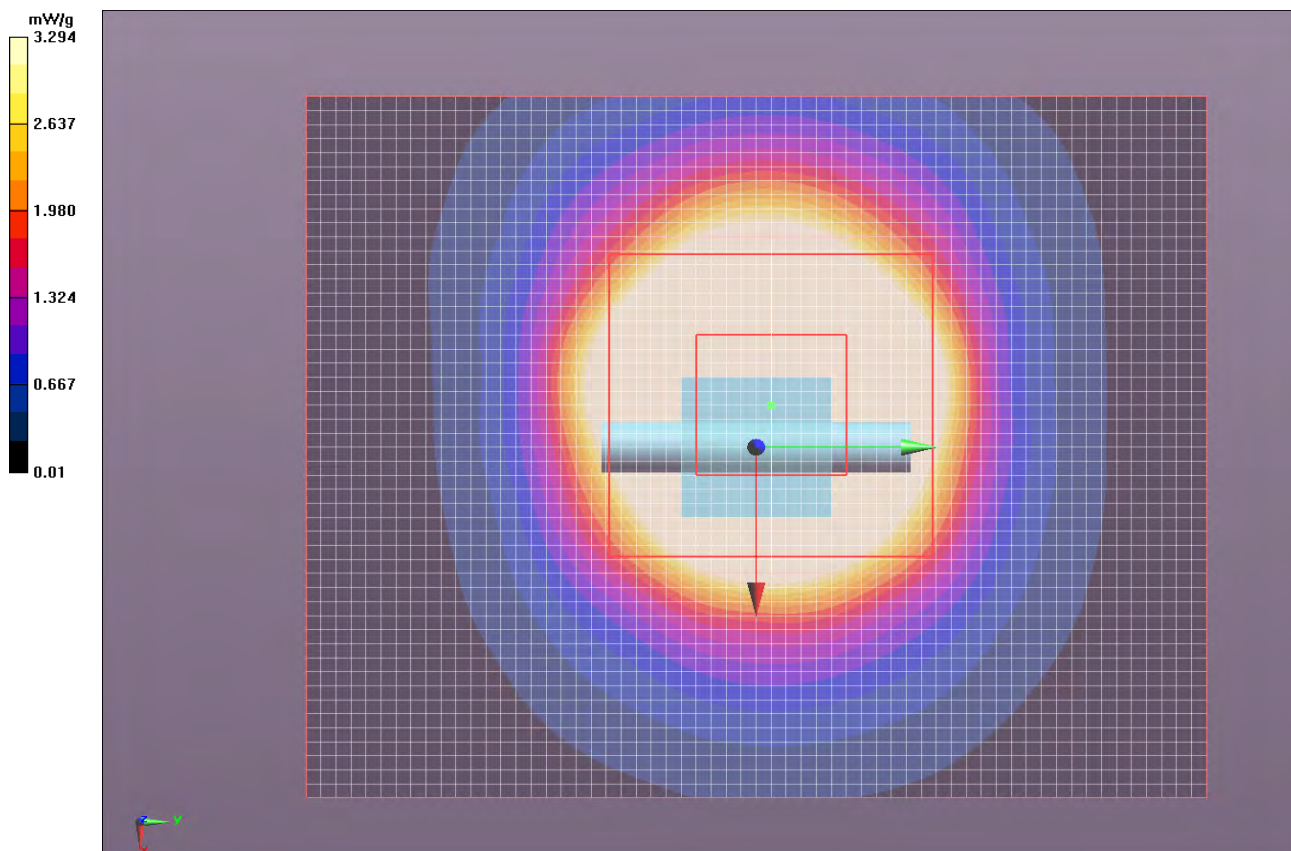
Maximum value of SAR (measured) = 15.101 mW/g

System Check/System Check - Low Channel/Area Scan (51x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 15.014 mW/g

System Check/System Check - Low Channel/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 25.158 V/m



Room Temperature (°C):	22.8	Humidity (%):	31.5	Test Date:	01/06/12
Liquid Temperature (°C):	22.5	Barometric Pressure (mb):	1028.1	Tested by:	Jennifer Herrett and Khanh Tran

MSL501 System Check_5500MHz 1-6-12

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1066

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5500 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5500$ MHz; $\sigma = 5.574$ mho/m; $\epsilon_r = 46.974$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.57374$ mho/m, $\epsilon_r = 46.9736$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASy5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASy52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

System Check/System Check - Mid Channel/Area Scan (51x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 16.277 mW/g

System Check/System Check - Mid Channel/Zoom Scan (7x9x7) (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 54.802 V/m; Power Drift = 0.11 dB

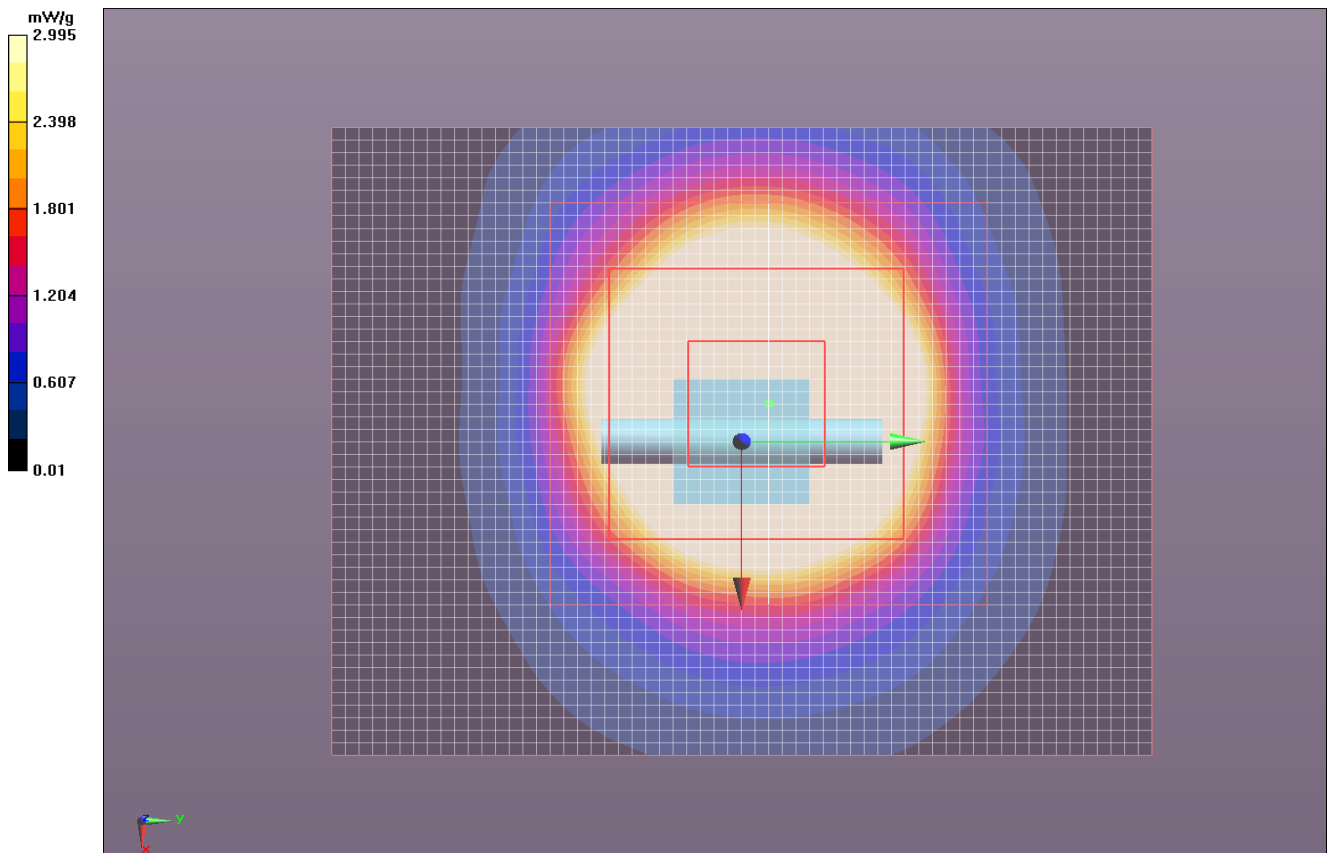
Peak SAR (extrapolated) = 29.051 W/kg

SAR(1 g) = 7.41 mW/g; SAR(10 g) = 2.09 mW/g

Maximum value of SAR (measured) = 15.772 mW/g

System Check/System Check - Mid Channel/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 23.181 V/m



Room Temperature (°C):	23.7	Humidity (%):	33.3	Test Date:	01/11/12
Liquid Temperature (°C):	22.4	Barometric Pressure (mb):	1027	Tested by:	Ethan Schoonover

MSL501 System Check 5500MHz 1-11-12

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1066

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5500 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5500$ MHz; $\sigma = 5.518$ mho/m; $\epsilon_r = 46.785$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.5183$ mho/m, $\epsilon_r = 46.7855$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

System Check/System Check - Mid Channel/Area Scan (51x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 15.529 mW/g

System Check/System Check - Mid Channel/Zoom Scan (7x9x7) (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 57.274 V/m; Power Drift = -0.03 dB

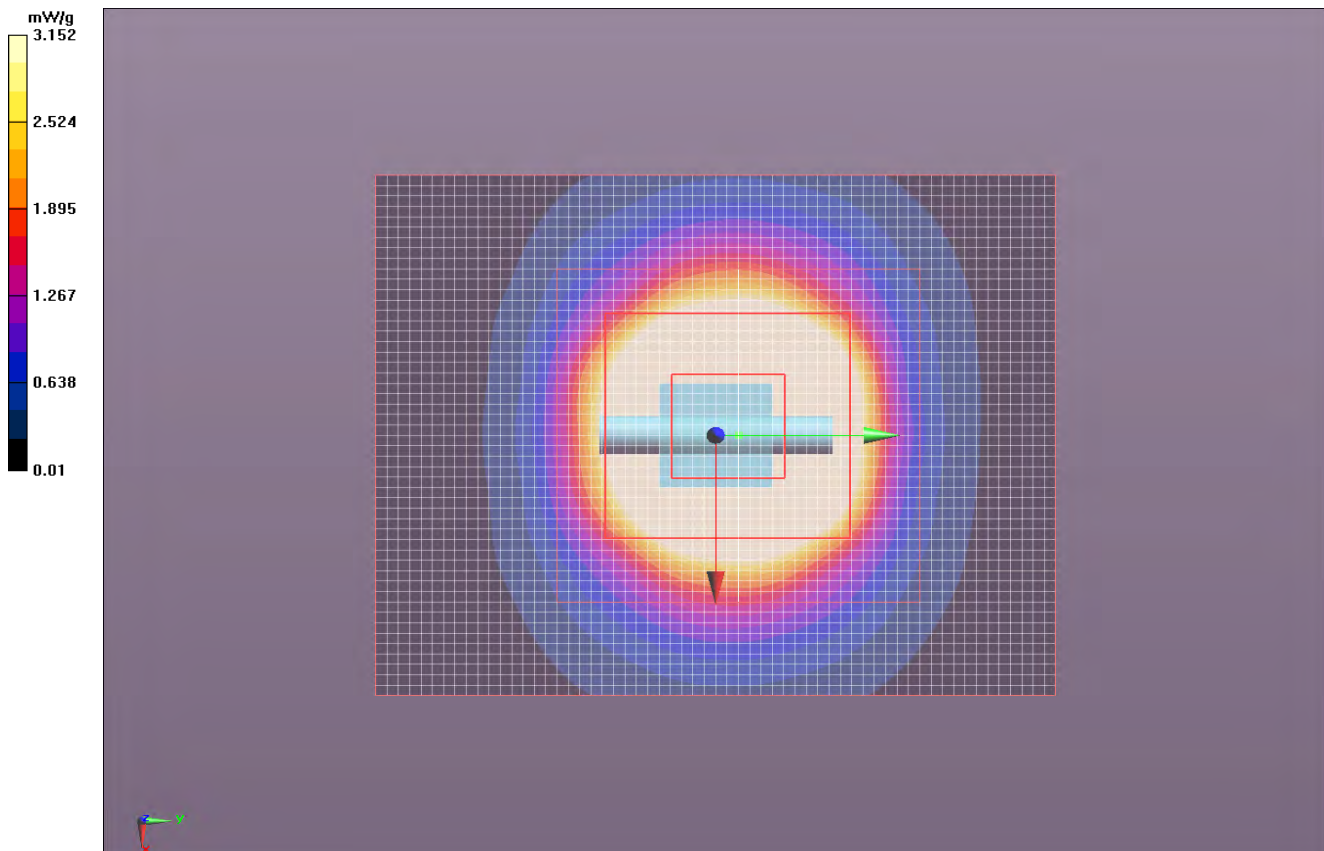
Peak SAR (extrapolated) = 26.771 W/kg

SAR(1 g) = 6.88 mW/g; SAR(10 g) = 1.95 mW/g

Maximum value of SAR (measured) = 14.659 mW/g

System Check/System Check - Mid Channel/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 23.901 V/m



Room Temperature (°C):	23.7	Humidity (%):	33.3	Test Date:	01/11/12
Liquid Temperature (°C):	22.2	Barometric Pressure (mb):	1027	Tested by:	Ethan Schoonover

HSL501 System Check 5200MHz 1-11-12

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1066

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5200 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5200$ MHz; $\sigma = 4.624$ mho/m; $\epsilon_r = 35.408$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 4.62378$ mho/m, $\epsilon_r = 35.408$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASy5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASy52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

System Check/System Check - Low Channel/Zoom Scan (7x9x7) (8x8x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 62.111 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 31.288 W/kg

SAR(1 g) = 7.63 mW/g; SAR(10 g) = 2.2 mW/g

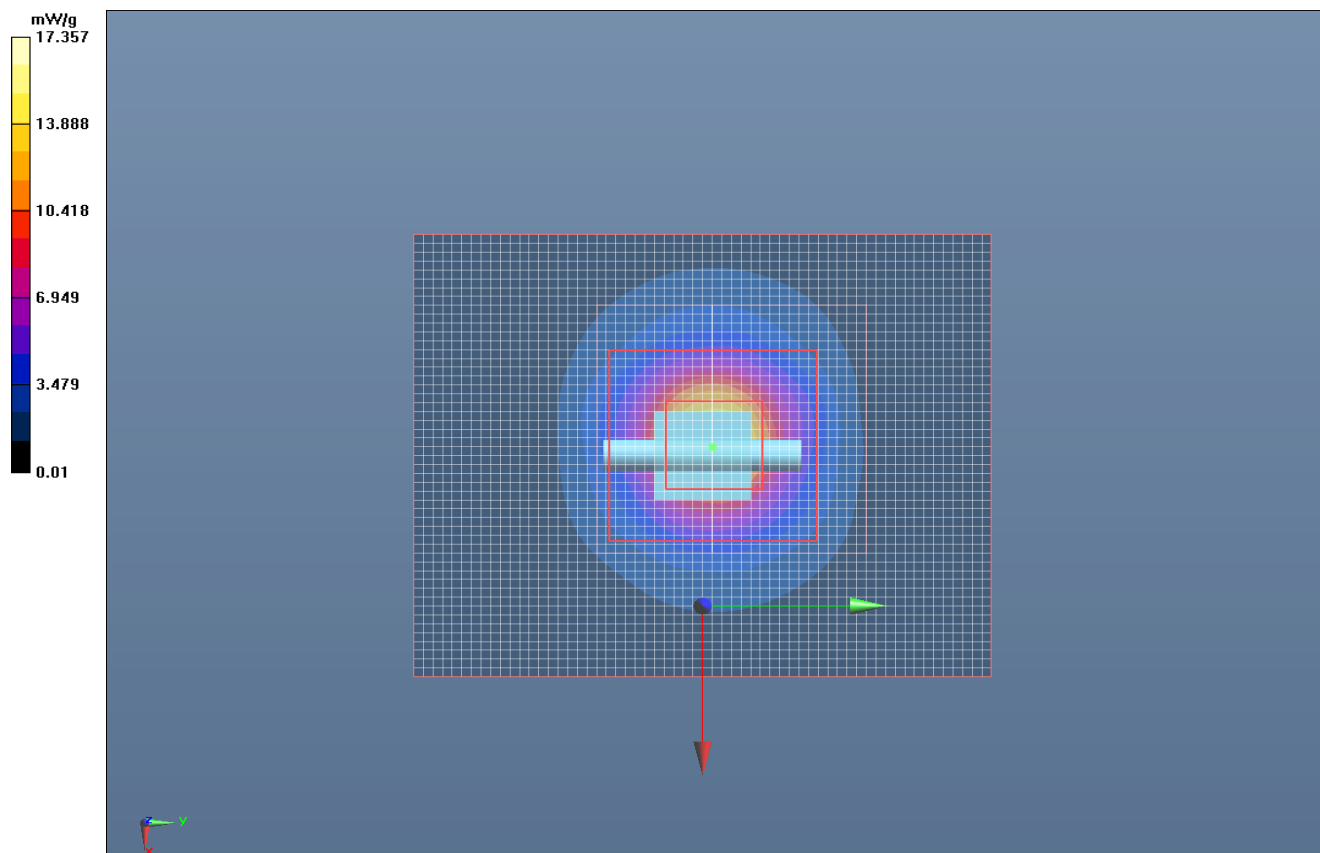
Maximum value of SAR (measured) = 15.742 mW/g

System Check/System Check - Low Channel/Area Scan (51x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 16.591 mW/g

System Check/System Check - Low Channel/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 61.269 V/m



Room Temperature (°C):	23.7	Humidity (%):	33.3	Test Date:	01/11/12
Liquid Temperature (°C):	22.2	Barometric Pressure (mb):	1027	Tested by:	Ethan Schoonover

HSL501 System Check 5500MHz 1-11-12

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1066

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5500 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5500$ MHz; $\sigma = 4.953$ mho/m; $\epsilon_r = 34.74$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 4.95274$ mho/m, $\epsilon_r = 34.7395$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

System Check/System Check - Mid Channel/Area Scan (51x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 17.041 mW/g

System Check/System Check - Mid Channel/Zoom Scan (7x9x7) (8x8x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 60.991 V/m; Power Drift = -0.03 dB

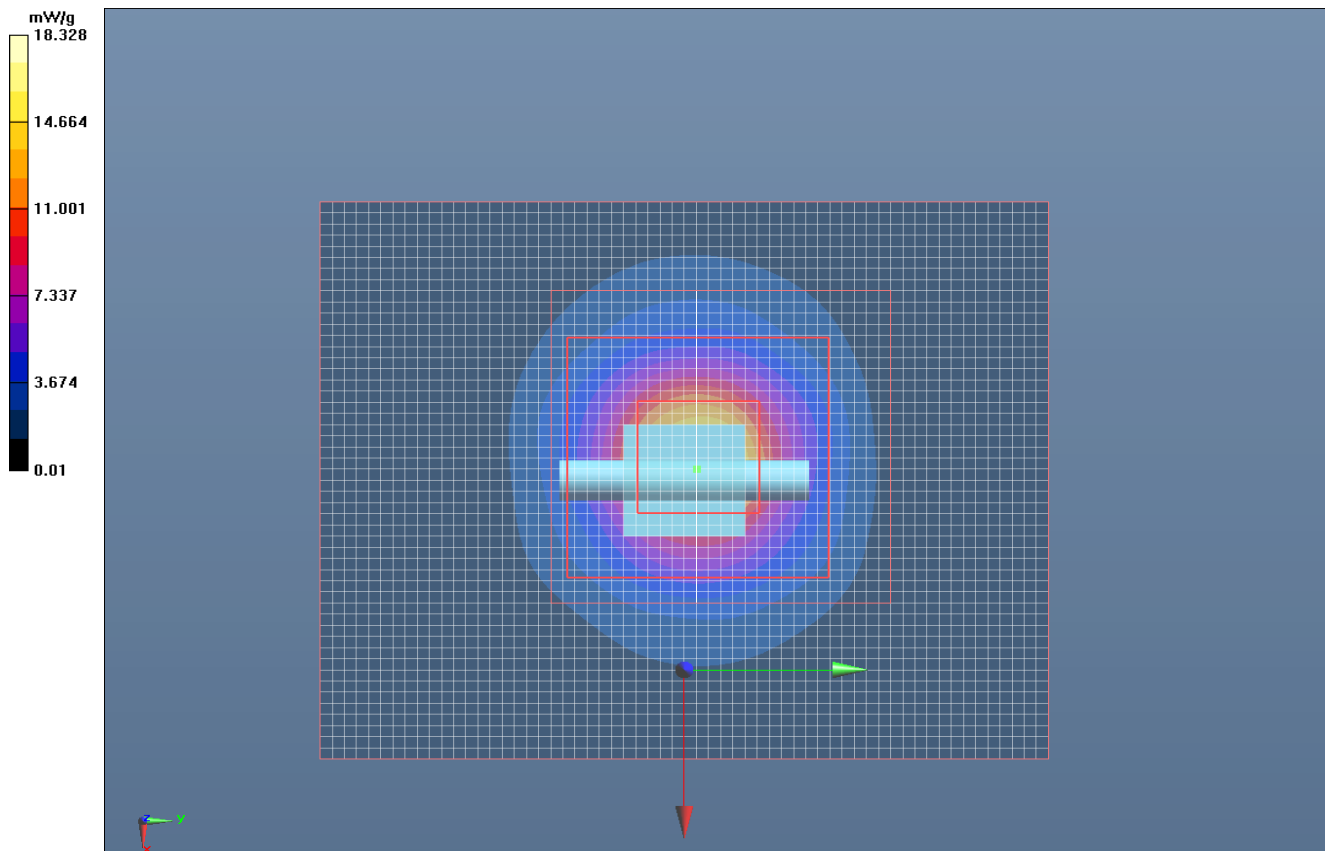
Peak SAR (extrapolated) = 31.931 W/kg

SAR(1 g) = 7.6 mW/g; SAR(10 g) = 2.16 mW/g

Maximum value of SAR (measured) = 15.874 mW/g

System Check/System Check - Mid Channel/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 60.833 V/m



Room Temperature (°C):	23.7	Humidity (%):	33.3	Test Date:	01/11/12
Liquid Temperature (°C):	22.2	Barometric Pressure (mb):	1027	Tested by:	Ethan Schoonover

HSL501 System Check 5800MHz 1-11-12

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1066

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5800 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5800$ MHz; $\sigma = 5.351$ mho/m; $\epsilon_r = 34.229$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.35092$ mho/m, $\epsilon_r = 34.229$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

System Check/System Check - High Channel/Area Scan (51x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 14.399 mW/g

System Check/System Check - High Channel/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 44.506 V/m

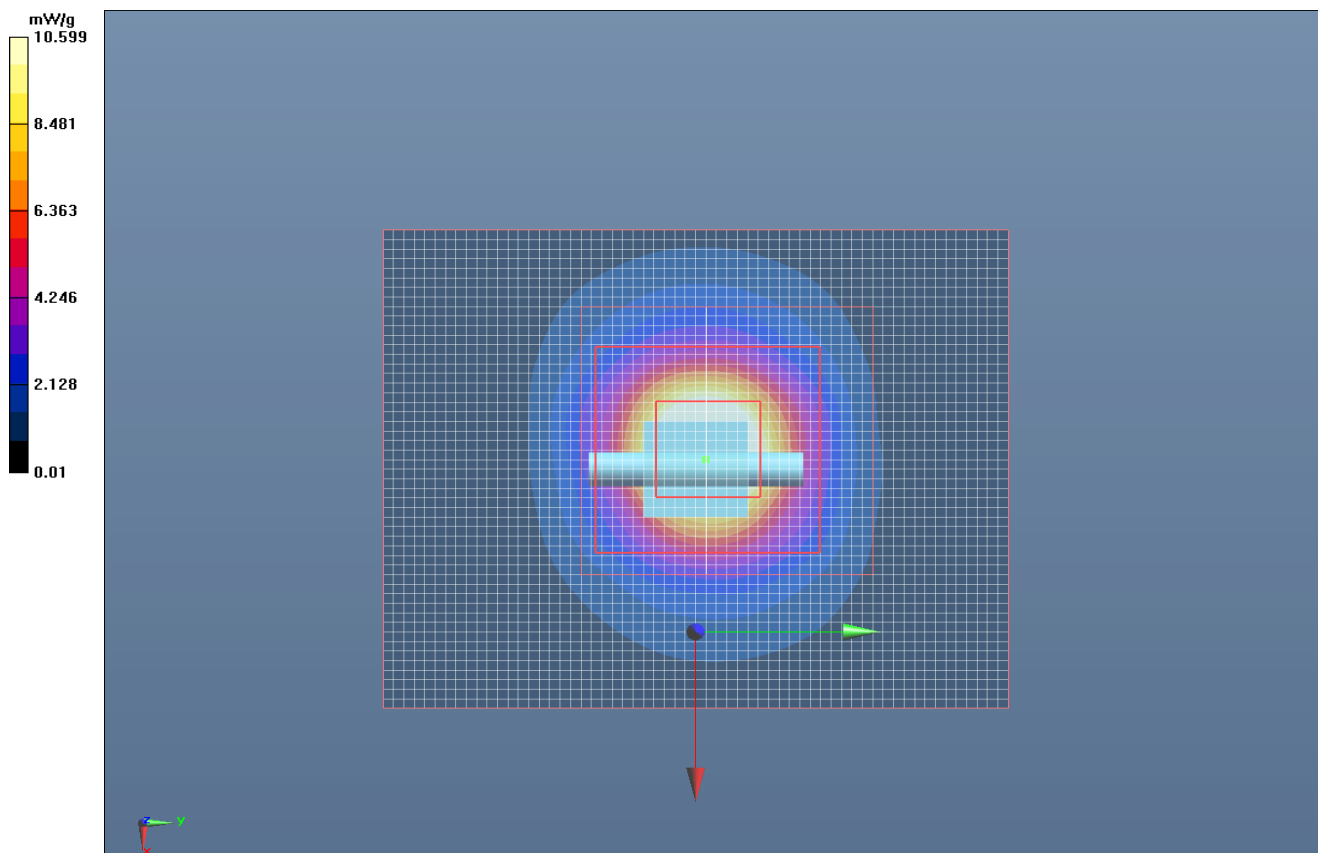
System Check/System Check - High Channel/Zoom Scan (7x9x7) (8x8x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 42.878 V/m; Power Drift = 0.32 dB

Peak SAR (extrapolated) = 27.961 W/kg

SAR(1 g) = 6.54 mW/g; SAR(10 g) = 1.88 mW/g

Maximum value of SAR (measured) = 13.841 mW/g



Room Temperature (°C):	25.9	Humidity (%):	24.7	Test Date:	01/13/12
Liquid Temperature (°C):	23.9	Barometric Pressure (mb):	1026	Tested by:	Ethan Schoonover

HSL2450 System Check_2450MHz 1-13-12

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:855

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 2450$ MHz; $\sigma = 1.82$ mho/m; $\epsilon_r = 38.617$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.82049$ mho/m, $\epsilon_r = 38.617$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

System Check/System Check/Area Scan (51x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 5.502 mW/g

System Check/System Check/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 77.711 V/m

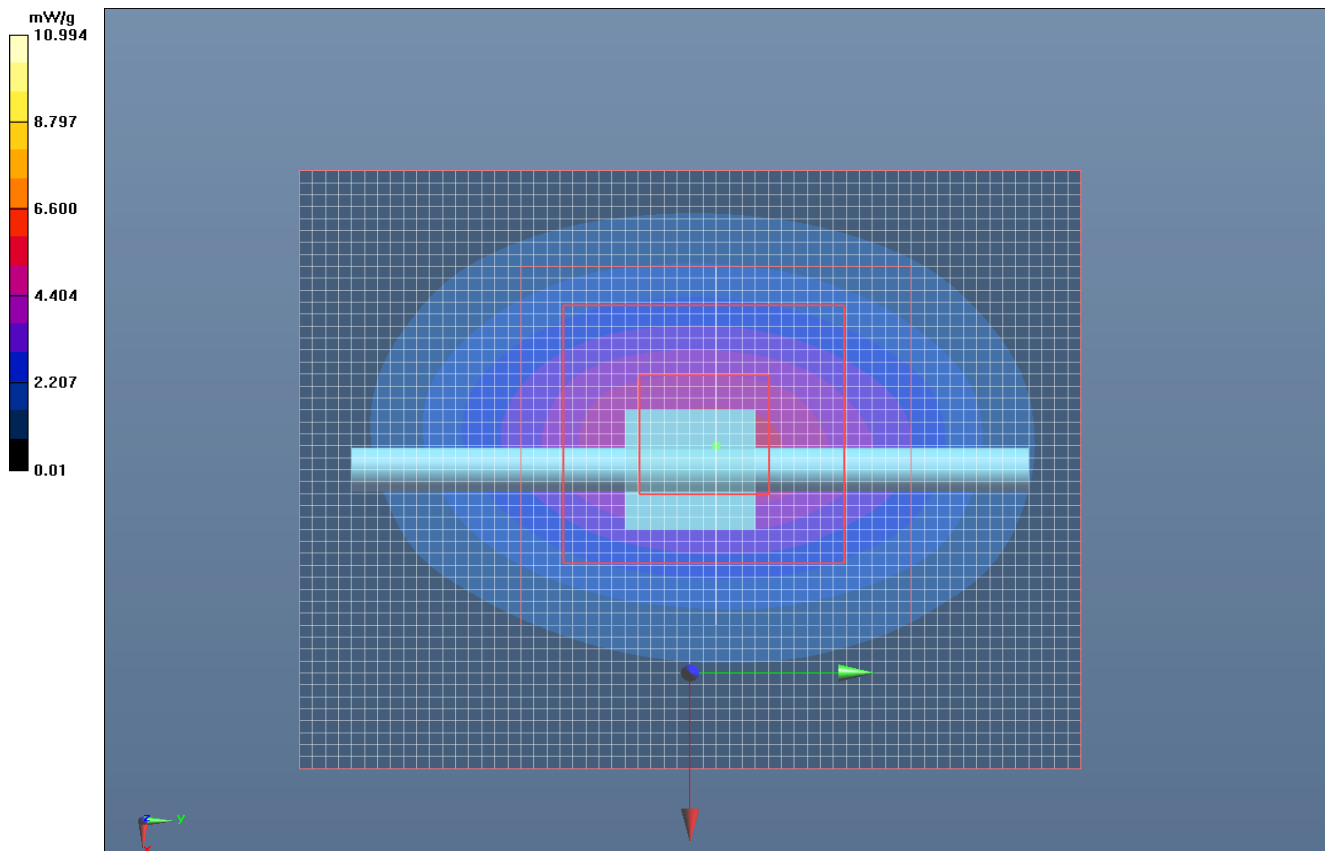
System Check/System Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.240 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 11.818 W/kg

SAR(1 g) = 5.59 mW/g; SAR(10 g) = 2.58 mW/g

Maximum value of SAR (measured) = 5.479 mW/g



Room Temperature (°C):	25.9	Humidity (%):	24.7	Test Date:	01/13/12
Liquid Temperature (°C):	23.9	Barometric Pressure (mb):	1026	Tested by:	Ethan Schoonover

MSL2450 System Check_2450MHz 1-13-12

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:855

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 2450$ MHz; $\sigma = 1.915$ mho/m; $\epsilon_r = 50.227$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.91493$ mho/m, $\epsilon_r = 50.2273$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

System Check/System Check/Area Scan (51x61x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 5.181 mW/g

System Check/System Check/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 62.143 V/m

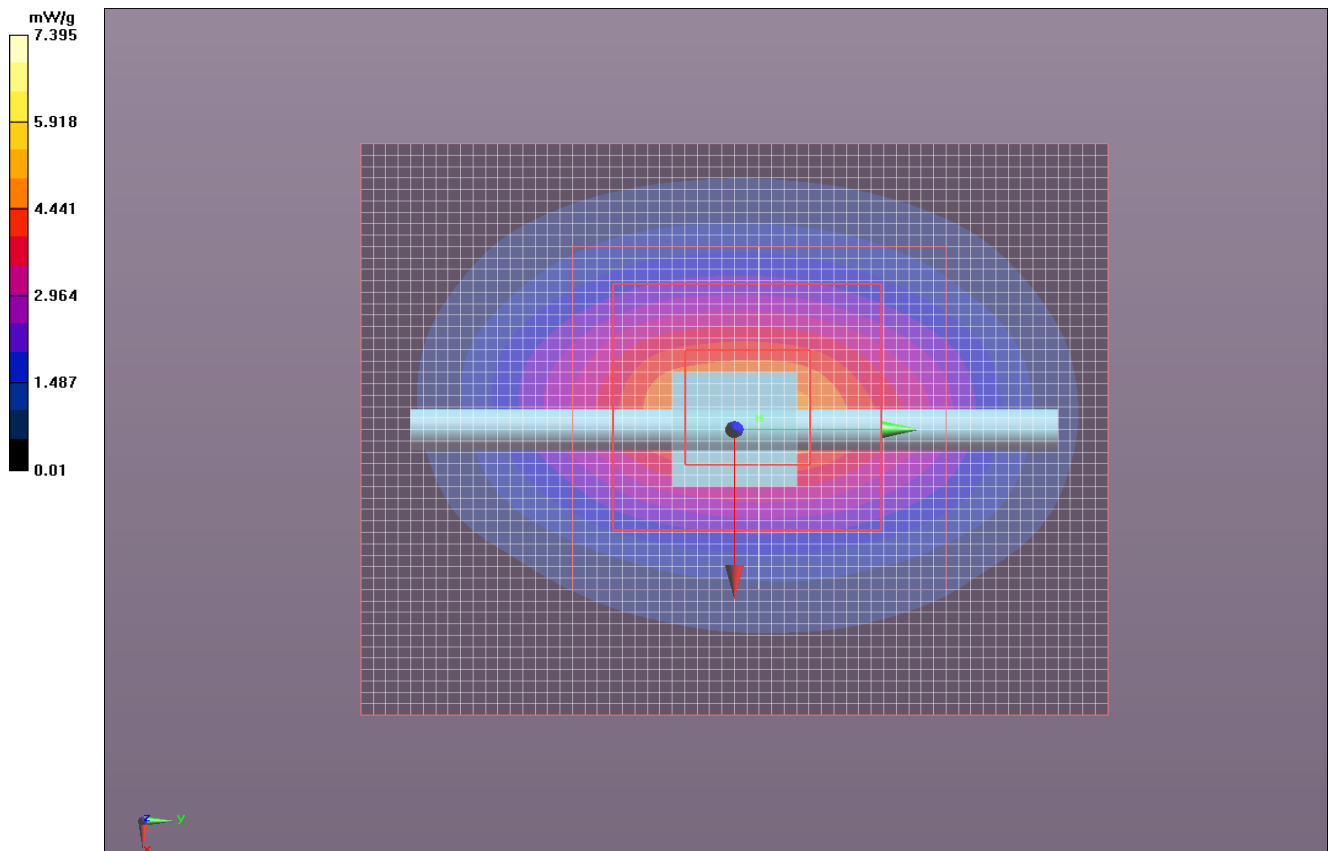
System Check/System Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 50.077 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 10.023 W/kg

SAR(1 g) = 5.06 mW/g; SAR(10 g) = 2.4 mW/g

Maximum value of SAR (measured) = 5.041 mW/g



Test Configurations

In normal operation, the EUT can be held in the hand, or next to the head like a cellular handset, or worn on the wrist/arm in a holster. The wrist holster is specially designed for airline baggage handlers to have their hands free, but still be able to scan bar-codes. The only Intermec approved accessory for body worn operation for the EUT is this wrist holster. The EUT can only fit in the holster with the top end of the unit pointing towards the hand and the keypad facing up away from the arm.

No snap-on accessories can be connected to the EUT while it is in the wrist holster.

The EUT is powered by a lithium-ion battery, Model 1000AB01. It was fully charged before each SAR evaluation.


Prior to this SAR evaluation, a non-PBA KDB inquiry was made to the FCC to confirm that a body phantom and body tissue equivalent liquids could be used for the evaluation of the wrist holster on three sides (left, right, back). The FCC agreed with the proposal (see KDB tracking #758326). SAR measurements of the head configurations that produced the highest SAR in the original filing were also made (see KDB 178919 D01 Permissive Change Policy v05r01, Item #5b).

Per KDB 648474, among the channels required for normal testing, SAR must be measured on the highest conducted output power channel in each band (see highlighted values in the Output Power section of this report). Since the measured SAR on the highest output channel is < 0.8 W/kg, SAR evaluation for the other required channels was not performed (reference also KDB 447498 Section 1(e))

All testing was performed with the EUT configured in a worst-case configuration and operating mode to produce the highest SAR levels. The EUT used Intermec test software that permitted the selection of transmit channel, modulation type, and data rate. It operated continuously at nearly 100% duty cycle.

Summary

The following tables summarize the measured SAR values.

NORTHWEST EMC		SAR TEST DATA		SAR 2011.02.07
EUT:	Hand Held Computer	Work Order:	INMC0746	
Serial Number:	187U1191613	Date:	See Data Sheets	
Customer:	Intermec Technologies Corporation	Temperature:	See Data Sheets	
Attendees:	None	Humidity:	See Data Sheets	
Project:	None	Barometric Pres.:	See Data Sheets	
Tested by:	Ethan Schoonover	Job Site:	EV08	
TEST SPECIFICATIONS		Test Method		
FCC 2.1093:2012		FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 248227 D01 V01r02 FCC KDB 648474 D01 V01r05 FCC 865664		
Health Safety Code 6:2009		RSS-102, Issue 4:2010		
COMMENTS				
None				
DEVIATIONS FROM TEST STANDARD				
No Deviations				
Configuration #	2	Signature 		

Test Configuration	Frequency Band	Transmit Frequency (MHz)	Transmit Channel	Data Rate (Mbps)	Transmit Mode	Audio Accessory	EUT Position	SAR Drift During Test (dB)	Measured 1g SAR Level (mW/g)	Test #
Head	2450	2462	11	1	BPSK	None	Left-Cheek	-0.11	0.048	16
	2450	2462	11	1	BPSK	None	Left-Tilt	0.03	0.043	17

EMC

SAR TEST DATA

Room Temperature (°C):	21.3	Humidity (%):	35.6	Test Date:	01/13/12
Liquid Temperature (°C):	23.1	Barometric Pressure (mb):	1029	Tested by:	Ethan Schoonover

Test 16 1-13-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2462 MHz; Communication System PAR: 0 dB
 Medium parameters used: $\sigma = 1.82049$ mho/m, $\epsilon_r = 38.617$; $\rho = 1000$ kg/m³, Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.834$ mho/m; $\epsilon_r = 38.575$; $\rho = 1000$ kg/m³
 Phantom section: Left Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head - Left/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
 Maximum value of Total (measured) = 4.010 V/m

Head - Left/Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 5.652 V/m; Power Drift = -0.11 dB
 Peak SAR (extrapolated) = 0.085 W/kg
SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.027 mW/g

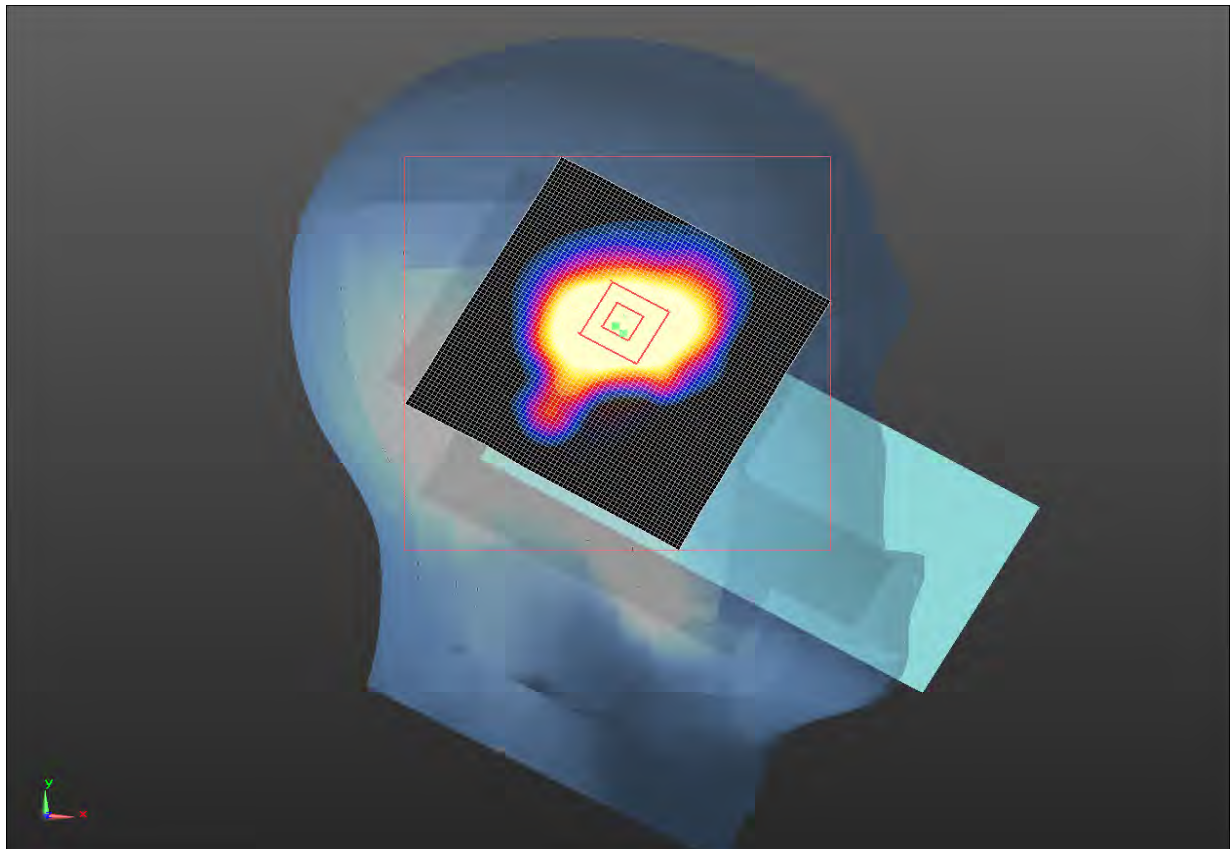
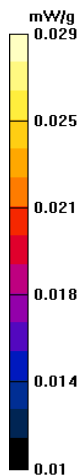
[Info: Interpolated medium parameters used for SAR evaluation.](#)
 Maximum value of SAR (measured) = 0.059 mW/g

Head - Left/Cheek/Reference scan (41x71x1): Measurement grid: dx=30mm, dy=30mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)
 Maximum value of SAR (interpolated) = 0.056 mW/g

Head - Left/Cheek/Area scan (71x71x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)
 Maximum value of SAR (interpolated) = 0.055 mW/g



EMC

SAR TEST DATA

Room Temperature (°C):	21.3	Humidity (%):	35.6	Test Date:	01/13/12
Liquid Temperature (°C):	23.1	Barometric Pressure (mb):	1029	Tested by:	Ethan Schoonover

Test 17 1-13-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2462 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.834$ mho/m; $\epsilon_r = 38.575$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.82049$ mho/m, $\epsilon_r = 38.617$; $\rho = 1000$ kg/m³
 Phantom section: Left Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head - Left/Tilt/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.184 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.079 W/kg

SAR(1 g) = 0.043 mW/g; SAR(10 g) = 0.024 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.053 mW/g

Head - Left/Tilt/Reference scan (51x91x1): Measurement grid: dx=30mm, dy=30mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.054 mW/g

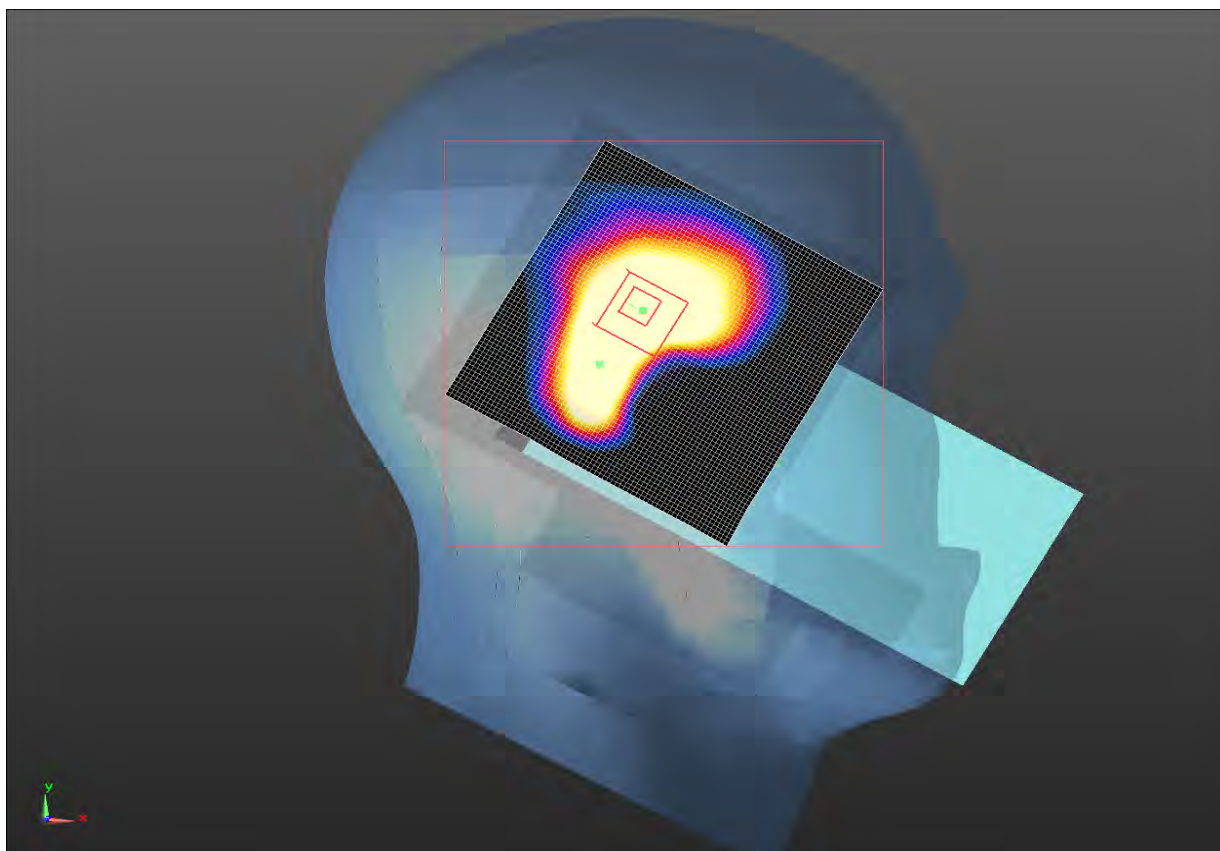
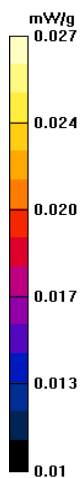
Head - Left/Tilt/Area scan (71x71x1): Measurement grid: dx=15mm, dy=15mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.049 mW/g

Head - Left/Tilt/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 3.859 V/m

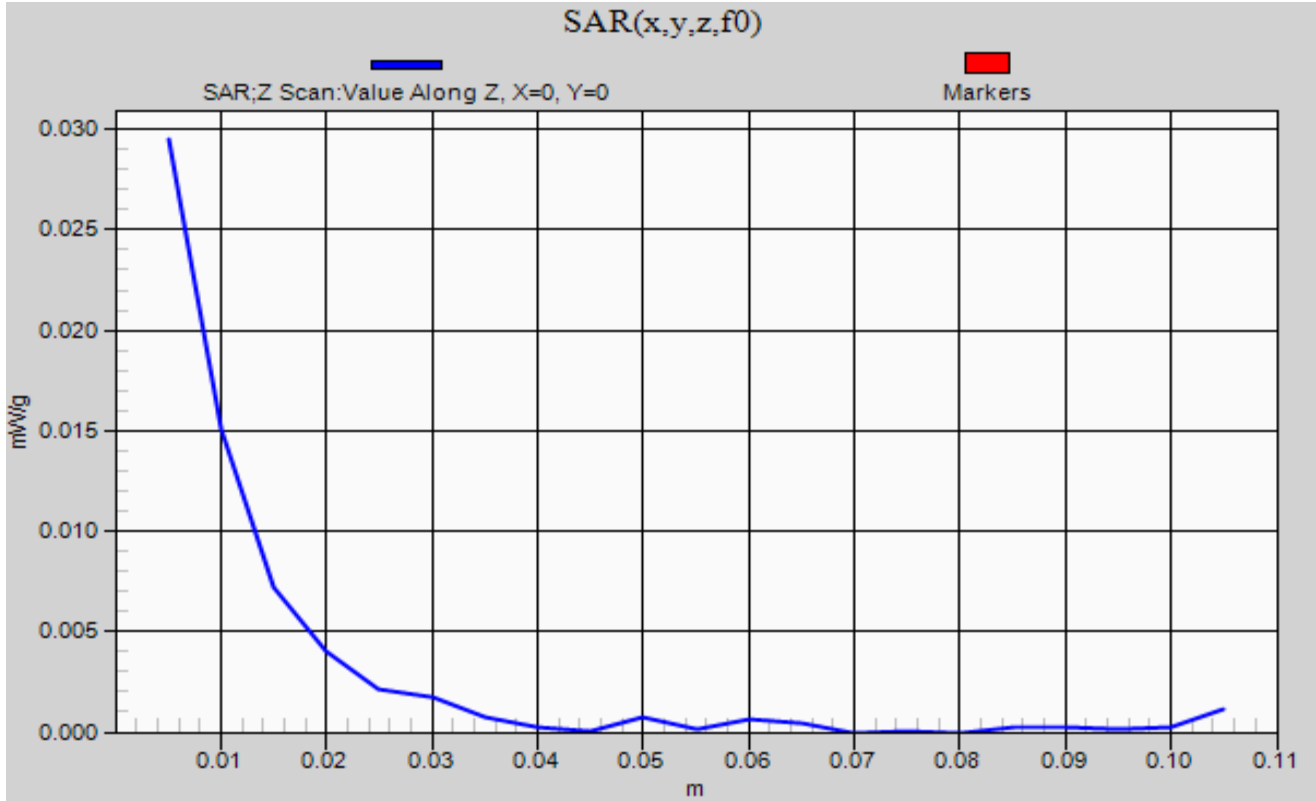


EMC

SAR TEST DATA

Room Temperature (°C):	21.3	Humidity (%):	35.6	Test Date:	01/13/12
Liquid Temperature (°C):	23.1	Barometric Pressure (mb):	1029	Tested by:	Ethan Schoonover

Test #16



NORTHWEST
EMC

SAR TEST DATA

SAR 2011.02.07

EUT: Hand Held Computer	Work Order: INMC0746
Serial Number: 187U1191613	Date: See Data Sheets
Customer: Intermec Technologies Corporation	Temperature: See Data Sheets
Attendees: None	Humidity: See Data Sheets
Project: None	Barometric Pres.: See Data Sheets
Tested by: Ethan Schoonover	Job Site: EV08

TEST SPECIFICATIONS	Test Method
FCC 2.1093:2012	FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 248227 D01 V01r02 FCC KDB 648474 D01 V01r05 FCC 865664
Health Safety Code 6:2009	RSS-102, Issue 4:2010

COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

Configuration #	1	<i>Signature</i>
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Test Configuration	Frequency Band	Transmit Frequency (MHz)	Transmit Channel	Data Rate (Mbps)	Transmit Mode	Body-Worn Accessory	Audio Accessory	EUT Position	SAR Drift During Test (dB)	Measured 1g SAR Level (mW/g)	Test #
Body	2450	2462	11	1	BPSK	Wrist Holster	None	Left	-0.22	0.014	1
	2450	2462	11	1	BPSK	Wrist Holster	None	Back	-0.65	0.014	2
	2450	2462	11	1	BPSK	Wrist Holster	None	Right	-0.02	0.207	3

Room Temperature (°C):	22.7	Humidity (%):	31.5	Test Date:	01/13/12
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1029	Tested by:	Ethan Schoonover

Test 1 1-13-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2462 MHz; Communication System PAR: 0 dB
 Medium parameters used: $\sigma = 1.91493$ mho/m, $\epsilon_r = 50.2273$; $\rho = 1000$ kg/m³, Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 50.189$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASy5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASy52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
 Maximum value of Total (measured) = 2.193 V/m

Body/Body/Reference scan (41x71x1): Measurement grid: dx=30mm, dy=30mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.017 mW/g

Body/Body/Area scan (71x71x1): Measurement grid: dx=15mm, dy=15mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.043 mW/g

Body/Body/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

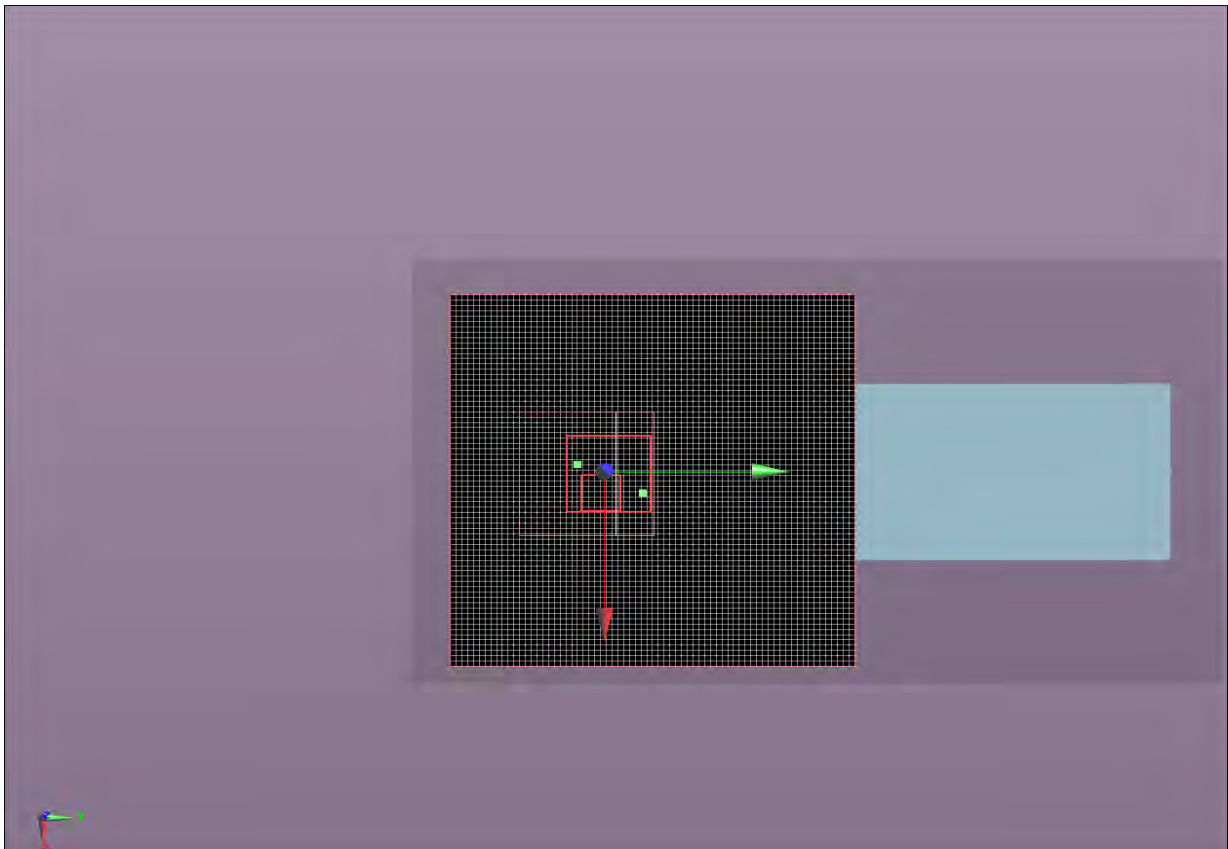
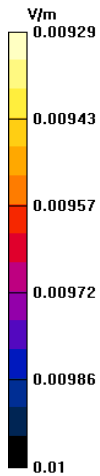
Reference Value = 3.228 V/m; Power Drift = -0.22 dB

Peak SAR (extrapolated) = 0.080 W/kg

SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00755 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.018 mW/g



Room Temperature (°C):	20.8	Humidity (%):	30.1	Test Date:	01/13/12
Liquid Temperature (°C):	22.1	Barometric Pressure (mb):	1029	Tested by:	Ethan Schoonover

Test 2 1-13-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2462 MHz; Communication System PAR: 0 dB
 Medium parameters used: $\sigma = 1.91493$ mho/m, $\epsilon_r = 50.2273$; $\rho = 1000$ kg/m³, Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 50.189$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
 Maximum value of Total (measured) = 1.944 V/m

Body/Body/Area scan 2 (71x21x1): Measurement grid: dx=15mm, dy=15mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.014 mW/g

Body/Body/Reference scan (51x81x1): Measurement grid: dx=30mm, dy=30mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.015 mW/g

Body/Body/Area scan (71x71x1): Measurement grid: dx=15mm, dy=15mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.019 mW/g

Body/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

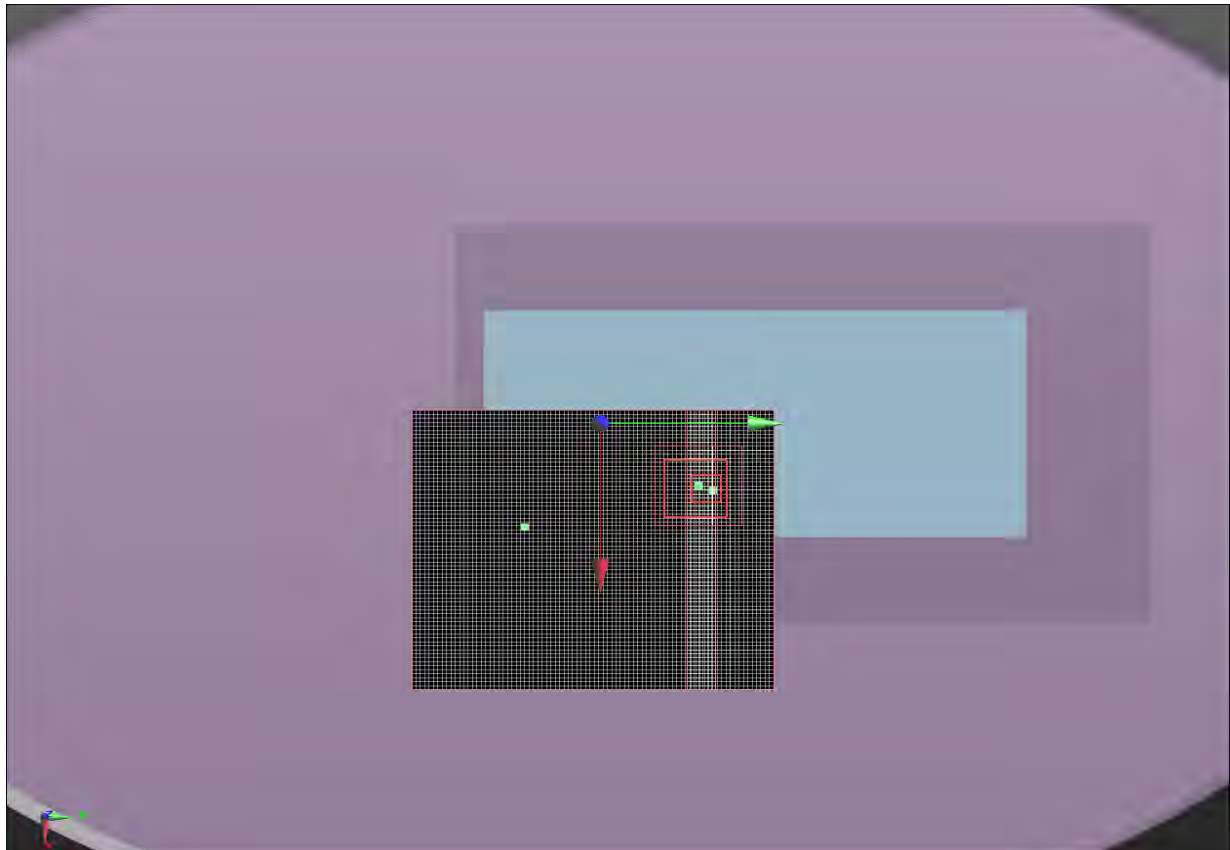
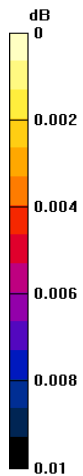
Reference Value = 2.916 V/m; Power Drift = -0.65 dB

Peak SAR (extrapolated) = 0.024 W/kg

SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00883 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.018 mW/g



EMC

SAR TEST DATA

Room Temperature (°C):	22.7	Humidity (%):	31.5	Test Date:	01/13/12
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1029	Tested by:	Ethan Schoonover

Test 3 1-13-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2462 MHz; Communication System PAR: 0 dB

Medium parameters used: $\sigma = 1.91493$ mho/m, $\epsilon_r = 50.2273$; $\rho = 1000$ kg/m³, Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 50.189$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 7.978 V/m

Body/Body/Reference scan (41x71x1): Measurement grid: dx=30mm, dy=30mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.197 mW/g

Body/Body/Area scan (71x71x1): Measurement grid: dx=15mm, dy=15mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.266 mW/g

Body/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

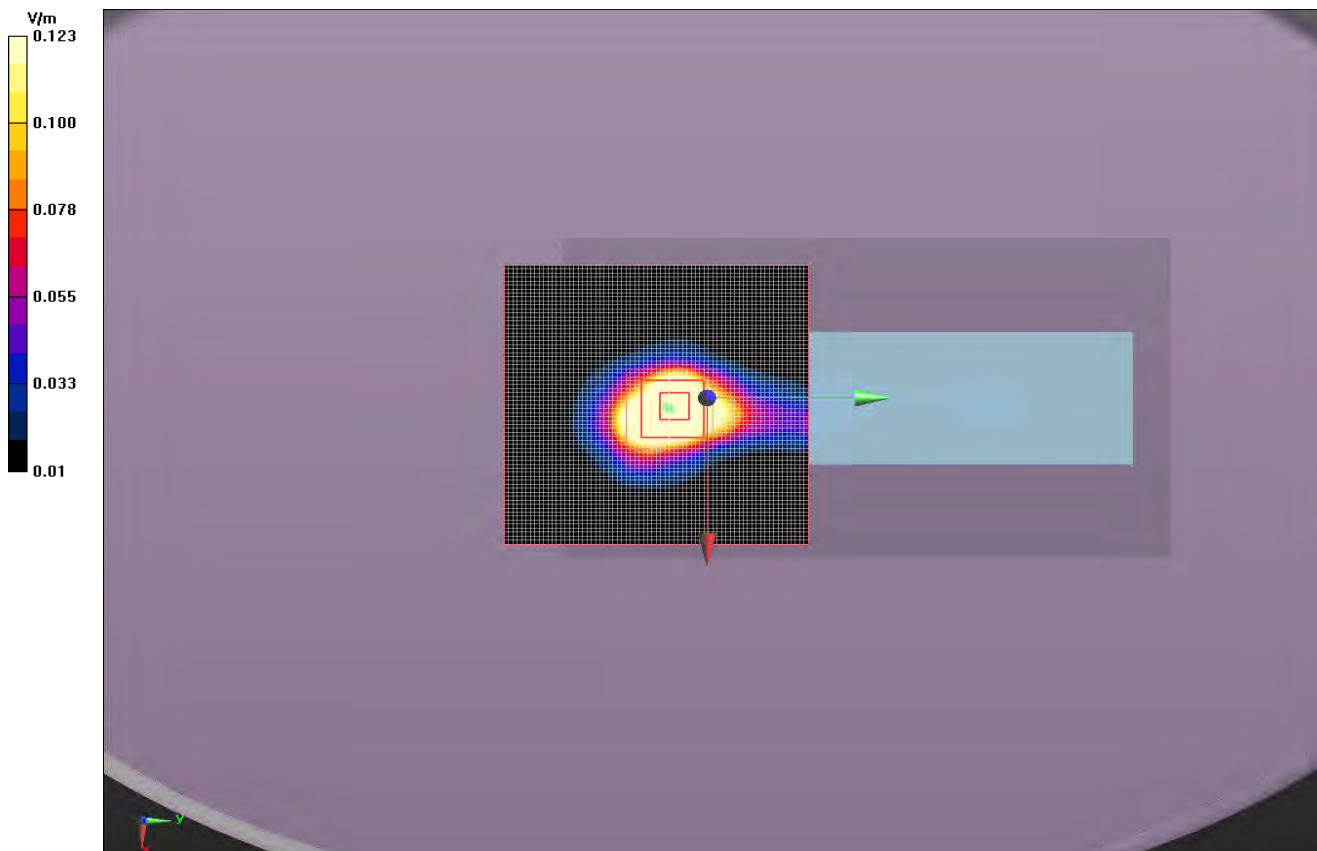
Reference Value = 10.435 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.435 W/kg

SAR(1 g) = 0.207 mW/g; SAR(10 g) = 0.098 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.266 mW/g

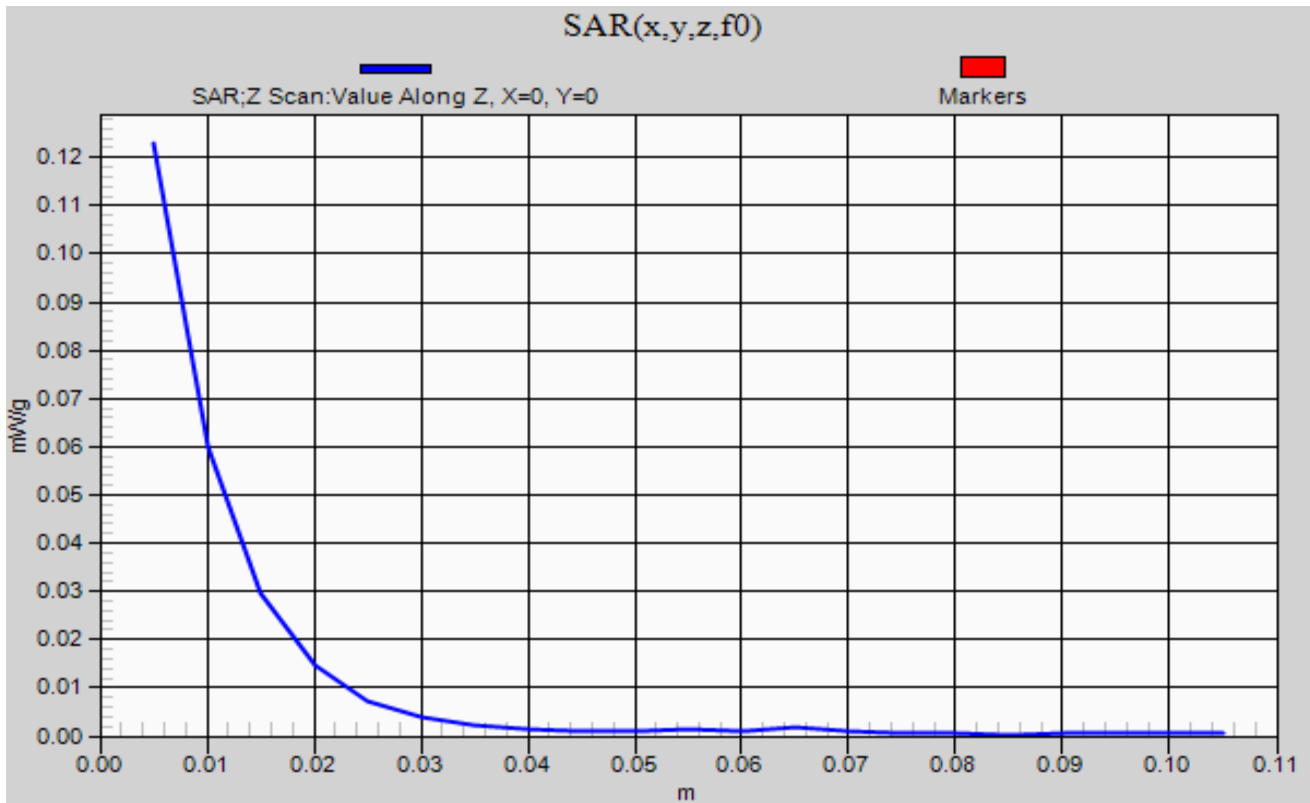



EMC

SAR TEST DATA

Room Temperature (°C):	22.7	Humidity (%):	31.5	Test Date:	01/13/12
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1029	Tested by:	Ethan Schoonover

Test #3



EUT: Hand Held Computer		Work Order: INMC0746
Serial Number: 187U1191613		Date: See Data Sheets
Customer: Intermec Technologies Corporation		Temperature: See Data Sheets
Attendees: None		Humidity: See Data Sheets
Project: None		Barometric Pres.: See Data Sheets
Tested by: Ethan Schoonover		Job Site: EV08
TEST SPECIFICATIONS		Test Method
FCC 2.1093:2012	FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 248227 D01 V01r02 FCC KDB 648474 D01 V01r05 FCC 865664	
Health Safety Code 6:2009	RSS-102, Issue 4:2010	
COMMENTS		
None		
DEVIATIONS FROM TEST STANDARD		
No Deviations		
Configuration #	2	Signature 

Test Configuration	Frequency Band	Transmit Frequency (MHz)	Transmit Channel	Data Rate (Mbps)	Transmit Mode	Audio Accessory	EUT Position	SAR Drift During Test (dB)	Measured 1g SAR Level (mW/g)	Test #
Head	5200	5180	36	6	OFDM	None	Left-Cheek	-0.37	0.018	18
	5200	5180	36	6	OFDM	None	Left-Tilt	0.74	0.015	19
	5300	5260	52	6	OFDM	None	Left-Cheek	0.14	0.036	20
	5300	5260	52	6	OFDM	None	Left-Tilt	0.18	0.016	21
	5600	5600	120	6	OFDM	None	Left-Cheek	0.16	0.05	22
	5600	5600	120	6	OFDM	None	Left-Tilt	0.13	0.027	23
	5800	5745	149	6	OFDM	None	Left-Cheek	0.5	0.069	24
	5800	5745	149	6	OFDM	None	Left-Tilt	0.41	0.034	25

Room Temperature (°C):	24.8	Humidity (%):	31.3	Test Date:	01/11/12
Liquid Temperature (°C):	21	Barometric Pressure (mb):	1031.2	Tested by:	Ethan Schoonover

Test 18 1-11-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5180 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5180$ MHz; $\sigma = 4.601$ mho/m; $\epsilon_r = 35.446$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 4.62378$ mho/m, $\epsilon_r = 35.408$; $\rho = 1000$ kg/m³
 Phantom section: Left Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Cheek/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.042 mW/g

Head/Cheek/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.065 mW/g

Head/Cheek/Zoom Scan (11x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 3.440 V/m; Power Drift = -0.37 dB

Peak SAR (extrapolated) = 0.141 W/kg

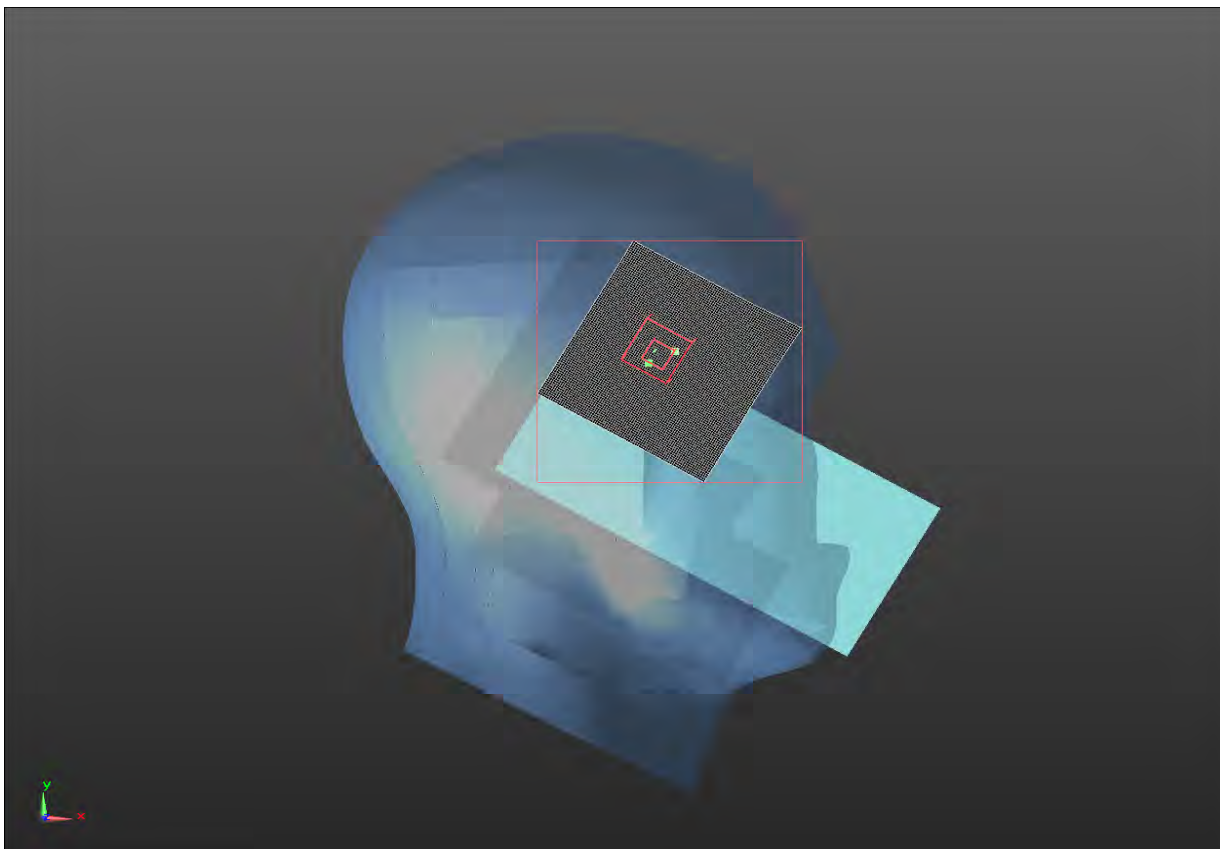
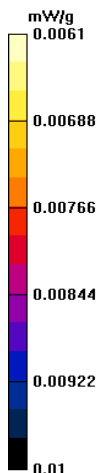
SAR(1 g) = 0.018 mW/g; SAR(10 g) = 0.00628 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.039 mW/g

Head/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.152 V/m



Room Temperature (°C):	23.1	Humidity (%):	34.4	Test Date:	01/12/12
Liquid Temperature (°C):	22.9	Barometric Pressure (mb):	1030.2	Tested by:	Ethan Schoonover

Test 19 1-12-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5180 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5180$ MHz; $\sigma = 4.601$ mho/m; $\epsilon_r = 35.446$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 4.62378$ mho/m, $\epsilon_r = 35.408$; $\rho = 1000$ kg/m³
 Phantom section: Left Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Tilt/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.540 V/m; Power Drift = 0.74 dB

Peak SAR (extrapolated) = 0.178 W/kg

SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00312 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.033 mW/g

Head/Tilt/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.021 mW/g

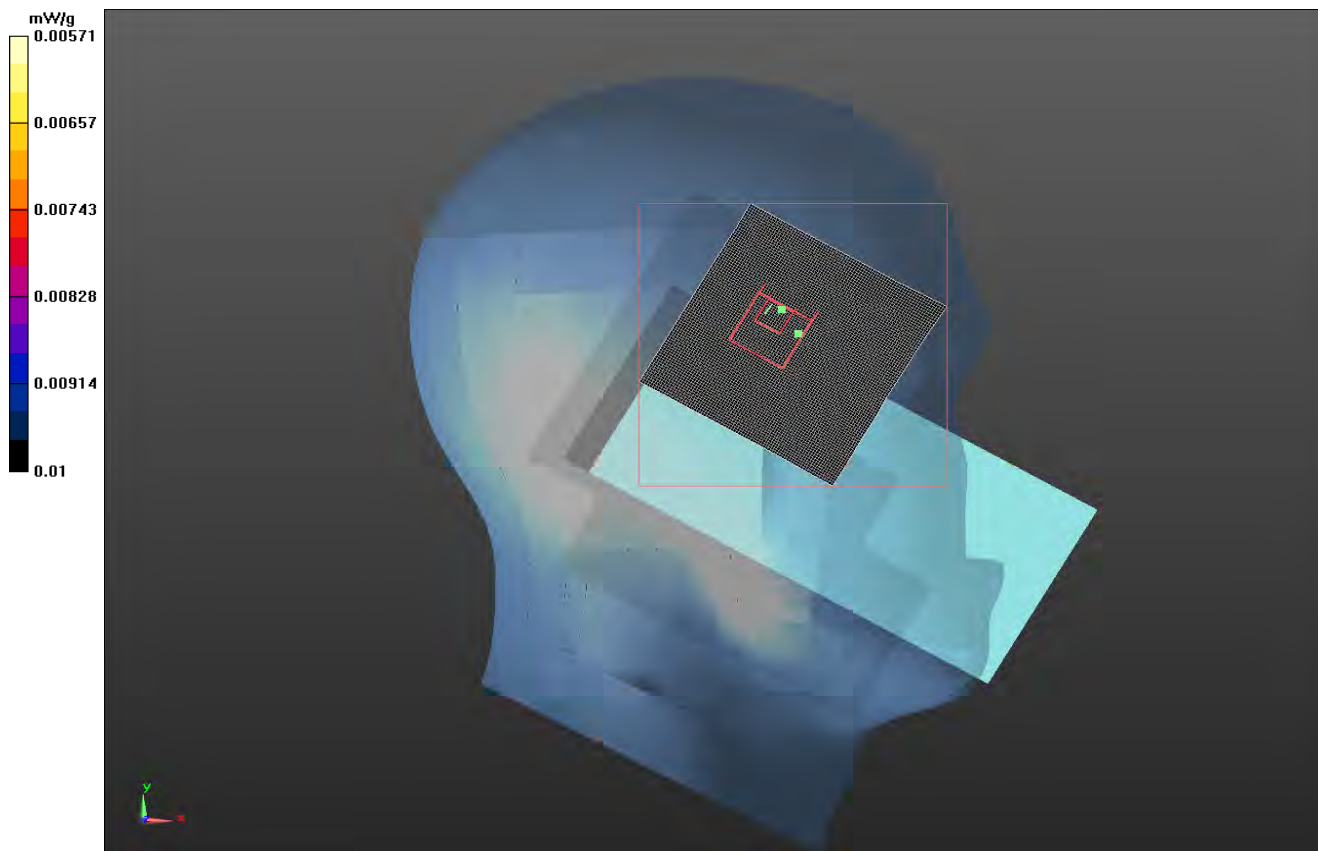
Head/Tilt/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.017 mW/g

Head/Tilt/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.114 V/m



Room Temperature (°C):	29.8	Humidity (%):	22.9	Test Date:	01/12/12
Liquid Temperature (°C):	26.3	Barometric Pressure (mb):	1030.2	Tested by:	Ethan Schoonover

Test 20 1-12-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5260 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5260$ MHz; $\sigma = 4.681$ mho/m; $\epsilon_r = 35.31$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 4.67277$ mho/m, $\epsilon_r = 35.3333$; $\rho = 1000$ kg/m³
 Phantom section: Left Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Cheek/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.051 mW/g

Head/Cheek/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.159 mW/g

Head/Cheek/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 3.993 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.138 W/kg

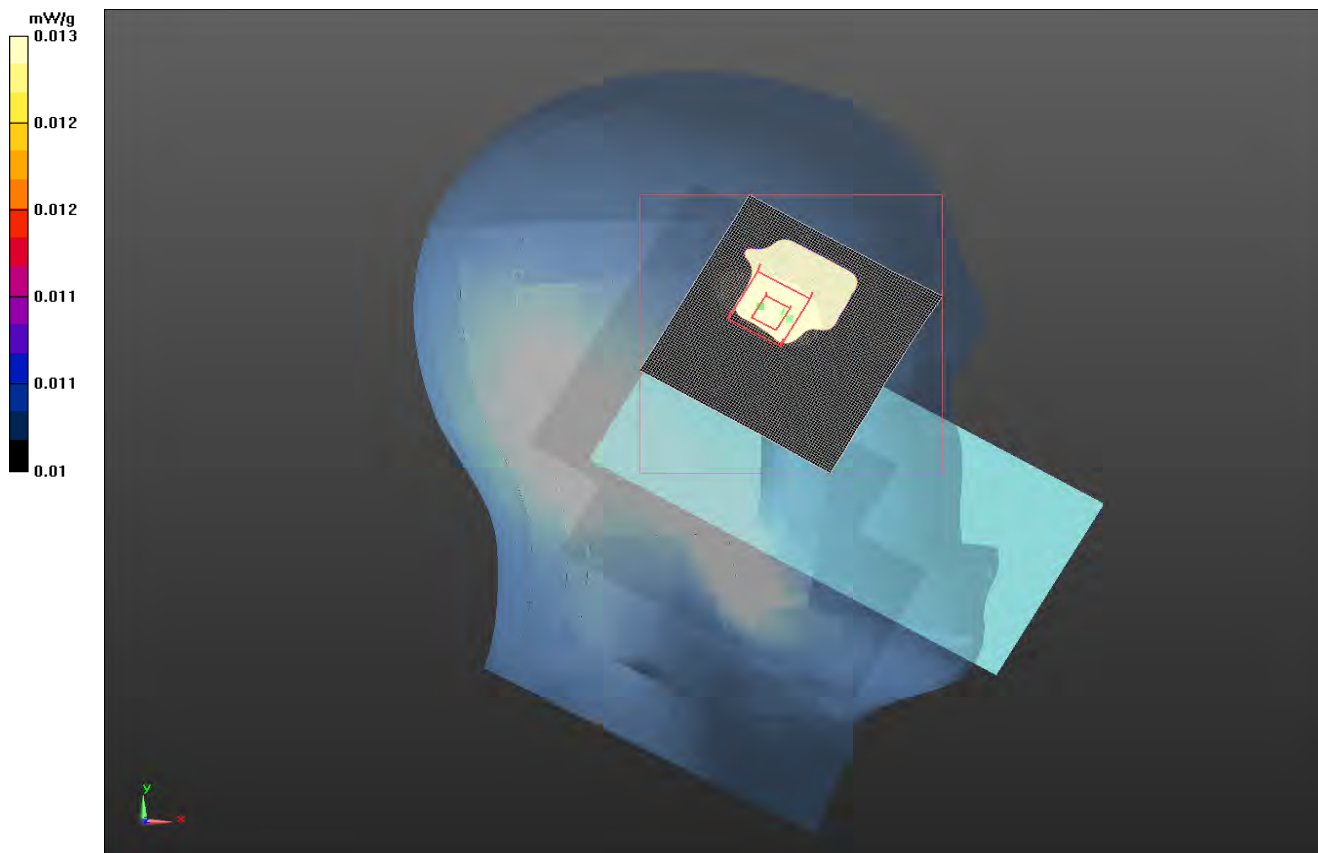
SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.014 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.062 mW/g

Head/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.672 V/m



Room Temperature (°C):	22.7	Humidity (%):	31.1	Test Date:	01/12/12
Liquid Temperature (°C):	22.9	Barometric Pressure (mb):	1030.2	Tested by:	Ethan Schoonover

Test 21 1-12-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5260 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5260$ MHz; $\sigma = 4.681$ mho/m; $\epsilon_r = 35.31$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 4.67277$ mho/m, $\epsilon_r = 35.3333$; $\rho = 1000$ kg/m³
 Phantom section: Left Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Tilt/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.698 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.072 W/kg

SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.00595 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.032 mW/g

Head/Tilt/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.037 mW/g

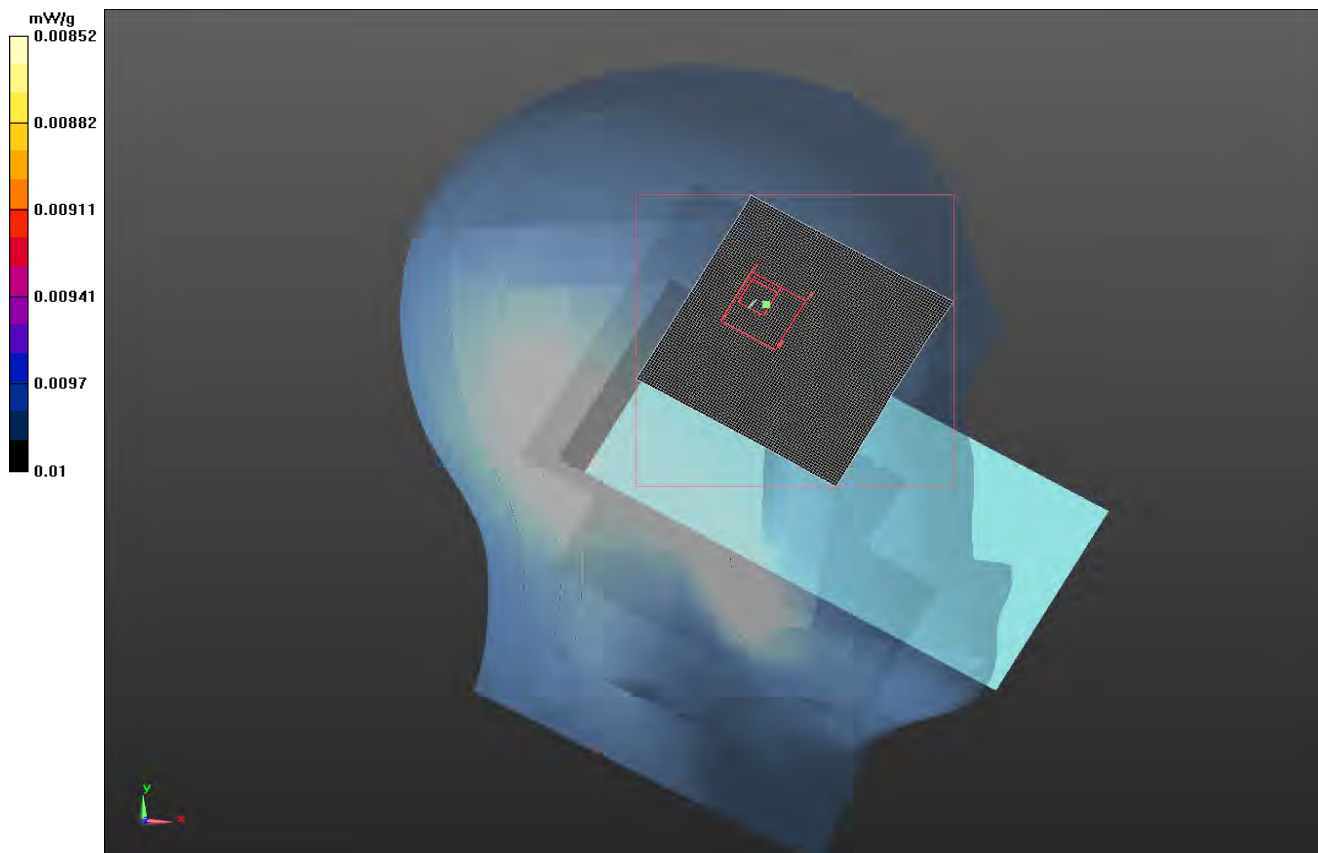
Head/Tilt/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0 mW/g

Head/Tilt/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.349 V/m



Room Temperature (°C):	22.7	Humidity (%):	31.1	Test Date:	01/12/12
Liquid Temperature (°C):	22.9	Barometric Pressure (mb):	1030.2	Tested by:	Ethan Schoonover

Test 22 1-12-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5600 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.078$ mho/m; $\epsilon_r = 34.565$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.0784$ mho/m; $\epsilon_r = 34.5645$; $\rho = 1000$ kg/m³
 Phantom section: Left Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Cheek/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm
 Maximum value of SAR (interpolated) = 0.056 mW/g

Head/Cheek/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
 Maximum value of SAR (interpolated) = 0.211 mW/g

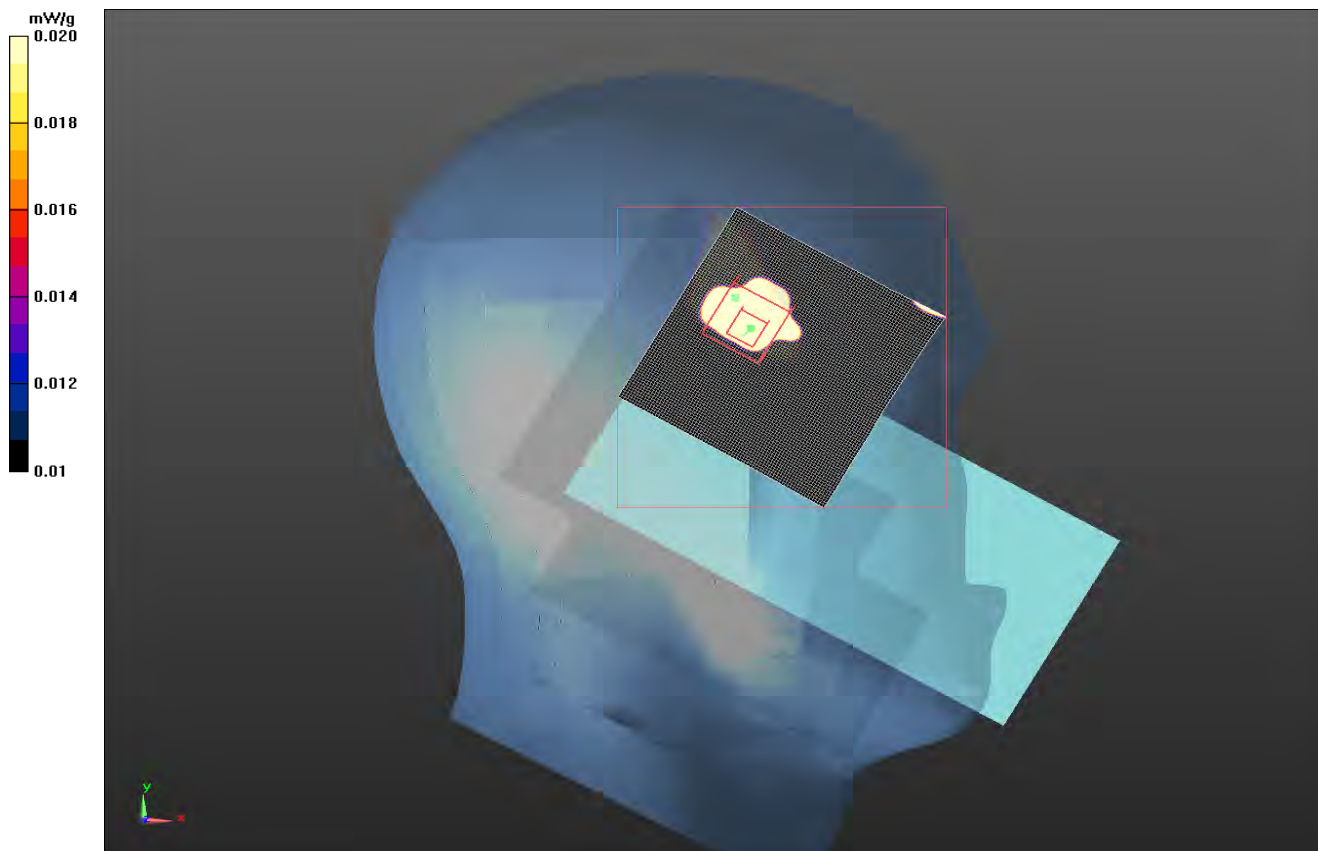
Head/Cheek/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 4.052 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.135 W/kg

SAR(1 g) = 0.050 mW/g; SAR(10 g) = 0.028 mW/g

Maximum value of SAR (measured) = 0.084 mW/g

Head/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
 Maximum value of Total (measured) = 1.975 V/m



Room Temperature (°C):	26.9	Humidity (%):	27.3	Test Date:	01/12/12
Liquid Temperature (°C):	23	Barometric Pressure (mb):	1030.2	Tested by:	Ethan Schoonover

Test 23 1-12-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5600 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.078$ mho/m; $\epsilon_r = 34.565$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.0784$ mho/m, $\epsilon_r = 34.5645$; $\rho = 1000$ kg/m³
 Phantom section: Left Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Tilt/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 3.057 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.148 W/kg

SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.00966 mW/g

Maximum value of SAR (measured) = 0.051 mW/g

Head/Tilt/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

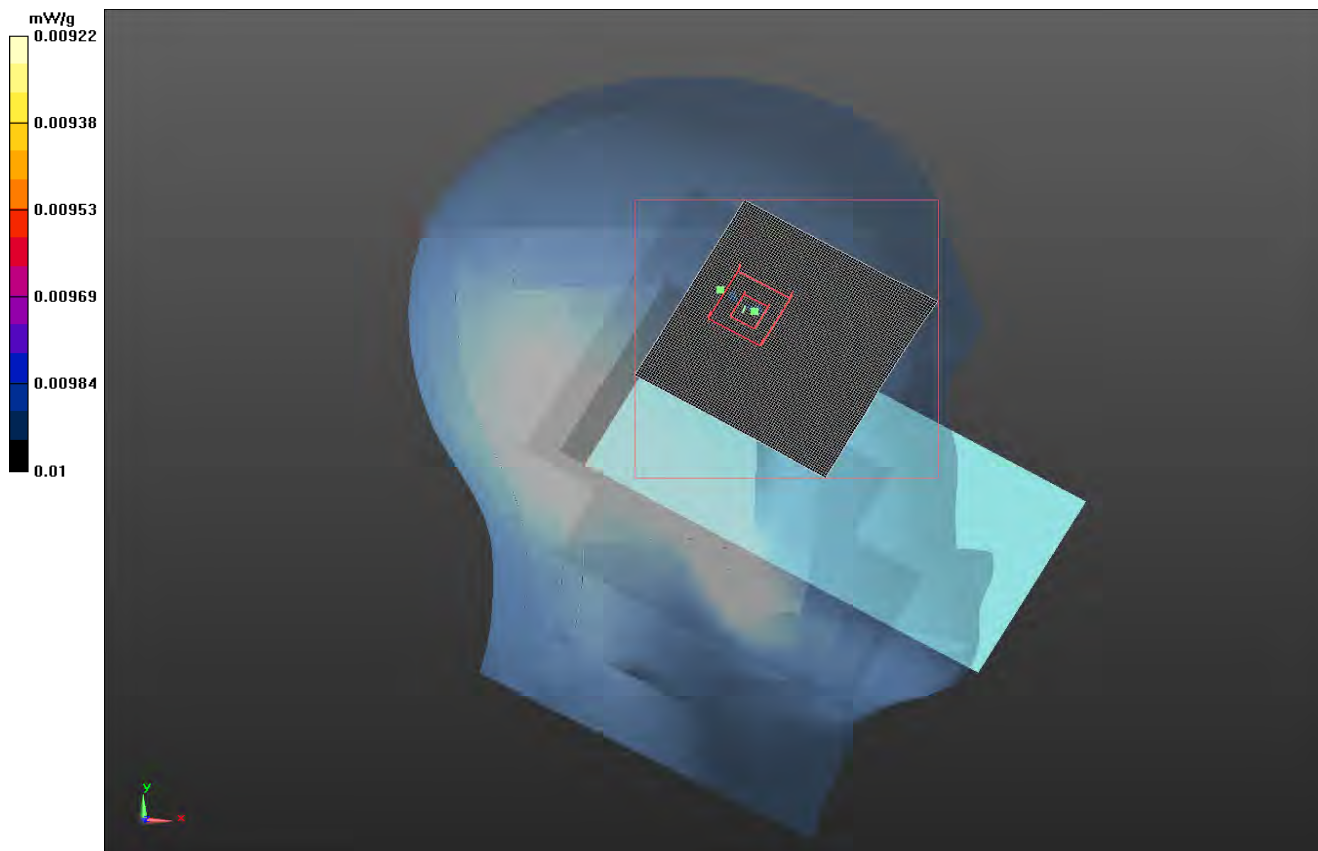
Maximum value of SAR (interpolated) = 0.098 mW/g

Head/Tilt/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm

Maximum value of SAR (interpolated) = 0.027 mW/g

Head/Tilt/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.347 V/m



Room Temperature (°C):	26.9	Humidity (%):	27.3	Test Date:	01/12/12
Liquid Temperature (°C):	23	Barometric Pressure (mb):	1030.2	Tested by:	Ethan Schoonover

Test 24 1-12-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5745 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5745$ MHz; $\sigma = 5.271$ mho/m; $\epsilon_r = 34.298$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.27789$ mho/m, $\epsilon_r = 34.2893$; $\rho = 1000$ kg/m³
 Phantom section: Left Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Cheek/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)
 Maximum value of SAR (interpolated) = 0 mW/g

Head/Cheek/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)
 Maximum value of SAR (interpolated) = 0.126 mW/g

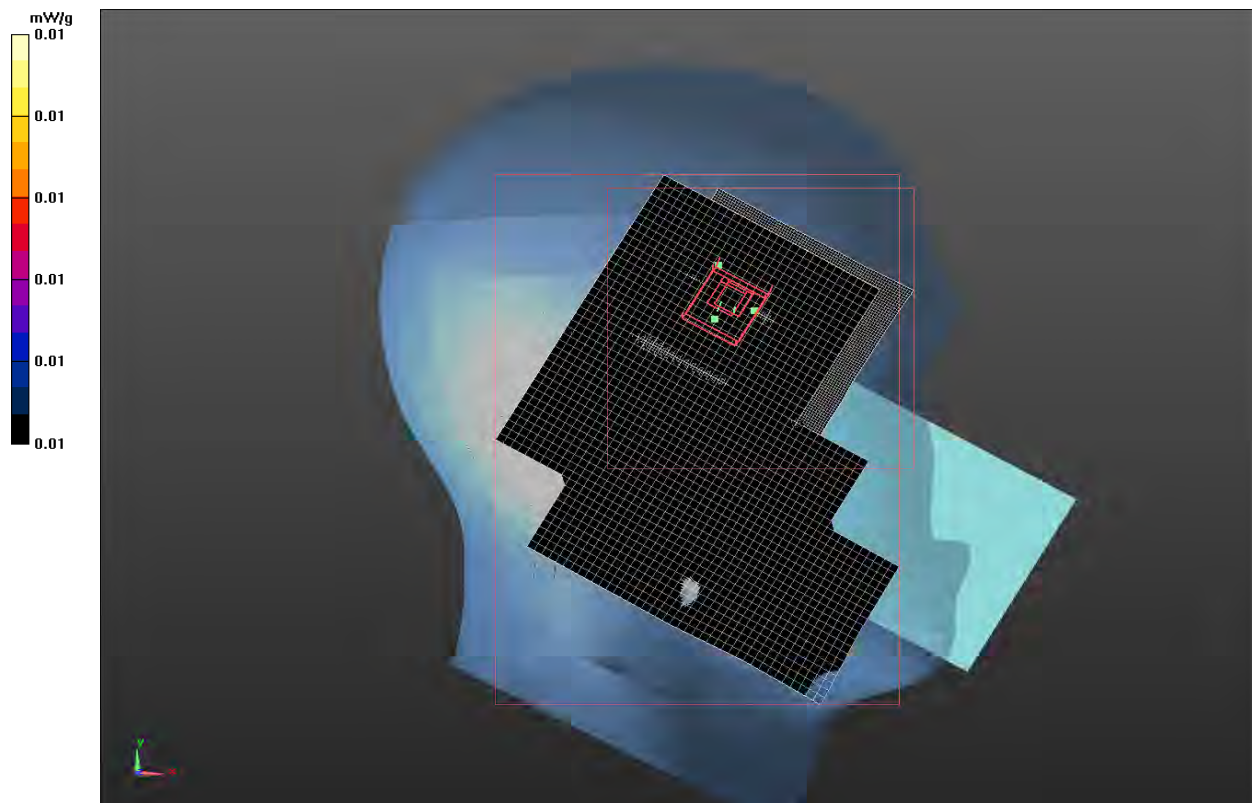
Head/Cheek/Zoom Scan 2 (10x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 4.284 V/m; Power Drift = 0.32 dB
 Peak SAR (extrapolated) = 0.143 W/kg
SAR(1 g) = 0.042 mW/g; SAR(10 g) = 0.017 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
 Maximum value of SAR (measured) = 0.089 mW/g

Head/Cheek/Zoom Scan (10x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
 Reference Value = 4.284 V/m; Power Drift = 0.50 dB
 Peak SAR (extrapolated) = 0.165 W/kg
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.038 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
 Maximum value of SAR (measured) = 0.109 mW/g

Head/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
 Maximum value of Total (measured) = 1.401 V/m



EMC

SAR TEST DATA

Room Temperature (°C):	23.8	Humidity (%):	25.6	Test Date:	01/12/12
Liquid Temperature (°C):	22.7	Barometric Pressure (mb):	1030.2	Tested by:	Ethan Schoonover

Test 25 1-12-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5745 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5745$ MHz; $\sigma = 5.271$ mho/m; $\epsilon_r = 34.298$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.27789$ mho/m, $\epsilon_r = 34.2893$; $\rho = 1000$ kg/m³
 Phantom section: Left Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Tilt/Zoom Scan (10x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 3.842 V/m; Power Drift = -0.41 dB

Peak SAR (extrapolated) = 0.165 W/kg

SAR(1 g) = 0.034 mW/g; SAR(10 g) = 0.017 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.054 mW/g

Head/Tilt/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.097 mW/g

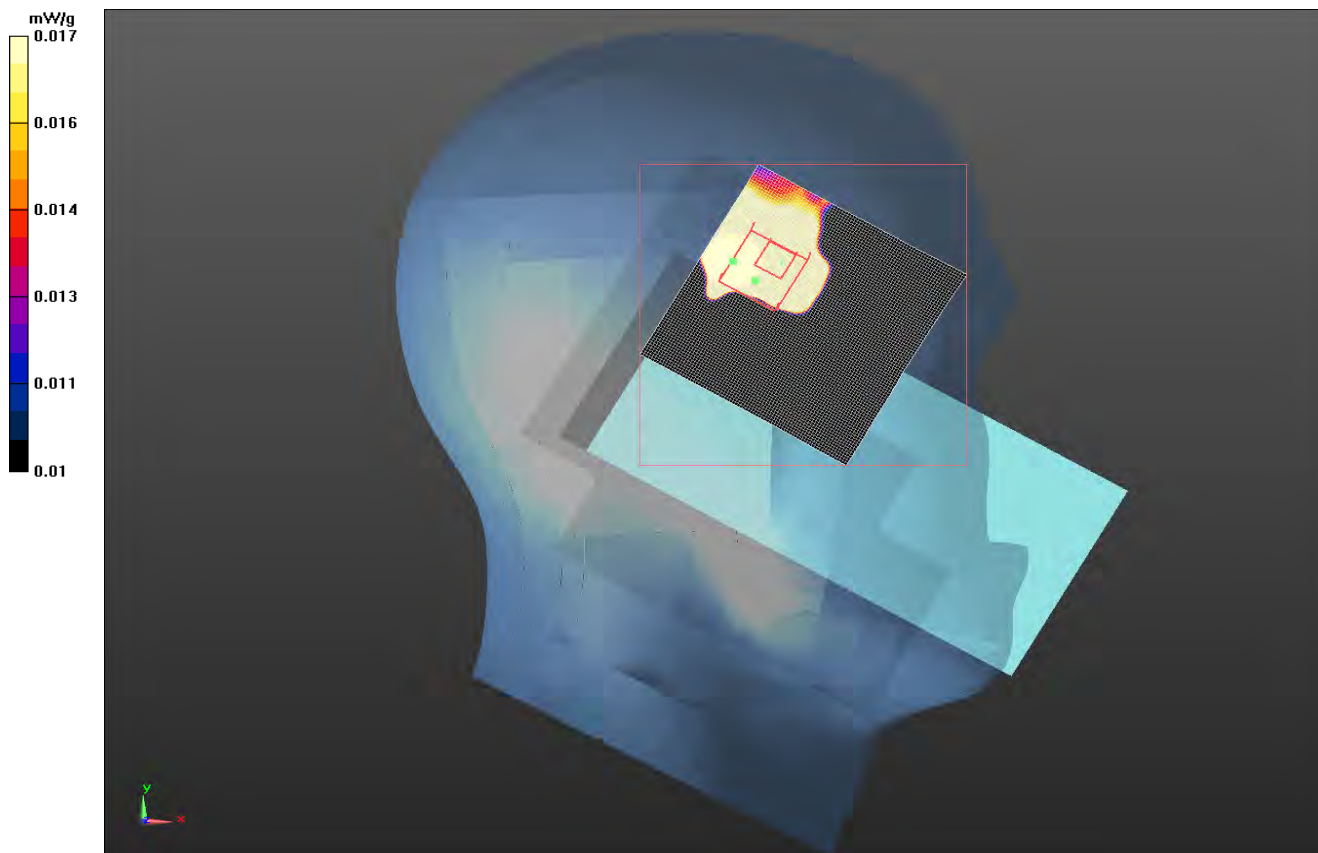
Head/Tilt/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.050 mW/g

Head/Tilt/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.820 V/m

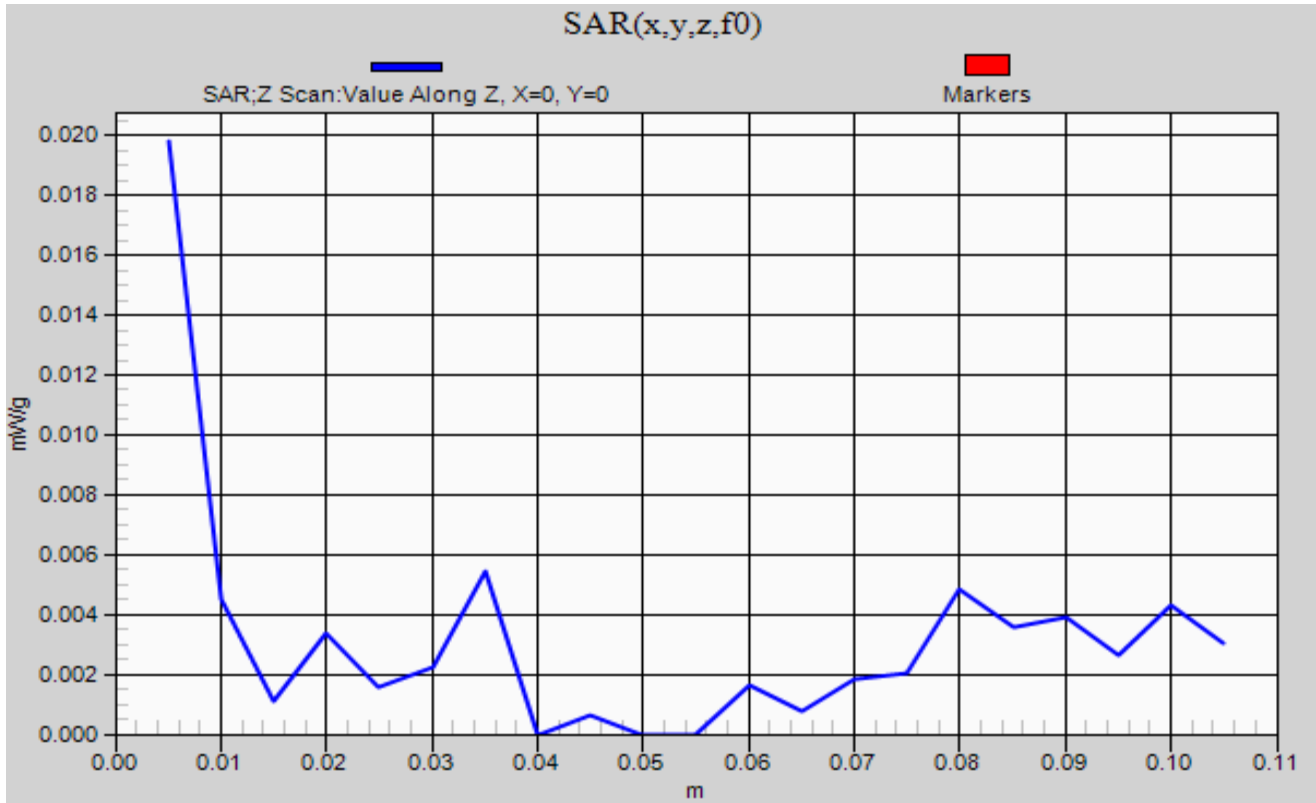


EMC


SAR TEST DATA

Room Temperature (°C):	23	Humidity (%):	25.5	Test Date:	01/12/12
Liquid Temperature (°C):	22.7	Barometric Pressure (mb):	1030.2	Tested by:	Ethan Schoonover

Test #24



SAR TEST DATA

EUT: Hand Held Computer		Work Order: INMC0746
Serial Number: 187U1191613		Date: See Data Sheets
Customer: Intermec Technologies Corporation		Temperature: See Data Sheets
Attendees: None		Humidity: See Data Sheets
Project: None		Barometric Pres.: See Data Sheets
Tested by: Ethan Schoonover and Khanh Tran		Job Site: EV08
TEST SPECIFICATIONS		Test Method
FCC 2.1093:2012	FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 248227 D01 V01r02 FCC KDB 648474 D01 V01r05 FCC 865664	
Health Safety Code 6:2009	RSS-102, Issue 4:2010	
COMMENTS		
None		
DEVIATIONS FROM TEST STANDARD		
No Deviations		
Configuration #	1	Signature 

Test Configuration	Frequency Band	Transmit Frequency (MHz)	Transmit Channel	Data Rate (Mbps)	Transmit Mode	Body-Worn Accessory	Audio Accessory	EUT Position	SAR Drift During Test (dB)	Measured 1g SAR Level (mW/g)	Test #
Body	5200	5180	36	6	OFDM	Wrist Holster	None	Left	0.03	0.03	4
	5200	5180	36	6	OFDM	Wrist Holster	None	Back	-0.2	0.202	5
	5200	5180	36	6	OFDM	Wrist Holster	None	Right	0.06	0.022	6
	5300	5260	52	6	OFDM	Wrist Holster	None	Left	0.57	0.03	7
	5300	5260	52	6	OFDM	Wrist Holster	None	Back	0.57	0.03	8
	5300	5260	52	6	OFDM	Wrist Holster	None	Right	-0.03	0.296	9
	5600	5600	120	6	OFDM	Wrist Holster	None	Left	-0.43	0.025	10
	5600	5600	120	6	OFDM	Wrist Holster	None	Back	0.01	0.201	11
	5600	5600	120	6	OFDM	Wrist Holster	None	Right	-0.41	0.209	12
	5800	5745	149	6	OFDM	Wrist Holster	None	Left	0.32	0.023	13
	5800	5745	149	6	OFDM	Wrist Holster	None	Back	-0.05	0.081	14
	5800	5745	149	6	OFDM	Wrist Holster	None	Right	-0.16	0.145	15

Room Temperature (°C):	23.7	Humidity (%):	33.3	Test Date:	01/06/12
Liquid Temperature (°C):	22.2	Barometric Pressure (mb):	1028	Tested by:	Ethan Schoonover

Test 4 1-6-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5180 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5180$ MHz; $\sigma = 5.18$ mho/m; $\epsilon_r = 47.518$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.20478$ mho/m, $\epsilon_r = 47.4828$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Reference scan (51x91x1): Measurement grid: dx=30mm, dy=30mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.031 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.061 mW/g

Body/Body/Zoom Scan (10x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.132 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.040 W/kg

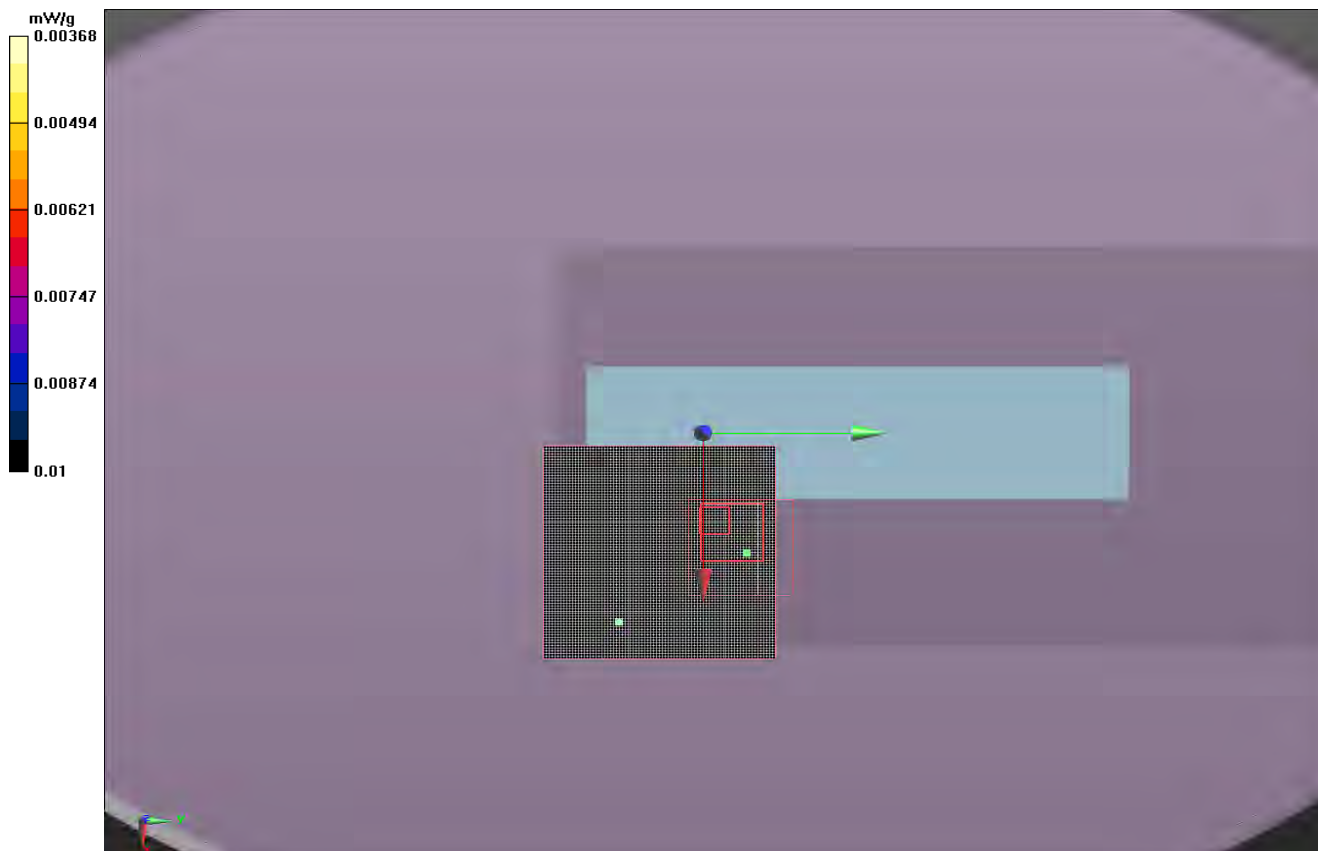
SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.024 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.038 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 0.843 V/m



Room Temperature (°C):	23.9	Humidity (%):	33.5	Test Date:	01/06/12
Liquid Temperature (°C):	22.4	Barometric Pressure (mb):	1028	Tested by:	Ethan Schoonover

Test 5 1-6-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5180 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5180$ MHz; $\sigma = 5.18$ mho/m; $\epsilon_r = 47.518$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.20478$ mho/m, $\epsilon_r = 47.4828$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Reference scan (51x91x1): Measurement grid: dx=30mm, dy=30mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.328 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.

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

Body/Body/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 8.798 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 0.586 W/kg

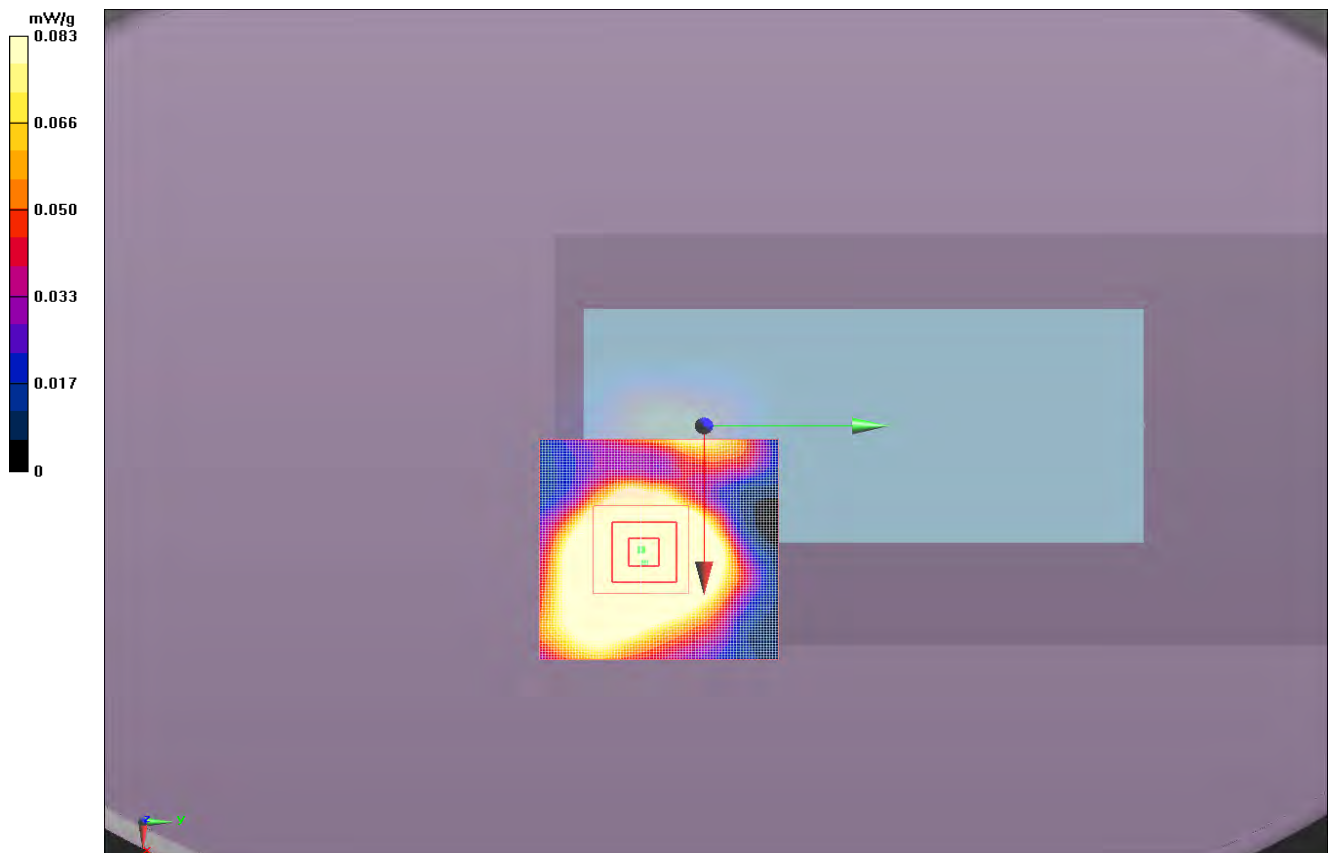
SAR(1 g) = 0.202 mW/g; SAR(10 g) = 0.085 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.348 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 3.992 V/m



Room Temperature (°C):	23.4	Humidity (%):	42.1	Test Date:	01/05/12
Liquid Temperature (°C):	22.1	Barometric Pressure (mb):	1029	Tested by:	Ethan Schoonover

Test 6 1-5-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5180 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5180$ MHz; $\sigma = 5.18$ mho/m; $\epsilon_r = 47.518$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.20478$ mho/m, $\epsilon_r = 47.4828$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Reference scan (41x71x1): Measurement grid: dx=30mm, dy=30mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.041 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.038 mW/g

Body/Body/Zoom Scan (10x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.016 V/m; Power Drift = 0.46 dB

Peak SAR (extrapolated) = 0.062 W/kg

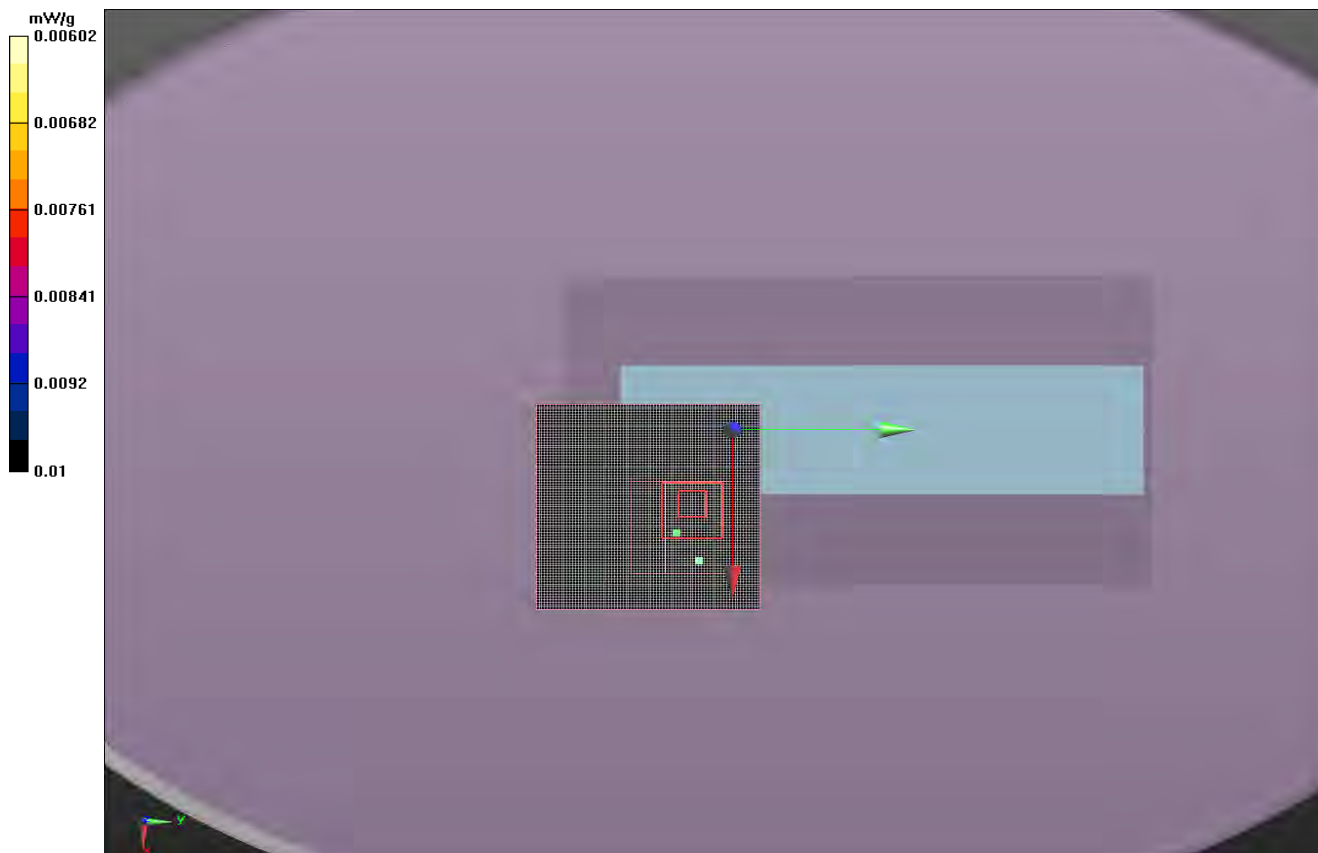
SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.016 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.037 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.078 V/m



Room Temperature (°C):	25.1	Humidity (%):	35.8	Test Date:	01/06/12
Liquid Temperature (°C):	22.6	Barometric Pressure (mb):	1028	Tested by:	Ethan Schoonover

Test 7 1-6-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5260 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5260$ MHz; $\sigma = 5.275$ mho/m; $\epsilon_r = 47.373$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.26493$ mho/m, $\epsilon_r = 47.3944$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Reference scan (51x91x1): Measurement grid: dx=30mm, dy=30mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.028 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.037 mW/g

Body/Body/Zoom Scan (10x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.242 V/m; Power Drift = 0.57 dB

Peak SAR (extrapolated) = 0.080 W/kg

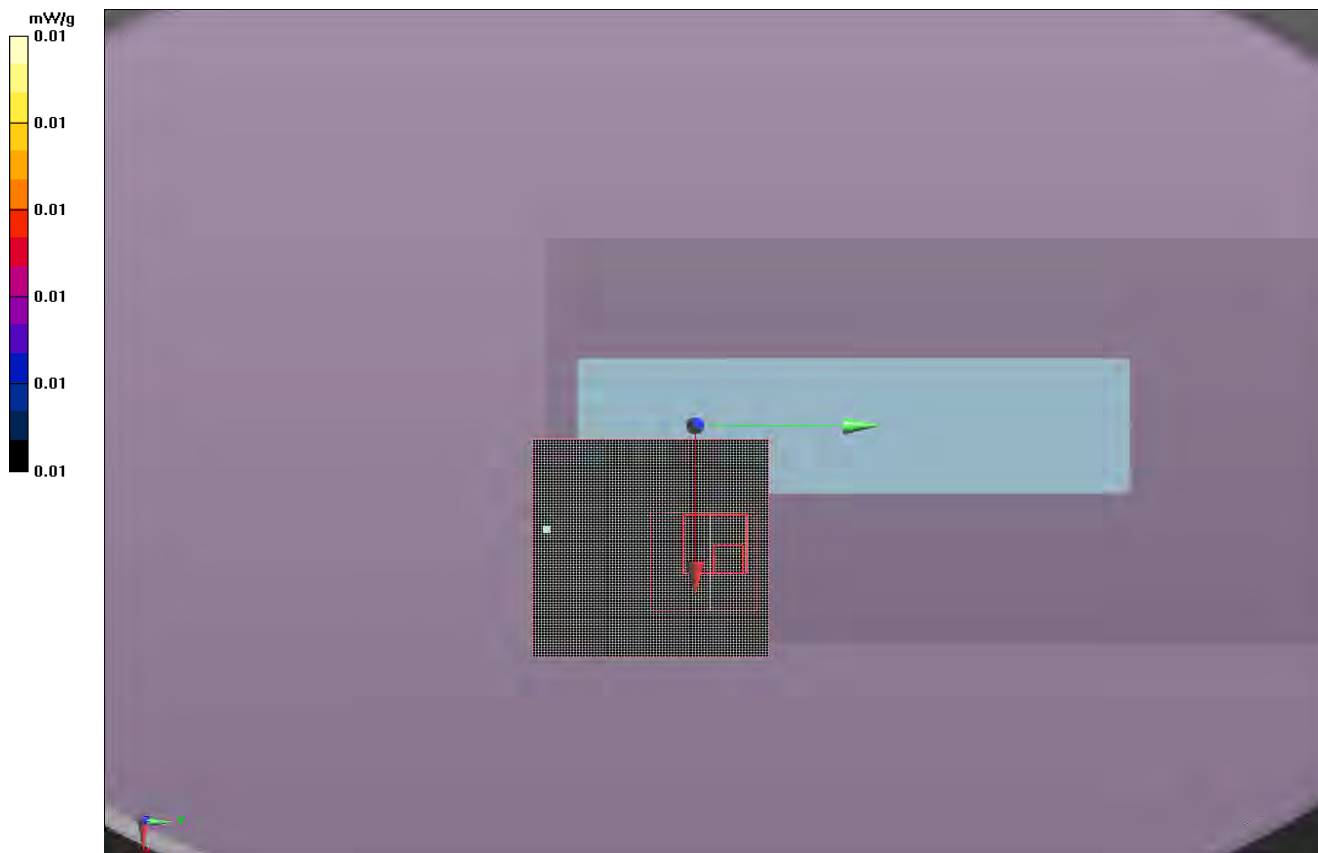
SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.020 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.043 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.394 V/m



Room Temperature (°C):	23.9	Humidity (%):	34.5	Test Date:	01/06/12
Liquid Temperature (°C):	22.4	Barometric Pressure (mb):	1028	Tested by:	Ethan Schoonover

Test 8 1-6-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5260 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5260$ MHz; $\sigma = 5.275$ mho/m; $\epsilon_r = 47.373$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.26493$ mho/m, $\epsilon_r = 47.3944$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Reference scan (51x91x1): Measurement grid: dx=30mm, dy=30mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.387 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.400 mW/g

Body/Body/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 9.613 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.655 W/kg

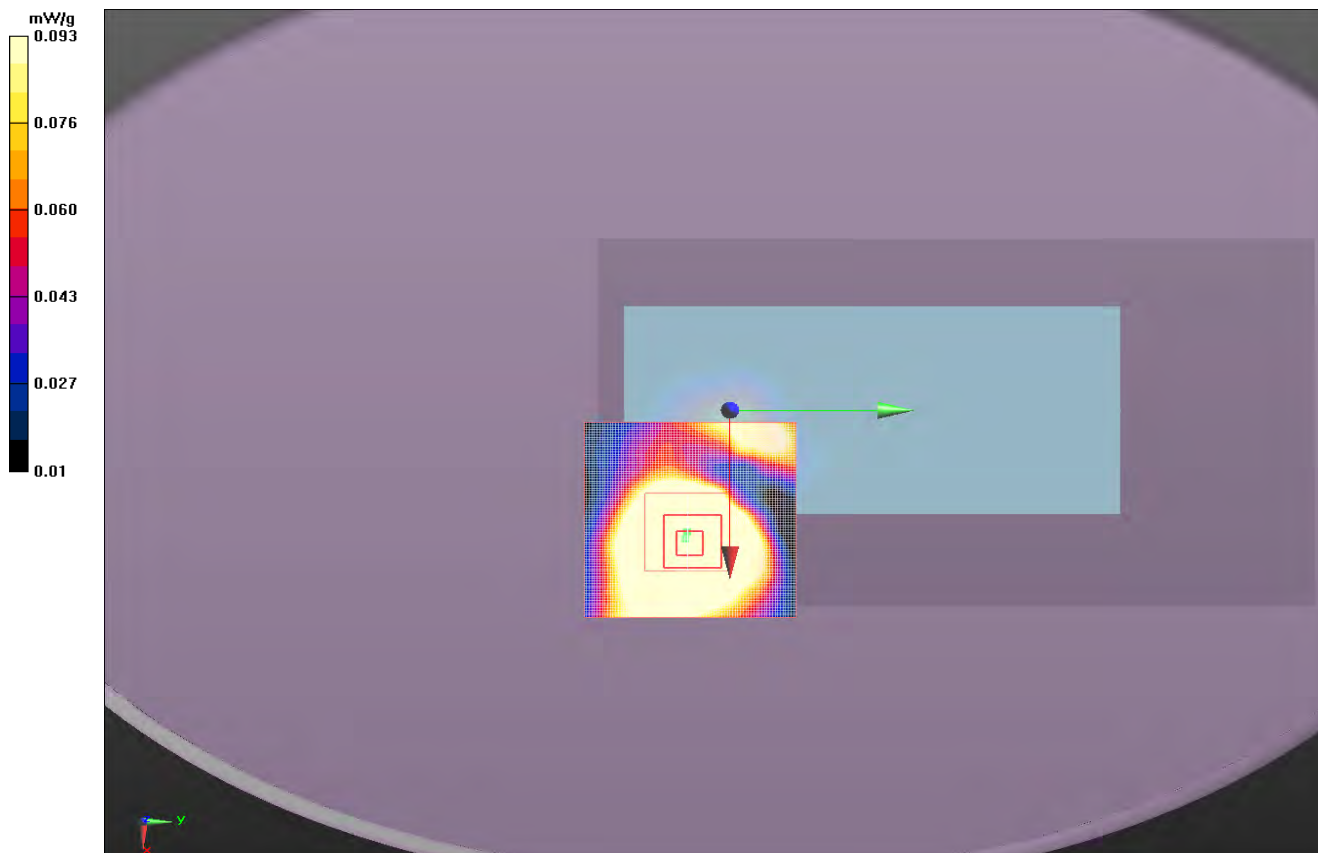
SAR(1 g) = 0.213 mW/g; SAR(10 g) = 0.084 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

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

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 4.190 V/m



Room Temperature (°C):	25.1	Humidity (%):	35.8	Test Date:	01/06/12
Liquid Temperature (°C):	22.6	Barometric Pressure (mb):	1028	Tested by:	Ethan Schoonover

Test 9 1-6-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5260 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5260$ MHz; $\sigma = 5.275$ mho/m; $\epsilon_r = 47.373$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.26493$ mho/m, $\epsilon_r = 47.3944$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Reference scan (51x91x1): Measurement grid: dx=30mm, dy=30mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.304 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.548 mW/g

Body/Body/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 11.237 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.977 W/kg

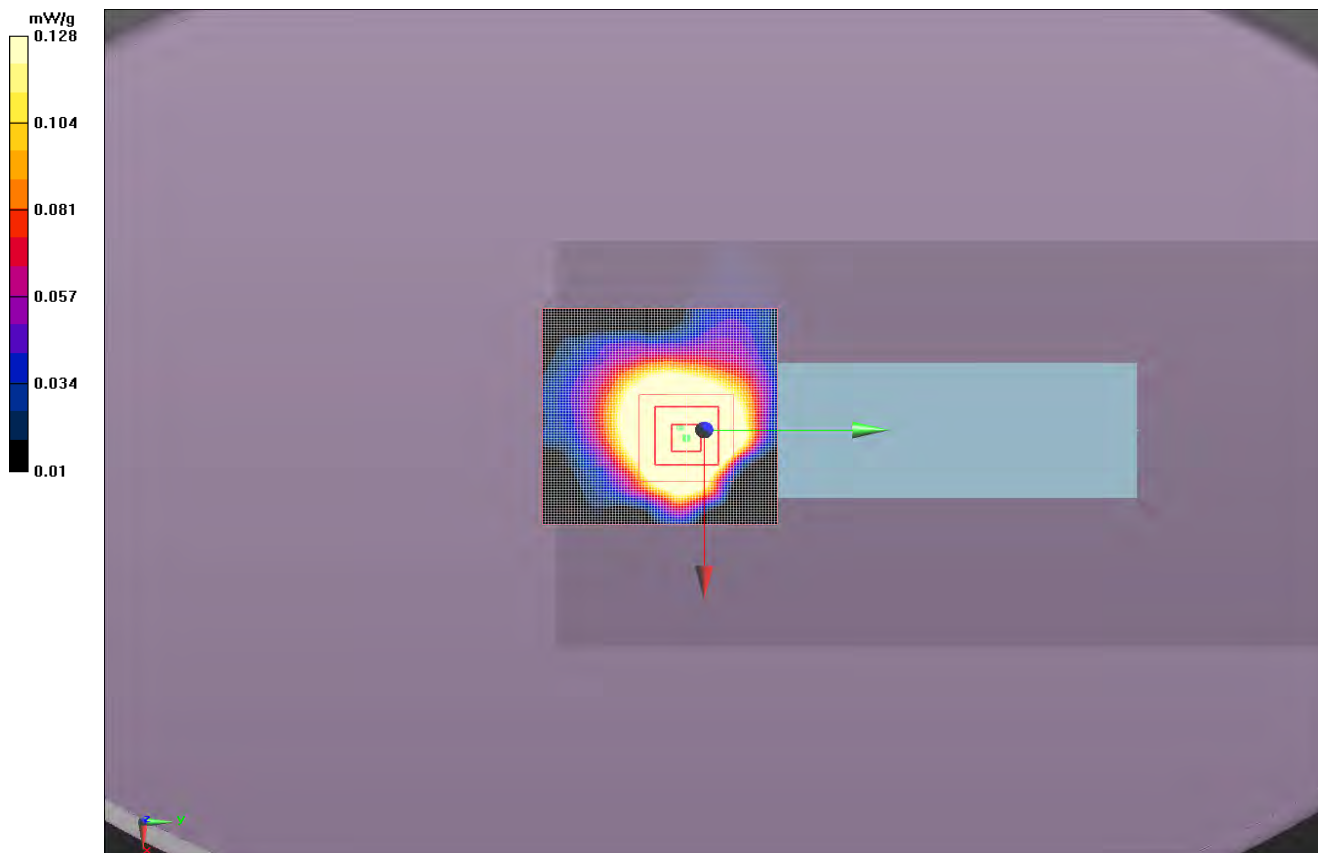
SAR(1 g) = 0.296 mW/g; SAR(10 g) = 0.108 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.552 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 4.927 V/m



Room Temperature (°C):	24.5	Humidity (%):	32.2	Test Date:	01/11/12
Liquid Temperature (°C):	22.9	Barometric Pressure (mb):	1031	Tested by:	Ethan Schoonover

Test 10 1-11-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5600 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.655$ mho/m; $\epsilon_r = 46.583$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.65518$ mho/m, $\epsilon_r = 46.583$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.392 V/m; Power Drift = -0.43 dB

Peak SAR (extrapolated) = 0.100 W/kg

SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.012 mW/g

Maximum value of SAR (measured) = 0.043 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

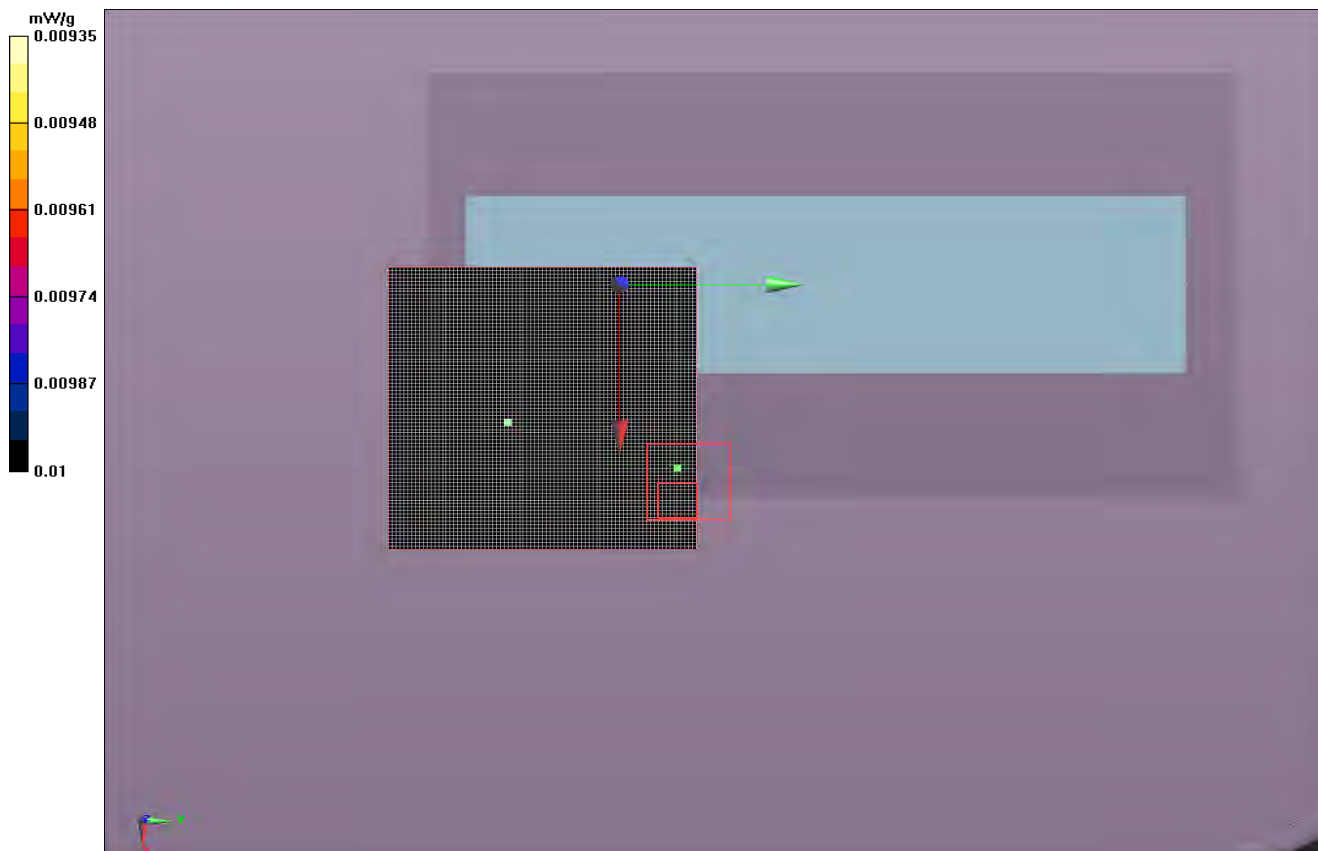
Maximum value of Total (measured) = 1.286 V/m

Body/Body/Reference scan (41x71x1): Measurement grid: dx=30mm, dy=30mm

Maximum value of SAR (interpolated) = 0.038 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.033 mW/g



EMC

SAR TEST DATA

Room Temperature (°C):	23	Humidity (%):	25.2	Test Date:	01/11/12
Liquid Temperature (°C):	21.8	Barometric Pressure (mb):	1031	Tested by:	Ethan Schoonover

Test 11 1-11-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5600 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.655$ mho/m; $\epsilon_r = 46.583$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.65518$ mho/m, $\epsilon_r = 46.583$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Zoom Scan (8x8x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 8.803 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.628 W/kg

SAR(1 g) = 0.201 mW/g; SAR(10 g) = 0.080 mW/g

Maximum value of SAR (measured) = 0.370 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

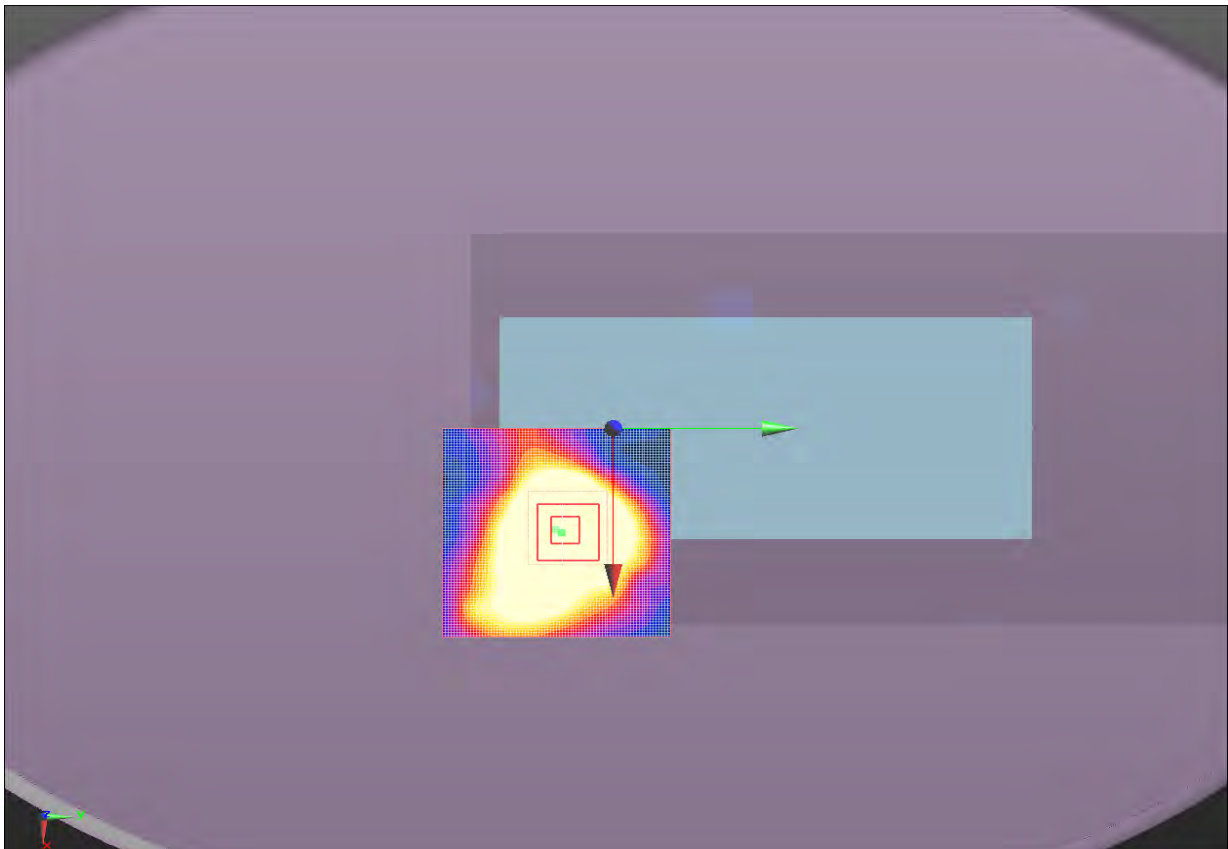
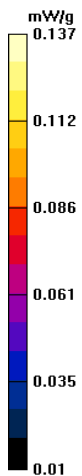
Maximum value of Total (measured) = 4.913 V/m

Body/Body/Reference scan (51x91x1): Measurement grid: dx=30mm, dy=30mm

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

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.395 mW/g



Room Temperature (°C):	23	Humidity (%):	25.5	Test Date:	01/11/12
Liquid Temperature (°C):	22.7	Barometric Pressure (mb):	1031	Tested by:	Ethan Schoonover and Khanh Tran

Test 12 1-11-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5600 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 5600$ MHz; $\sigma = 5.655$ mho/m; $\epsilon_r = 46.583$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.65518$ mho/m; $\epsilon_r = 46.583$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Zoom Scan 2 (12x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 9.427 V/m; Power Drift = -0.41 dB

Peak SAR (extrapolated) = 1.901 W/kg

SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.077 mW/g

Maximum value of SAR (measured) = 0.381 mW/g

Body/Body/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 9.427 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 0.676 W/kg

SAR(1 g) = 0.203 mW/g; SAR(10 g) = 0.075 mW/g

Maximum value of SAR (measured) = 0.395 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

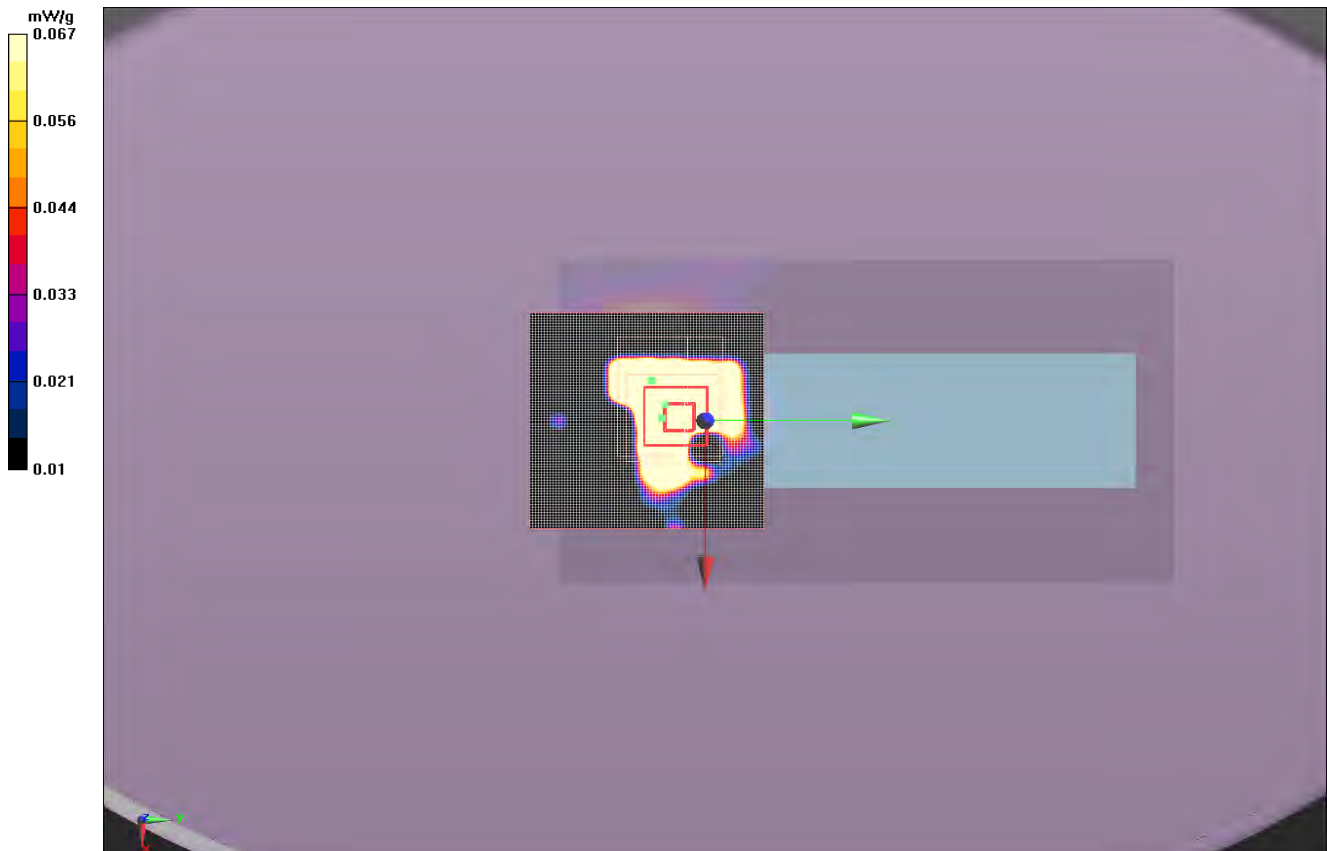
Maximum value of Total (measured) = 3.439 V/m

Body/Body/Reference scan (41x71x1): Measurement grid: dx=30mm, dy=30mm

Maximum value of SAR (interpolated) = 0.292 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.477 mW/g



Room Temperature (°C):	22.8	Humidity (%):	31.5	Test Date:	01/06/12
Liquid Temperature (°C):	22.5	Barometric Pressure (mb):	1028.1	Tested by:	Jennifer Herrette and Khanh Tran

Test 13 1-6-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5745 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5745$ MHz; $\sigma = 5.879$ mho/m; $\epsilon_r = 46.516$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.88579$ mho/m, $\epsilon_r = 46.5071$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 1.652 V/m; Power Drift = 0.32 dB

Peak SAR (extrapolated) = 0.087 W/kg

SAR(1 g) = 0.023 mW/g; SAR(10 g) = 0.015 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.031 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.860 V/m

Body/Body/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm

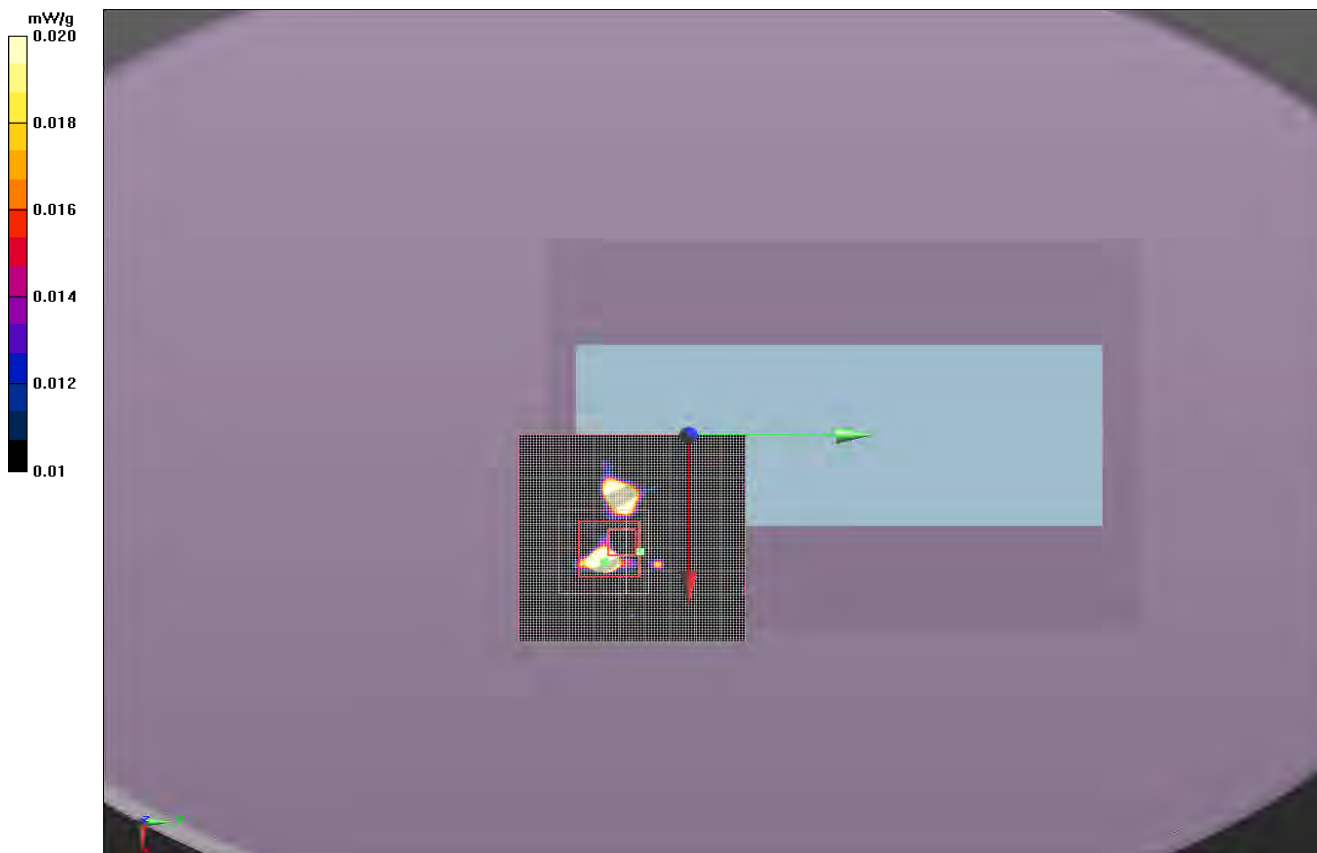
[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.011 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.066 mW/g



Room Temperature (°C):	22.7	Humidity (%):	31.6	Test Date:	01/06/12
Liquid Temperature (°C):	22.3	Barometric Pressure (mb):	1028.1	Tested by:	Jennifer Herrette and Khanh Tran

Test 14 1-6-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5745 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5745$ MHz; $\sigma = 5.879$ mho/m; $\epsilon_r = 46.516$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.88579$ mho/m, $\epsilon_r = 46.5071$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 5.328 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.266 W/kg

SAR(1 g) = 0.081 mW/g; SAR(10 g) = 0.041 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.142 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.957 V/m

Body/Body/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm

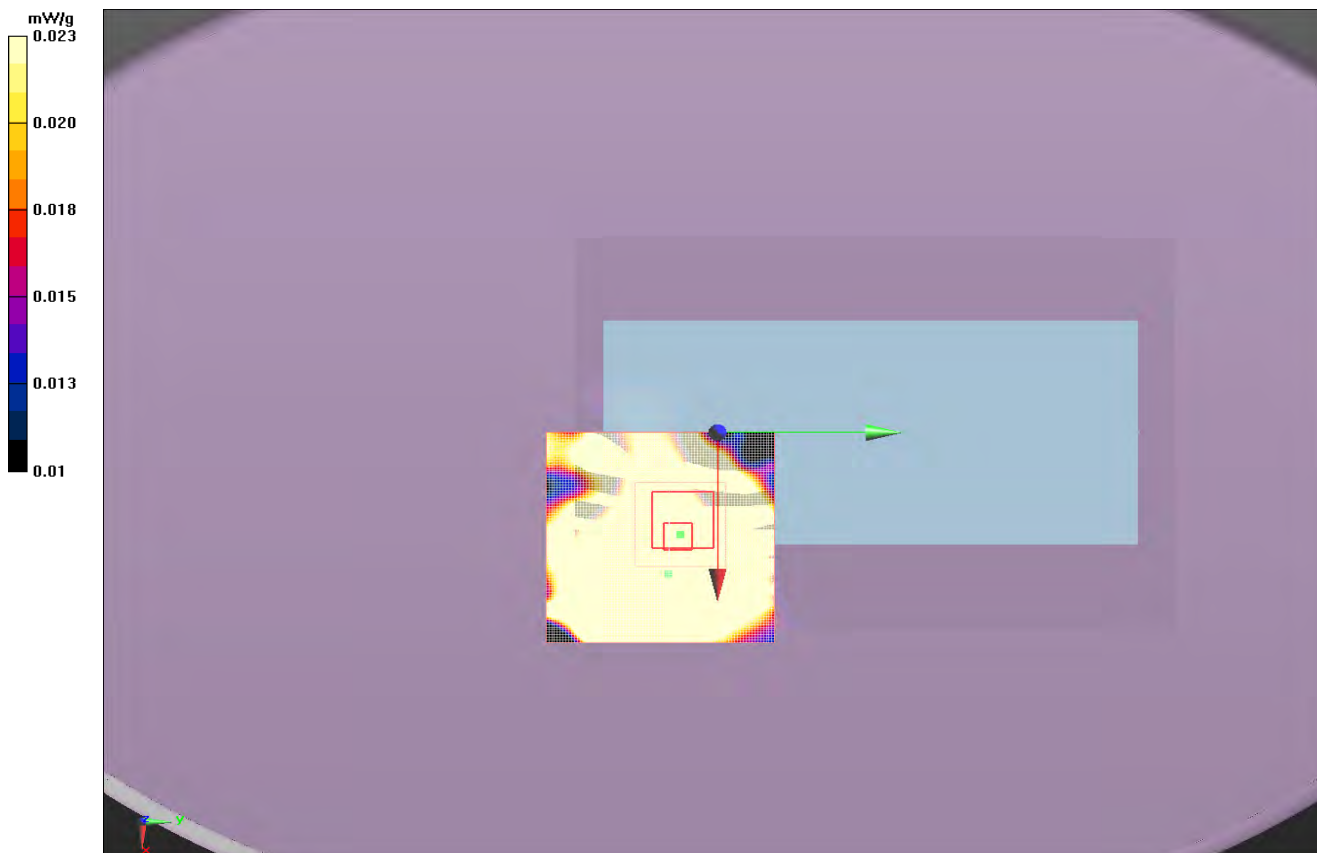
[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.134 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.140 mW/g



Room Temperature (°C):	23.3	Humidity (%):	32	Test Date:	01/06/12
Liquid Temperature (°C):	21.8	Barometric Pressure (mb):	1028.1	Tested by:	Jennifer Herrette and Khanh Tran

Test 15 1-6-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 187U1191613

Communication System: CW; Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5745 MHz; Communication System PAR: 0 dB
 Medium parameters used (interpolated): $f = 5745$ MHz; $\sigma = 5.879$ mho/m; $\epsilon_r = 46.516$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.88579$ mho/m, $\epsilon_r = 46.5071$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Body/Body/Zoom Scan (8x8x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 8.334 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 1.033 W/kg

SAR(1 g) = 0.145 mW/g; SAR(10 g) = 0.056 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.300 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 3.050 V/m

Body/Body/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm

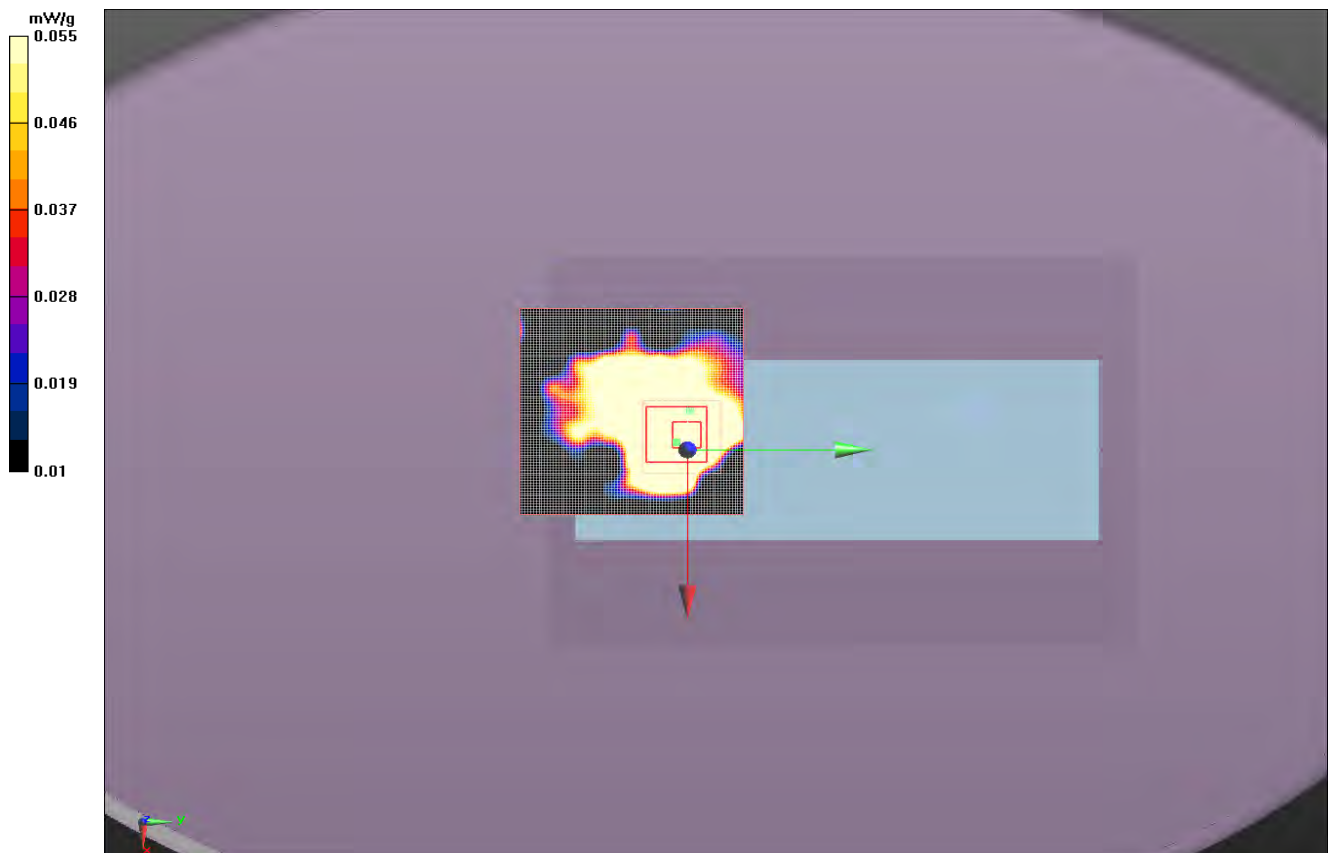
[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.198 mW/g

Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.353 mW/g

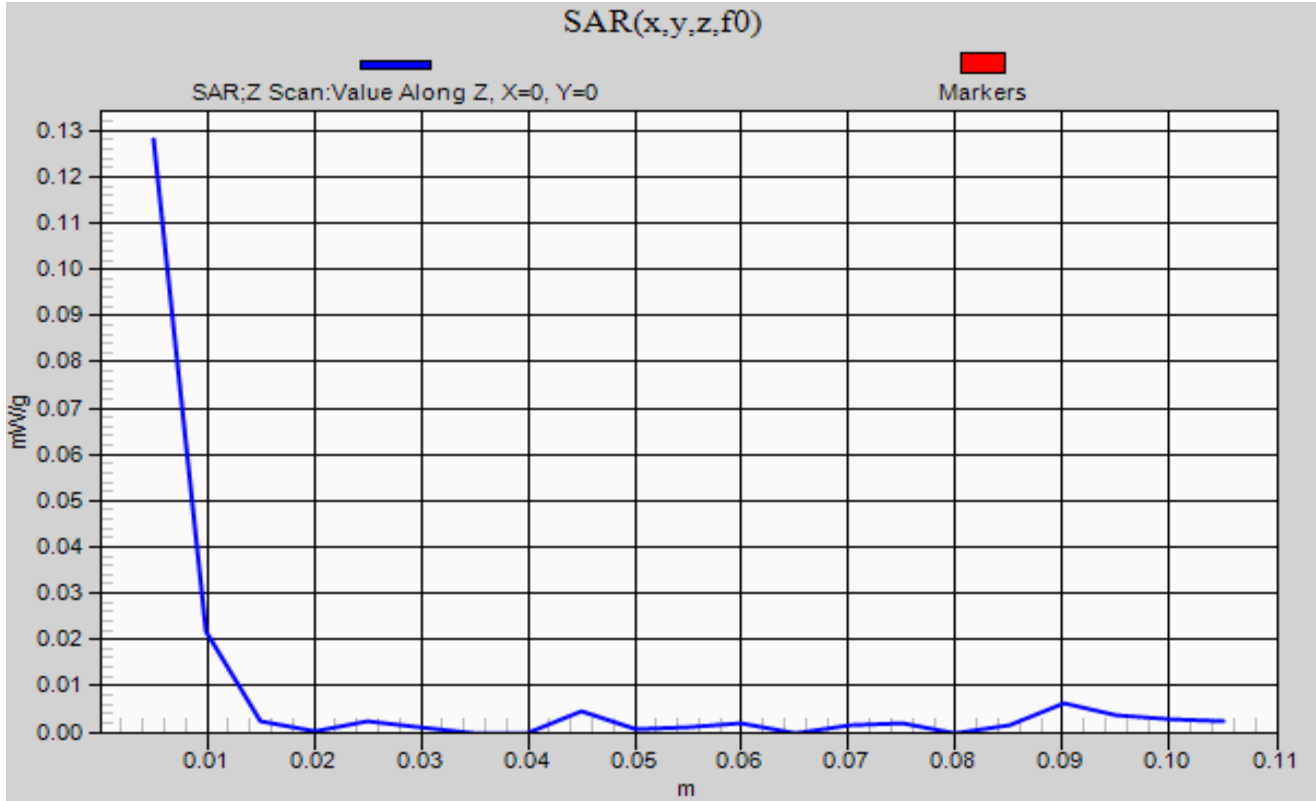


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SAR TEST DATA

Room Temperature (°C):	25.1	Humidity (%):	35.8	Test Date:	01/06/12
Liquid Temperature (°C):	22.6	Barometric Pressure (mb):	1028	Tested by:	Ethan Schoonover

Test #9

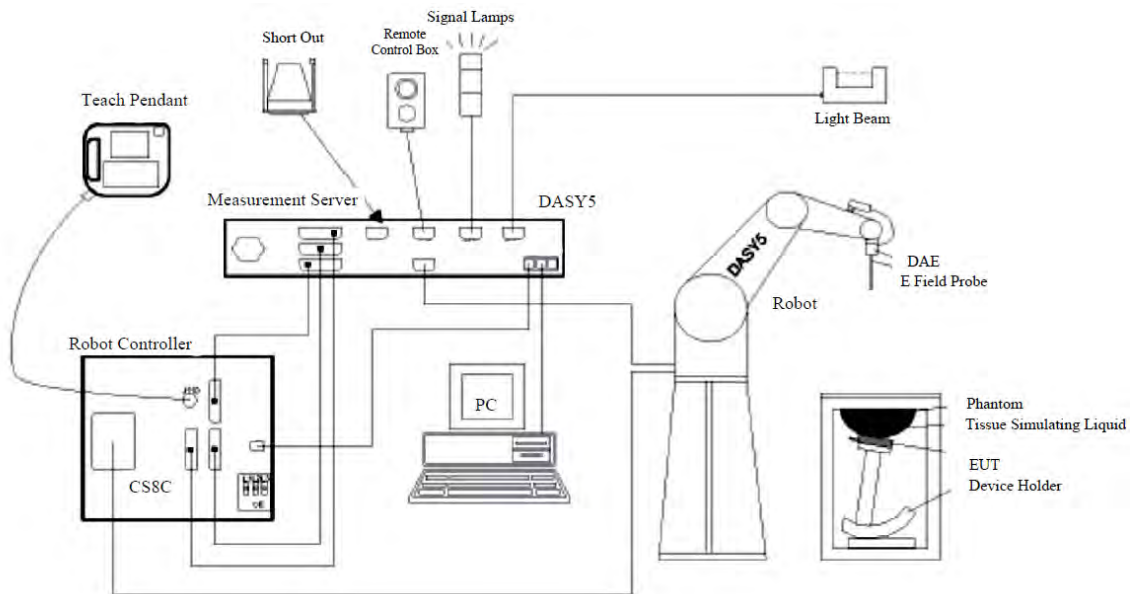


SAR Measurement System

Schmid & Partner Engineering AG, DASY52

Northwest EMC selected the leader in SAR evaluation systems to provide the measurement tools for this evaluation. SPEAG's DASY52 is the fastest and most accurate scanner on the market. It is fully compatible with all world-wide standards for transmitters operating at the ear or within 20cm of the body. It provides full compatibility with IEC 62209-1, IEC 62209-2, IEEE 1528 as well as national adaptations such as FCC OET-65c and Korean Std. MIC #2000-93

The DASY52 system for performing compliance tests consists of the following items:



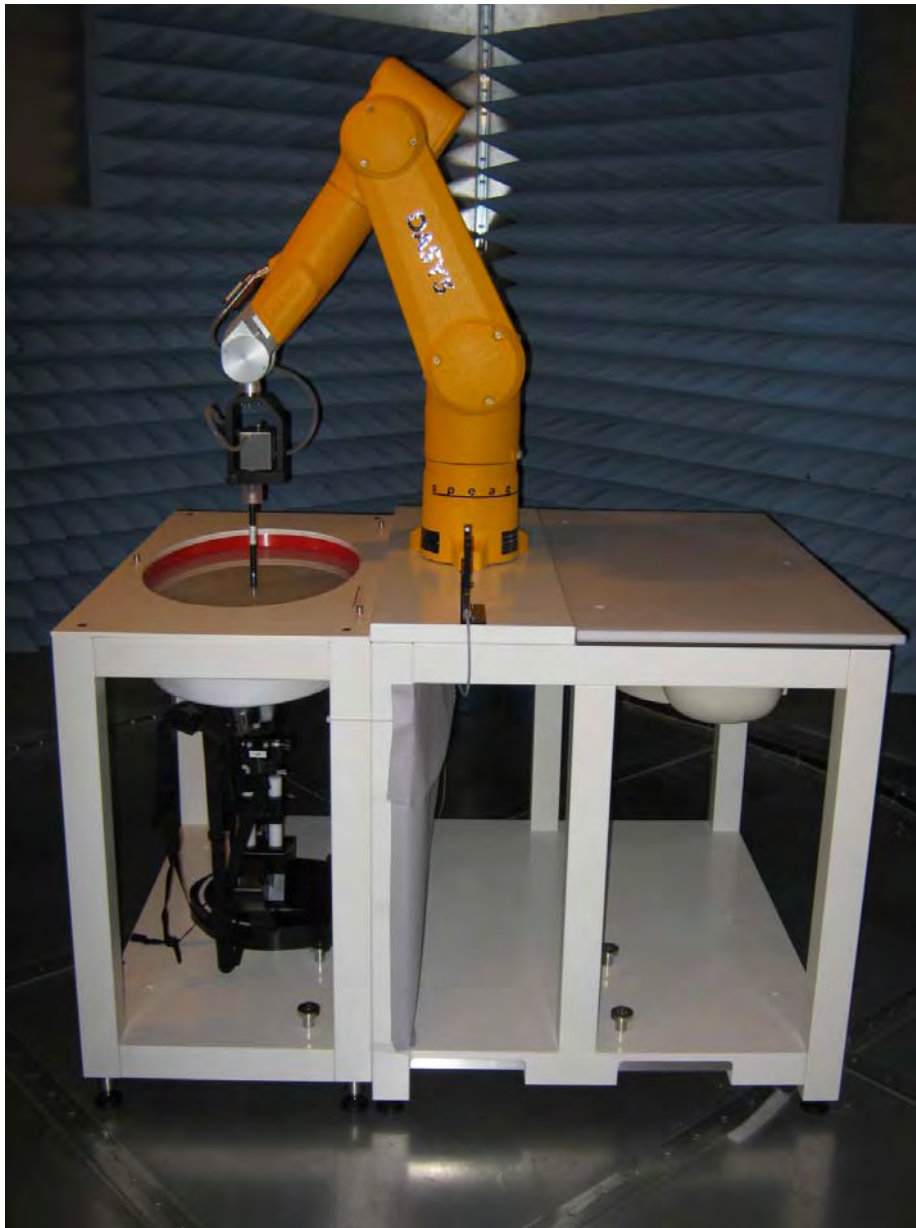
- A standard high precision 6-axis robot (Staubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) 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.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted 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.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom, oval flat phantom, device holder, tissue simulating liquids, and validation dipole kits.

Test Site

Northwest EMC, Lab EV08

The SAR measurement system is located in a semi-anechoic chamber. This provides an ambient free environment that also eliminates reflections.

The chamber is 12 ft wide by 16 ft long x 8 ft high. A dedicated HVAC unit provides +/- 1 degree C temperature control.



TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Robot Arm	Staeubli	TX60LSPEAG	SAA	NCR	0 mo
Phantom, Twin SAM (Head)	SPEAG	QD 000 P40 CC	SAB	NCR	0 mo
Phantom, 2mm Oval ELI4 (Body)	SPEAG	QD OVA 001 BB	SAC	NCR	0 mo
Light Beam Unit	SPEAG	SE UKS 030 AA	SAD	NCR	0 mo
SAR Probe	SPEAG	EX3DV4	SAG	11/17/2011	12 mo
DAE	Schid & Partner Engineering	SD 000 D04 EJ	SAH	11/8/2011	12 mo
Robot Controller	Staeubli	CS8C	SAI	NCR	0 mo
Robot Chasis and power Supply	Staeubli	N/A	SAJ	NCR	0 mo
DASY5 Measurement Server	Staeubli	DAYS5	SAK	NCR	0 mo
Head Solution	SPEAG	HSL 2450	SAL	Within 24 hours of a measurement	
Body Solution	SPEAG	MSL 2450	SAM		
Head Solution	SPEAG	HSL 501	SAU		
Body Solution	SPEAG	MSL 501	SAV		
Device Holder	SPEAG	N/A	SAW	NCR	0 mo
Antenna, Dipole 2450MHz SAR	SPEAG	D2450V2	ADL	12/9/2011	12 mo
Antenna, Dipole 5.1-5.8GHz SAR	SPEAG	D5GHzV2	ADM	12/14/2011	12 mo
Network Analyzer	Hewlett Packard	N5230A	NAD	8/3/2011	12 mo
Dielectric Probe Kit	Agilent	85070E	IPP	9/8/2010	24 mo
Power Meter	Agilent	N1913A	SQR	6/6/2011	24 mo
Power Sensor	Agilent	E9300H	SQO	6/6/2011	24 mo
MXG Analog Signal Generator	Agilent	N5181A	TIG	NCR	0 mo
Broadband Amplifier, SMA, 2000-8000 MHz	Mini Circuits	ZVE-3W-83+	TTA	NCR	0 mo
Humidity Temperature Meter	Omegaette	HH311	DTX	3/29/2011	24 mo
Humidity Temperature Meter	Omegaette	HH311	DTY	3/29/2011	24 mo
Wireless Communication Test Set	Agilent	E5515C	BSV	NCR	0 mo

Measurement Uncertainty Budgets per IEEE 1528:2003

300 – 3000 MHz range

Uncertainty Component	Tolerance (+/- %)	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	u_i (1g) (+/-%)	u_i (10g) (+/-%)	v_i
Measurement System								
Probe calibration (k=1)	5.5	normal	1	1	1	5.5	5.5	∞
Axial isotropy	4.7	rectangular	1.732	0.707	0.707	1.9	1.9	∞
Hemispherical isotropy	9.6	rectangular	1.732	0.707	0.707	3.9	3.9	∞
Boundary effect	1.0	rectangular	1.732	1	1	0.6	0.6	∞
Linearity	4.7	rectangular	1.732	1	1	2.7	2.7	∞
System detection limits	1.0	rectangular	1.732	1	1	0.6	0.6	∞
Readout electronics	0.3	normal	1	1	1	0.3	0.3	∞
Response time	0.8	rectangular	1.732	1	1	0.5	0.5	∞
Integration time	2.6	rectangular	1.732	1	1	1.5	1.5	∞
RF ambient conditions - noise	1.7	rectangular	1.732	1	1	1.0	1.0	∞
RF Ambient Reflections	0.0	rectangular	1.732	1	1	0.0	0.0	∞
Probe positioner mechanical tolerance	0.4	rectangular	1.732	1	1	0.2	0.2	∞
Probe positioner with respect to phantom shell	2.9	rectangular	1.732	1	1	1.7	1.7	∞
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	1.0	rectangular	1.732	1	1	0.6	0.6	∞
Test Sample Related								
Device Positioning	2.9	normal	1	1	1	2.9	2.9	145
Device Holder	3.6	normal	1	1	1	3.6	3.6	5
Power Drift	5.0	rectangular	1.732	1	1	2.9	2.9	∞
Phantom and tissue parameters								
Phantom Uncertainty - shell thickness tolerances	4.0	rectangular	1.732	1	1	2.3	2.3	∞
Liquid conductivity - deviation from target values	5.0	rectangular	1.732	0.64	0.43	1.8	1.2	∞
Liquid conductivity - measurement uncertainty	6.5	normal	1	0.64	0.43	4.2	2.8	∞
Liquid permittivity - deviation from target values	5.0	rectangular	1.732	0.6	0.49	1.7	1.4	∞
Liquid permittivity - measurement uncertainty	3.2	normal	1	0.6	0.49	1.9	1.6	∞
Combined Standard Uncertainty	RSS					11.2	10.6	387
Expanded Measurement Uncertainty (95% Confidence/	normal (k=2)					22.5	21.2	

3 – 6 GHz range

Uncertainty Component	Tolerance (+/- %)	Probability Distribution	Divisor	c_i (1g)	c_i (10g)	u_i (1g) (+/-%)	u_i (10g) (+/-%)	v_i
Measurement System								
Probe calibration (k=1)	6.55	normal	1	1	1	6.6	6.6	∞
Axial isotropy	4.7	rectangular	1.732	0.707	0.707	1.9	1.9	∞
Hemispherical isotropy	9.6	rectangular	1.732	0.707	0.707	3.9	3.9	∞
Boundary effect	2.0	rectangular	1.732	1	1	1.2	1.2	∞
Linearity	4.7	rectangular	1.732	1	1	2.7	2.7	∞
System detection limits	1.0	rectangular	1.732	1	1	0.6	0.6	∞
Readout electronics	0.3	normal	1	1	1	0.3	0.3	∞
Response time	0.8	rectangular	1.732	1	1	0.5	0.5	∞
Integration time	2.6	rectangular	1.732	1	1	1.5	1.5	∞
RF ambient conditions - noise	1.7	rectangular	1.732	1	1	1.0	1.0	∞
RF Ambient Reflections	0.0	rectangular	1.732	1	1	0.0	0.0	∞
Probe positioner mechanical tolerance	0.8	rectangular	1.732	1	1	0.5	0.5	∞
Probe positioner with respect to phantom shell	9.9	rectangular	1.732	1	1	5.7	5.7	∞
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	4.0	rectangular	1.732	1	1	2.3	2.3	∞
Test Sample Related								
Device Positioning	2.9	normal	1	1	1	2.9	2.9	145
Device Holder	3.6	normal	1	1	1	3.6	3.6	5
Power Drift	5.0	rectangular	1.732	1	1	2.9	2.9	∞
Phantom and tissue parameters								
Phantom Uncertainty - shell thickness tolerances	4.0	rectangular	1.732	1	1	2.3	2.3	∞
Liquid conductivity - deviation from target values	5.0	rectangular	1.732	0.64	0.43	1.8	1.2	∞
Liquid conductivity - measurement uncertainty	6.5	normal	1	0.64	0.43	4.2	2.8	∞
Liquid permittivity - deviation from target values	5.0	rectangular	1.732	0.6	0.49	1.7	1.4	∞
Liquid permittivity - measurement uncertainty	3.2	normal	1	0.6	0.49	1.9	1.6	∞
Combined Standard Uncertainty	RSS					13.2	12.7	330
Expanded Measurement Uncertainty (95% Confidence/	normal (k=2)					26.5	25.4	

Probe Calibration

Please see attached calibration data

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



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Accreditation No.: **SCS 108**

Client **Northwest EMC**

Certificate No: **EX3-3746_Nov11**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3746**

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: **November 17, 2011**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: November 17, 2011

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Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3746

Manufactured: March 26, 2010
Calibrated: November 17, 2011

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3746

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.49	0.47	0.50	$\pm 10.1\%$
DCP (mV) ^B	97.5	98.1	98.0	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	112.2	$\pm 3.0\%$
			Y	0.00	0.00	1.00	116.0	
			Z	0.00	0.00	1.00	114.8	
10061	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	3.60	X	6.31	77.5	22.0	114.7	$\pm 2.2\%$
			Y	4.08	73.8	21.3	111.0	
			Z	6.71	80.1	23.4	115.3	
10069	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	12.20	X	14.34	73.4	26.1	129.1	$\pm 4.6\%$
			Y	12.54	71.3	25.5	113.0	
			Z	14.02	73.2	26.1	128.5	
10077	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	13.12	X	13.85	73.4	27.0	110.1	$\pm 5.2\%$
			Y	13.00	73.9	28.0	139.2	
			Z	13.46	73.0	26.9	108.5	

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:3746

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)
2450	39.2	1.80	7.14	7.14	7.14	0.46	0.91	± 12.0 %
5200	36.0	4.66	4.90	4.90	4.90	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.67	4.67	4.67	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.56	4.56	4.56	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.23	4.23	4.23	0.50	1.80	± 13.1 %

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3746

Calibration Parameter Determined in Body Tissue Simulating Media

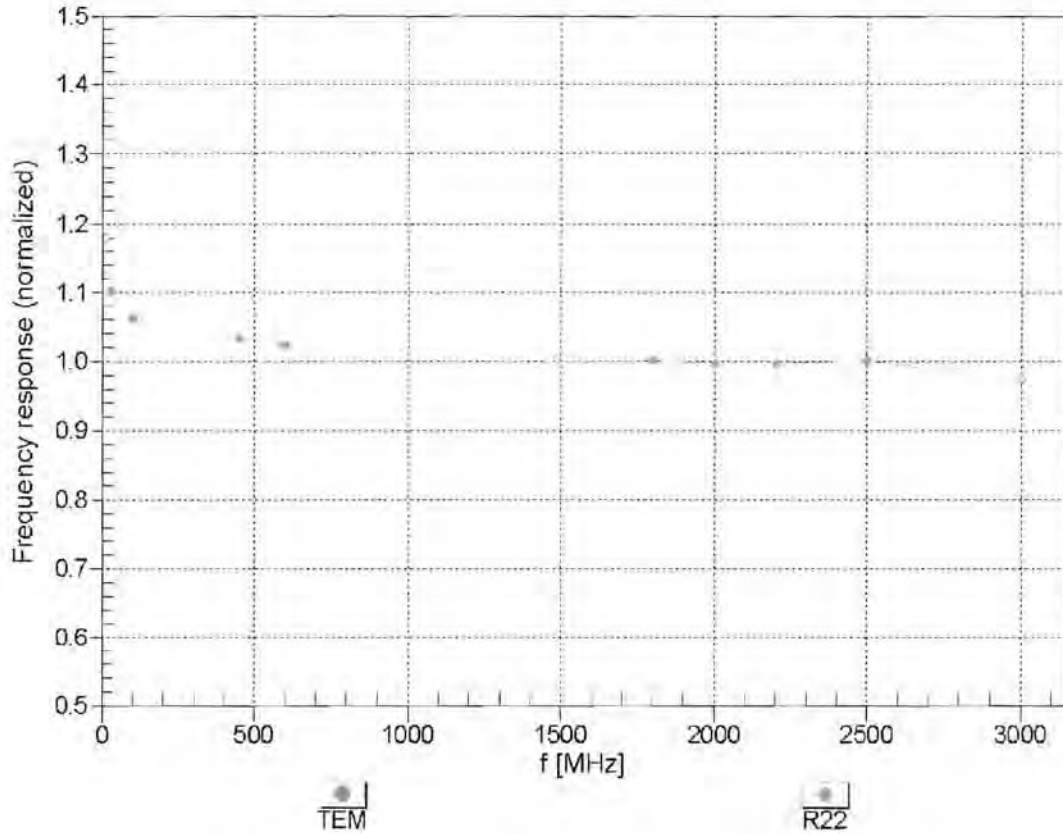
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
2450	52.7	1.95	6.77	6.77	6.77	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.10	4.10	4.10	0.52	1.90	± 13.1 %
5300	48.9	5.42	3.92	3.92	3.92	0.52	1.90	± 13.1 %
5500	48.6	5.65	3.72	3.72	3.72	0.55	1.90	± 13.1 %
5800	48.2	6.00	3.85	3.85	3.85	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.

Frequency Response of E-Field

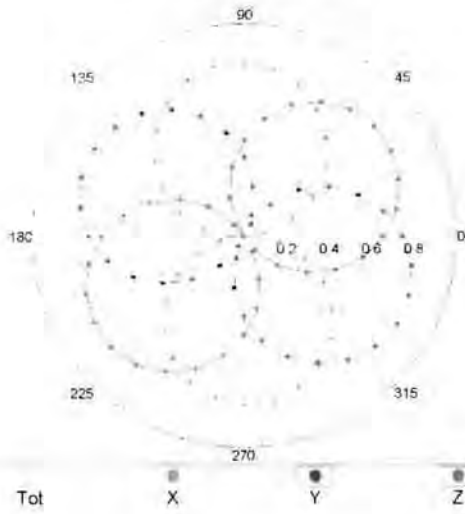
(TEM-Cell:ifi110 EXX, Waveguide: R22)



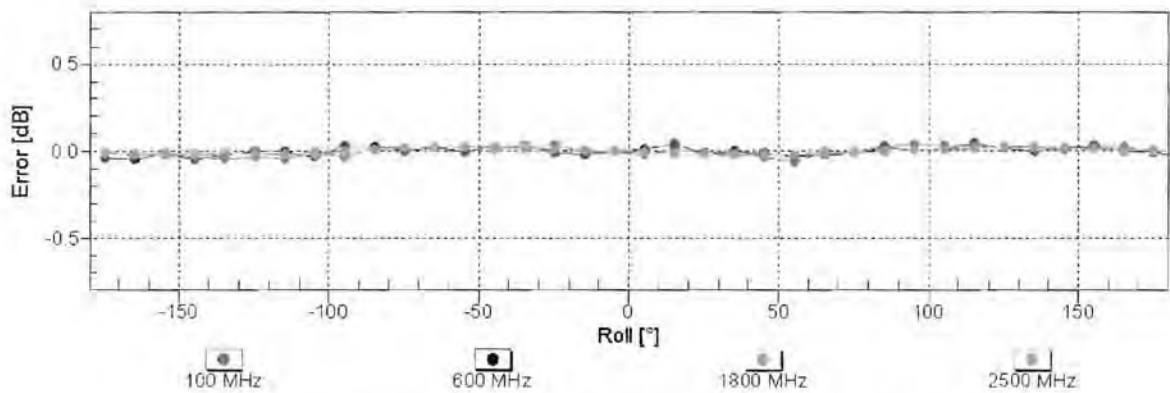
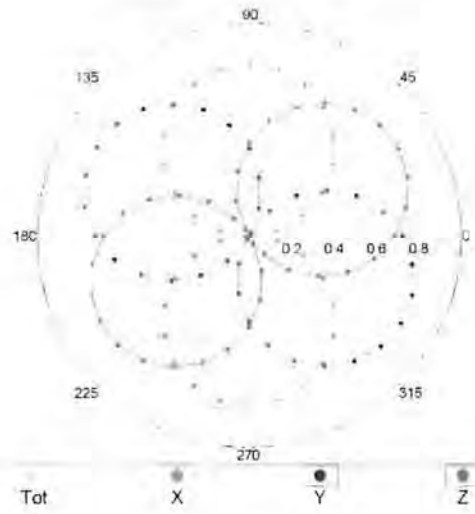
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

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

f=600 MHz,TEM

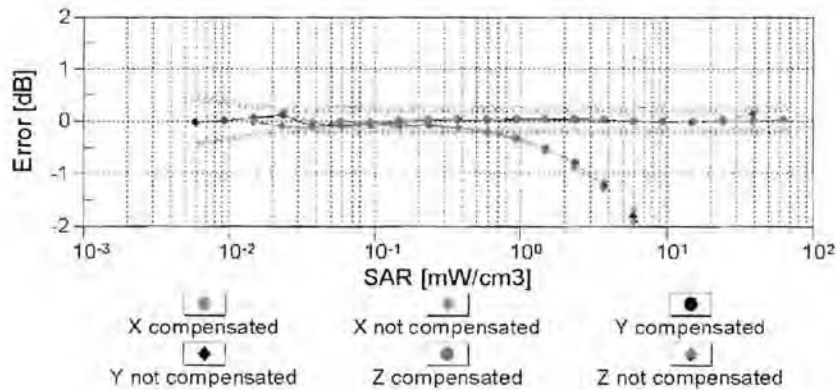
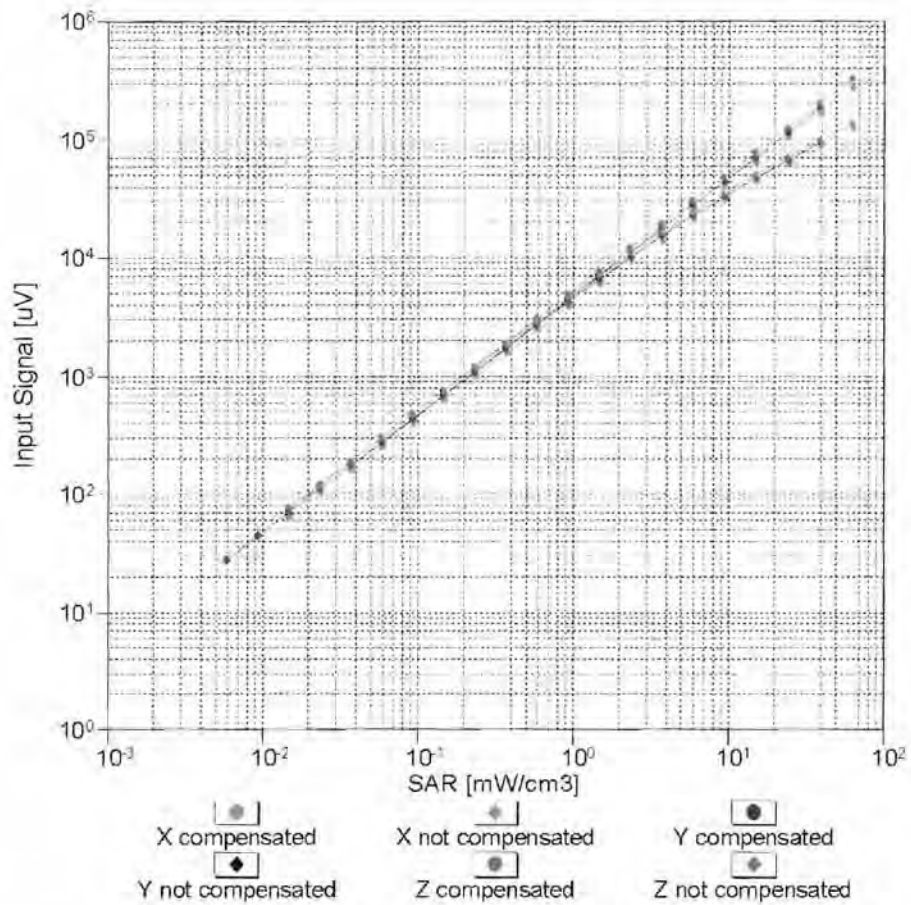


f=1800 MHz,R22



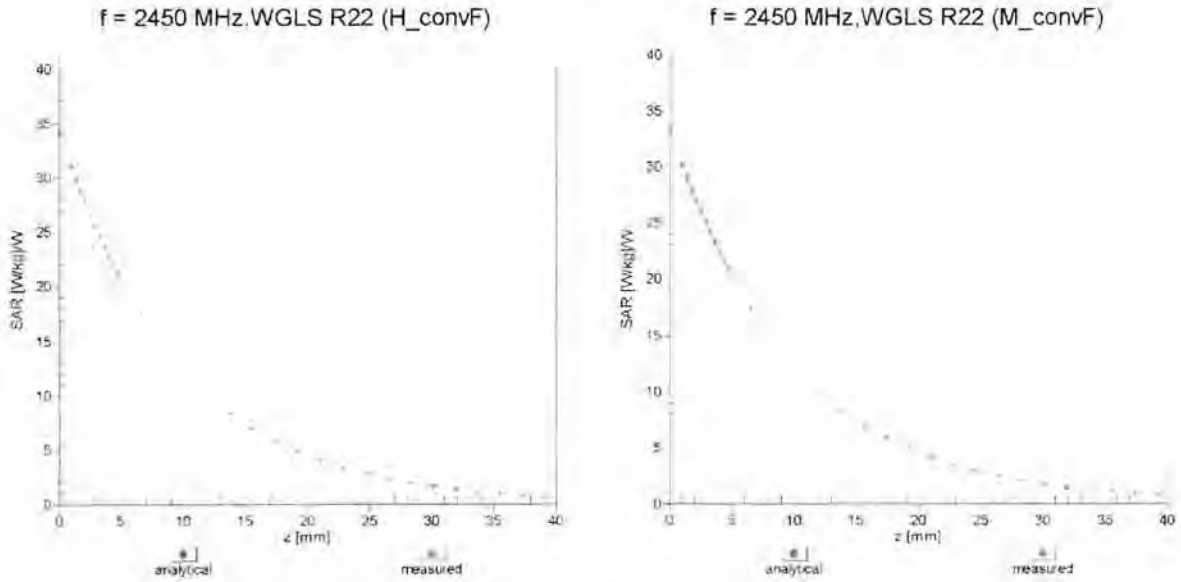
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

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

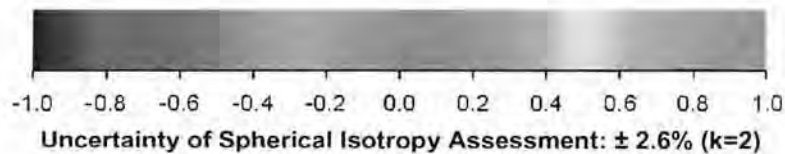
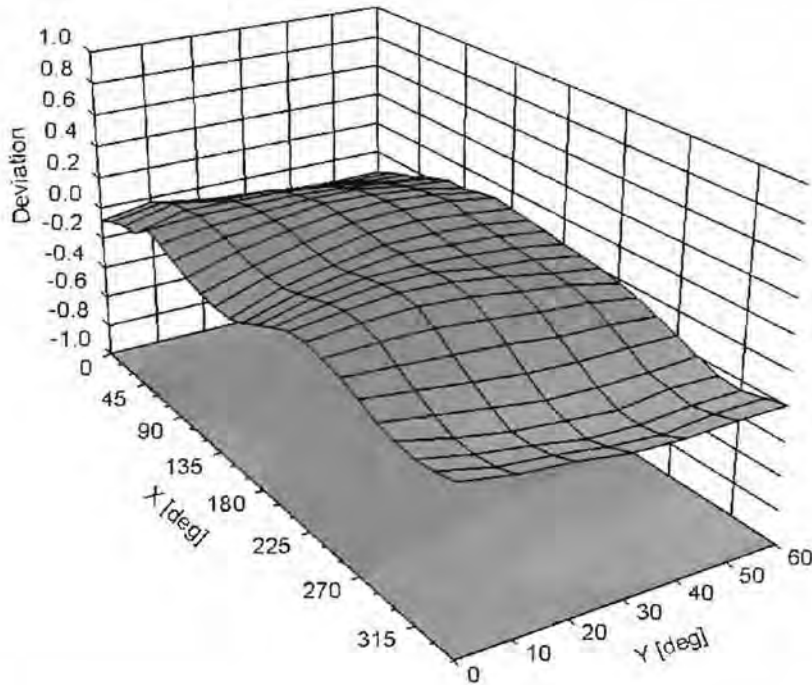


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



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



DASY/EASY - Parameters of Probe: EX3DV4 - SN:3746

Other Probe Parameters

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

Dipole Calibration

Please see attached calibration data

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



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Accreditation No.: **SCS 108**

Client **Northwest EMC**

Certificate No: **D2450V2-855_Dec11**

CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 855**

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

Calibration date: **December 09, 2011**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-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:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: December 9, 2011

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	39.5 \pm 6 %	1.87 mho/m \pm 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.7 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	53.9 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.38 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	25.3 mW / g \pm 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 \pm 0.2) °C	50.7 \pm 6 %	2.04 mho/m \pm 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	50.4 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.02 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.7 mW / g \pm 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$52.9 \Omega + 4.5 j\Omega$
Return Loss	- 25.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$50.4 \Omega + 5.3 j\Omega$
Return Loss	- 25.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.157 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 10, 2009

DASY5 Validation Report for Head TSL

Date: 09.12.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 855

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.87$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

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

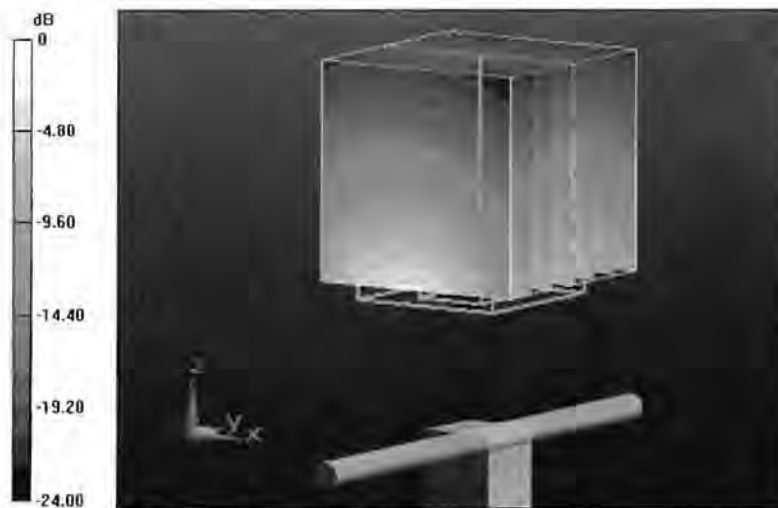
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.7 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 28.3310

SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.38 mW/g

Maximum value of SAR (measured) = 17.684 mW/g



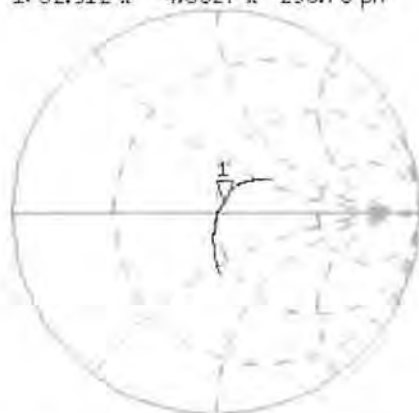
0 dB = 17.680mW/g = 24.95 dB mW/g

Impedance Measurement Plot for Head TSL

9 Dec 2011 13:32:30

CH1 S11 1 U FS 1: 52.912 Ω 4.5527 Ω 235.75 μH 2 450.000 000 MHz

*
Del
Cor



Avg
16

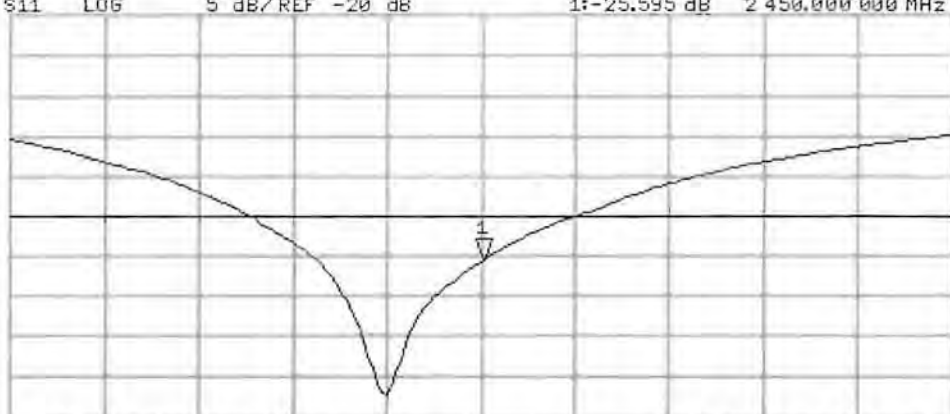
↑

CH2 S11 LOG 5 dB/REF -20 dB 1: -25.595 dB 2 450.000 000 MHz

Cor

Avg
16

↑



START 2 250.000 000 MHz

STOP 2 650.000 000 MHz

DASY5 Validation Report for Body TSL

Date: 08.12.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 855

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 2.04$ mho/m; $\epsilon_r = 50.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

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

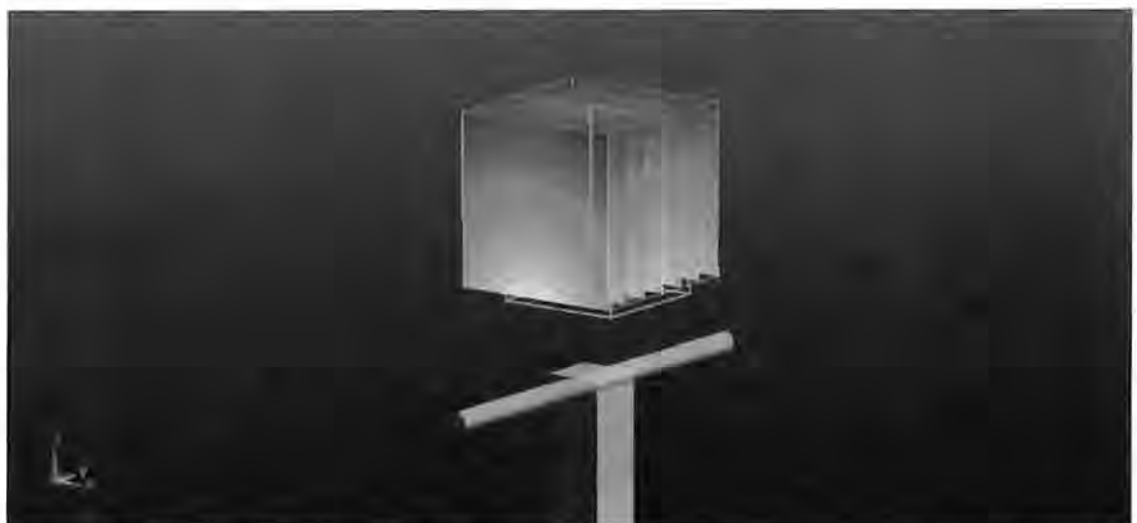
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.074 V/m; Power Drift = -0.0092 dB

Peak SAR (extrapolated) = 27.0840

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

Maximum value of SAR (measured) = 17.188 mW/g



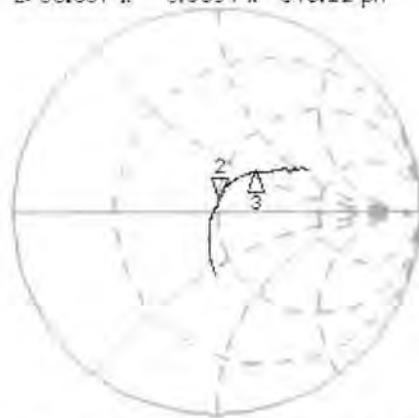
0 dB = 17.190mW/g = 24.71 dB mW/g

Impedance Measurement Plot for Body TSL

8 Dec 2011 11:09:43

CH1 S11 1 U FS 2: 50.367 Ω 5.3594 Ω 348.12 pF 2 450.220 000 MHz

*
De I
CA

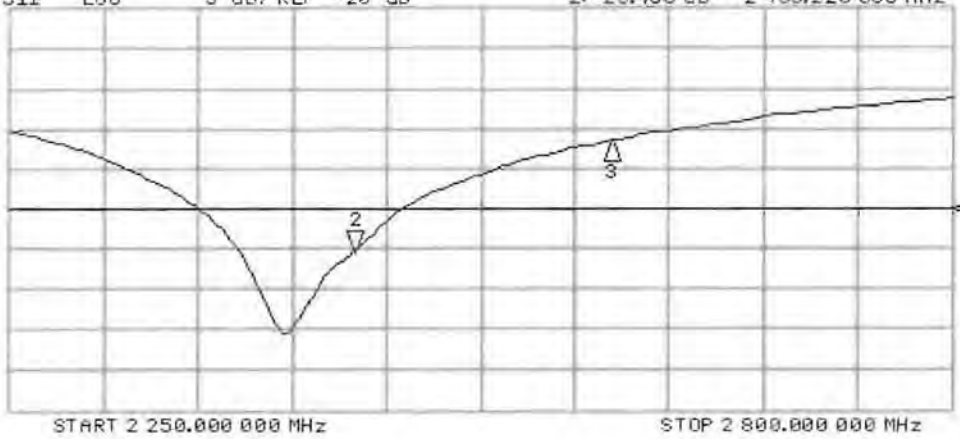


CH1 Markers
3: 65.660 Ω
27.344 Ω
2.60000 GHz

H1d

CH2 S11 LOG 5 dB/REF -20 dB 2:-25.455 dB 2 450.220 000 MHz

CA
Avg
16
H1d



CH2 Markers
3:-11.515 dB
2.60000 GHz

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



S Schweizerischer Kalibrierdienst
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C Servizio svizzero di taratura
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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 **Northwest EMC**

Certificate No: **D5GHzV2-1066_Dec11**

CALIBRATION CERTIFICATE

Object **D5GHzV2 - SN: 1066**

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

Calibration date: **December 14, 2011**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe EX3DV4	SN: 3503	04-Mar-11 (No. EX3-3503_Mar11)	Mar-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: December 14, 2011

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



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:

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

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5500 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	36.1 ± 6 %	4.65 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.13 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	81.3 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.2 mW / g ± 16.5 % (k=2)

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

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

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.53 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	85.3 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.41 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.1 mW / g ± 16.5 % (k=2)

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.1 ± 6 %	5.27 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	---

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.86 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	78.5 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.22 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	22.2 mW / g ± 16.5 % (k=2)

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	49.6 ± 6 %	5.44 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.51 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	75.3 mW / g ± 18.1 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.09 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.0 mW / g ± 17.6 % (k=2)

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	49.0 ± 6 %	5.86 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.04 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	80.7 mW / g ± 18.1 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	22.3 mW / g ± 17.6 % (k=2)

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	48.4 ± 6 %	6.28 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.54 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	75.6 mW / g ± 18.1 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.07 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.8 mW / g ± 17.6 % (k=2)

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	51.8 Ω - 5.1 j Ω
Return Loss	- 25.6 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	53.2 Ω - 2.3 j Ω
Return Loss	- 28.4 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	55.5 Ω - 1.0 j Ω
Return Loss	- 25.5 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	51.2 Ω - 4.7 j Ω
Return Loss	- 26.4 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	53.5 Ω - 0.2 j Ω
Return Loss	- 29.4 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	56.4 Ω + 1.6 j Ω
Return Loss	- 24.1 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	November 27, 2006

DASY5 Validation Report for Head TSL

Date: 14.12.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1066

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz
Medium parameters used: $f = 5200$ MHz; $\sigma = 4.65$ mho/m; $\epsilon_r = 36.1$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5500$ MHz; $\sigma = 4.96$ mho/m; $\epsilon_r = 35.6$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5800$ MHz; $\sigma = 5.27$ mho/m; $\epsilon_r = 35.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.41, 5.41, 5.41), ConvF(4.91, 4.91, 4.91), ConvF(4.81, 4.81, 4.81); Calibrated: 04.03.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

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

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

Reference Value = 64.855 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 30.2380

SAR(1 g) = 8.13 mW/g; SAR(10 g) = 2.32 mW/g

Maximum value of SAR (measured) = 18.418 mW/g

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan,

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

Reference Value = 64.965 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 33.8680

SAR(1 g) = 8.53 mW/g; SAR(10 g) = 2.41 mW/g

Maximum value of SAR (measured) = 19.692 mW/g

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

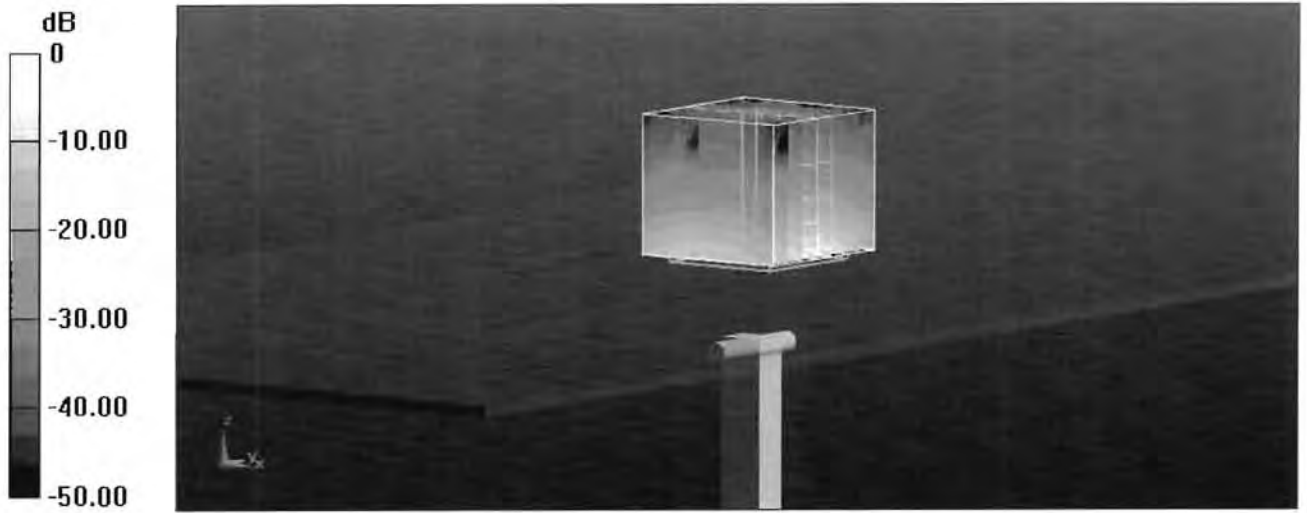
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 61.095 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 33.1420

SAR(1 g) = 7.86 mW/g; SAR(10 g) = 2.22 mW/g

Maximum value of SAR (measured) = 18.642 mW/g



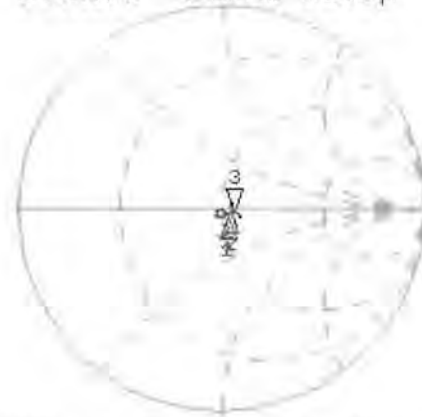
0 dB = 18.640mW/g = 25.41 dB mW/g

Impedance Measurement Plot for Head TSL

14 Dec 2011 09:59:02

CH1 S11 1 U FS 3: 55.518 Ω -994.14 m Ω 27.602 pF 5 800.000 000 MHz

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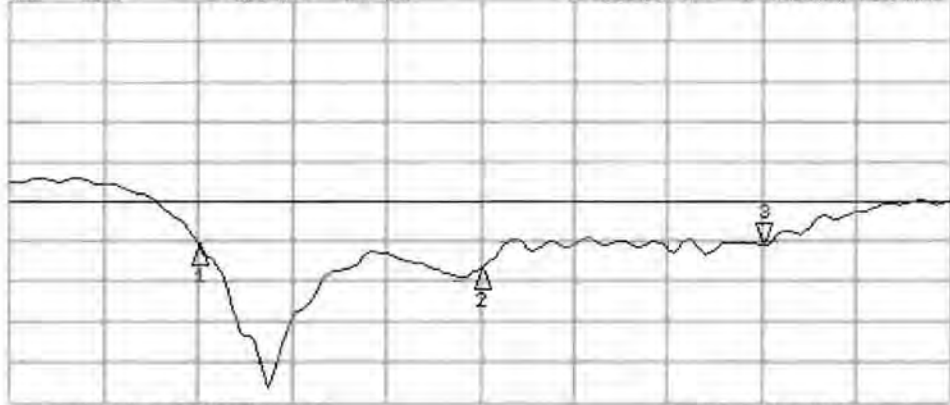
CH1 Markers

1: 51.801 Ω
-5.0625 Ω
5.20000 GHz
2: 53.201 Ω
-2.2308 Ω
5.50000 GHz

Avg
16
H1d

CH2 S11 LOG 5 dB/REF -20 dB 3: -25.493 dB 5 800.000 000 MHz

Cor
Avg
16
H1d



CH2 Markers

1: -25.562 dB
5.20000 GHz
2: -28.356 dB
5.50000 GHz

START 5 000.000 000 MHz

STOP 5 000.000 000 MHz

DASY5 Validation Report for Body TSL

Date: 13.12.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1066

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz
Medium parameters used: $f = 5200$ MHz; $\sigma = 5.44$ mho/m; $\epsilon_r = 49.6$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5500$ MHz; $\sigma = 5.86$ mho/m; $\epsilon_r = 49$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5800$ MHz; $\sigma = 6.28$ mho/m; $\epsilon_r = 48.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91), ConvF(4.43, 4.43, 4.43), ConvF(4.38, 4.38, 4.38); Calibrated: 04.03.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

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

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

Reference Value = 58.272 V/m; Power Drift = -0.0057 dB

Peak SAR (extrapolated) = 29.4900

SAR(1 g) = 7.51 mW/g; SAR(10 g) = 2.09 mW/g

Maximum value of SAR (measured) = 17.296 mW/g

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan,

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

Reference Value = 58.543 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 34.4970

SAR(1 g) = 8.04 mW/g; SAR(10 g) = 2.22 mW/g

Maximum value of SAR (measured) = 19.193 mW/g

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

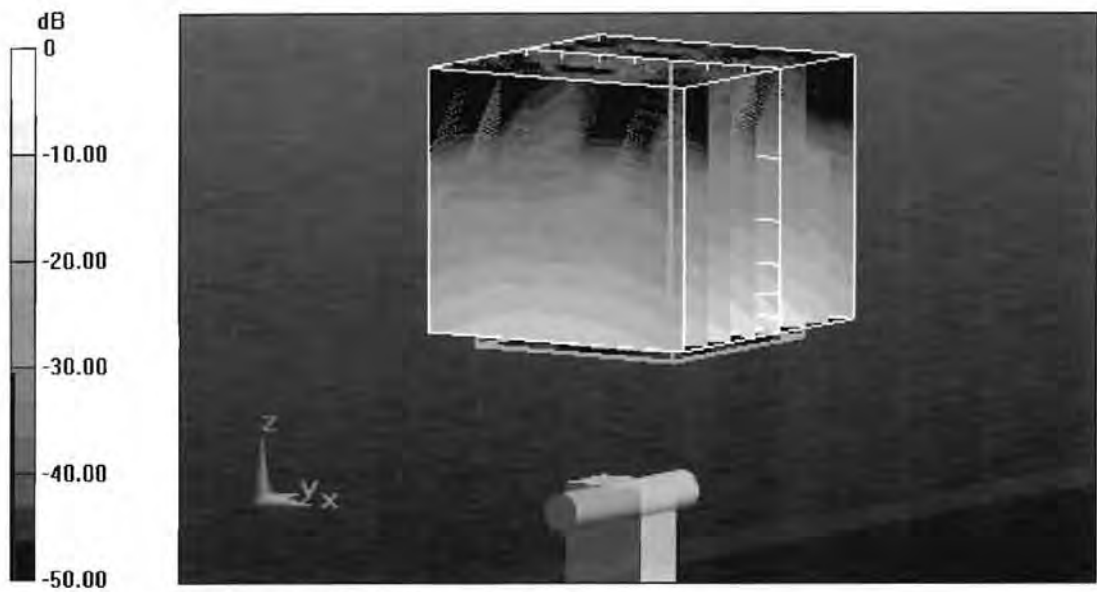
dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 54.820 V/m; Power Drift = -0.0098 dB

Peak SAR (extrapolated) = 35.3730

SAR(1 g) = 7.54 mW/g; SAR(10 g) = 2.07 mW/g

Maximum value of SAR (measured) = 18.371 mW/g



0 dB = 18.370mW/g = 25.28 dB mW/g

Impedance Measurement Plot for Body TSL

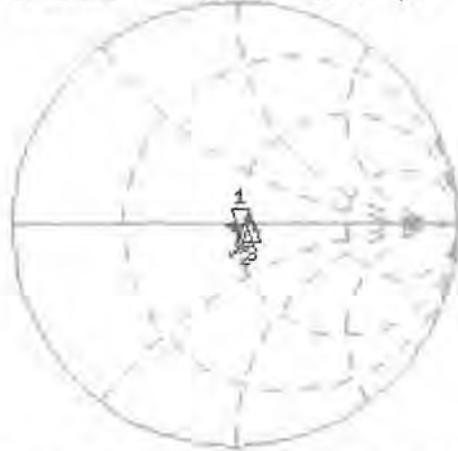
13 Dec 2011 10:52:37

CH1 S11 1 U FS 1: 51.188 Ω -4.7188 Ω 6.4863 pF 5 200.000 000 MHz

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Del
Cor

Avg
16

H1d



CH1 Markers
2: 53.516 Ω
-164.06 m Ω
5.50000 GHz

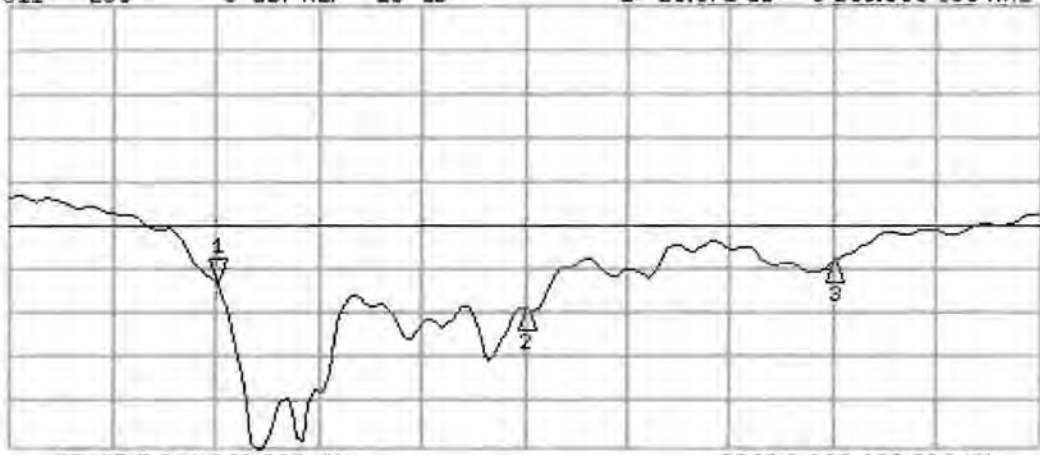
3: 56.428 Ω
1.6426 Ω
5.80000 GHz

CH2 S11 LOG 5 dB/REF -20 dB 1: -26.371 dB 5 200.000 000 MHz

Cor

Avg
16

H1d



CH2 Markers
2: -29.363 dB
5.50000 GHz

3: -24.106 dB
5.80000 GHz

START 5 000.000 000 MHz

STOP 5 000.000 000 MHz

EUT Photos



Keypad Side



Right Side



Left Side



Top-end



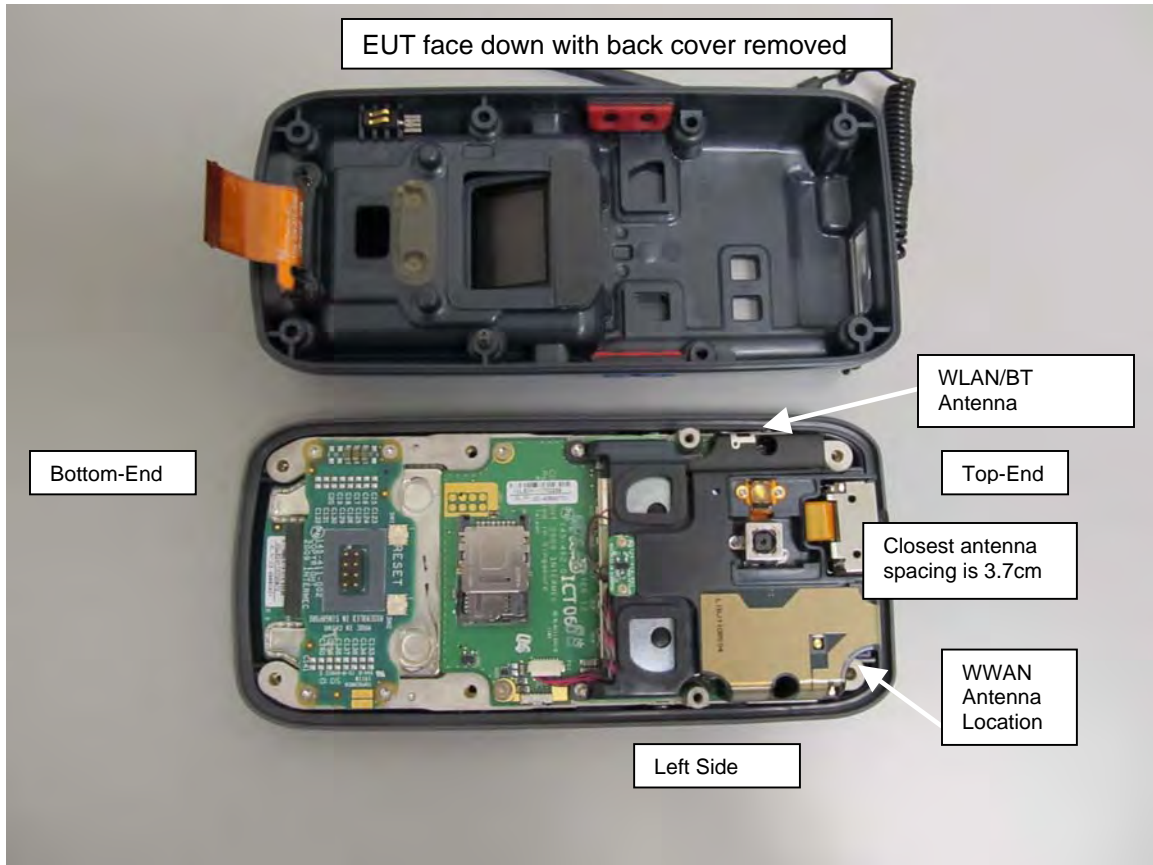
Bottom-end

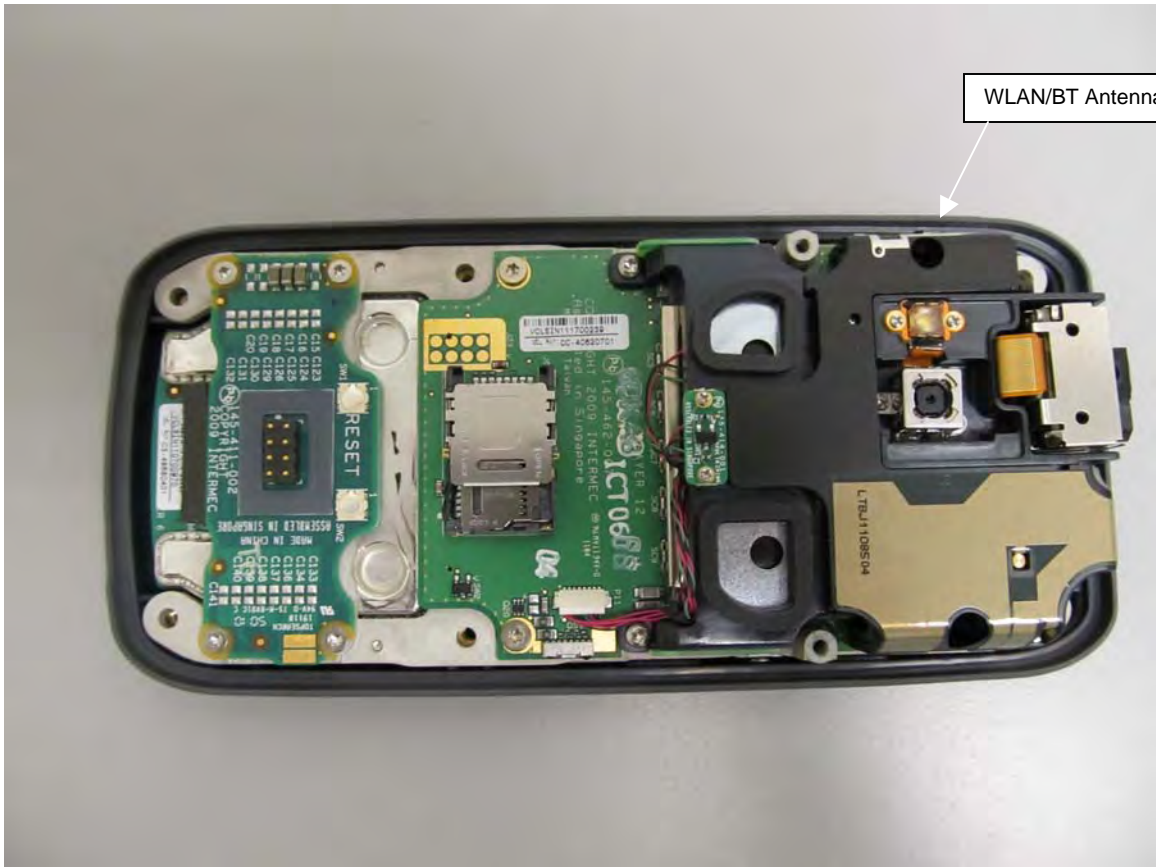


Back Side



Back side – battery cover removed





WLAN/BT Antenna



Wrist Holster – Right Side



Wrist Holster – Left Side

Constructed with a 12mm spacer on the left side to provide greater spacing between the WWAN antenna and the body.



Wrist Holster



Wrist Holster



Wrist Holster



Wrist Holster



Battery 1000AB01

SAR TEST SETUP PHOTOS - HEAD

EMC

Left Cheek

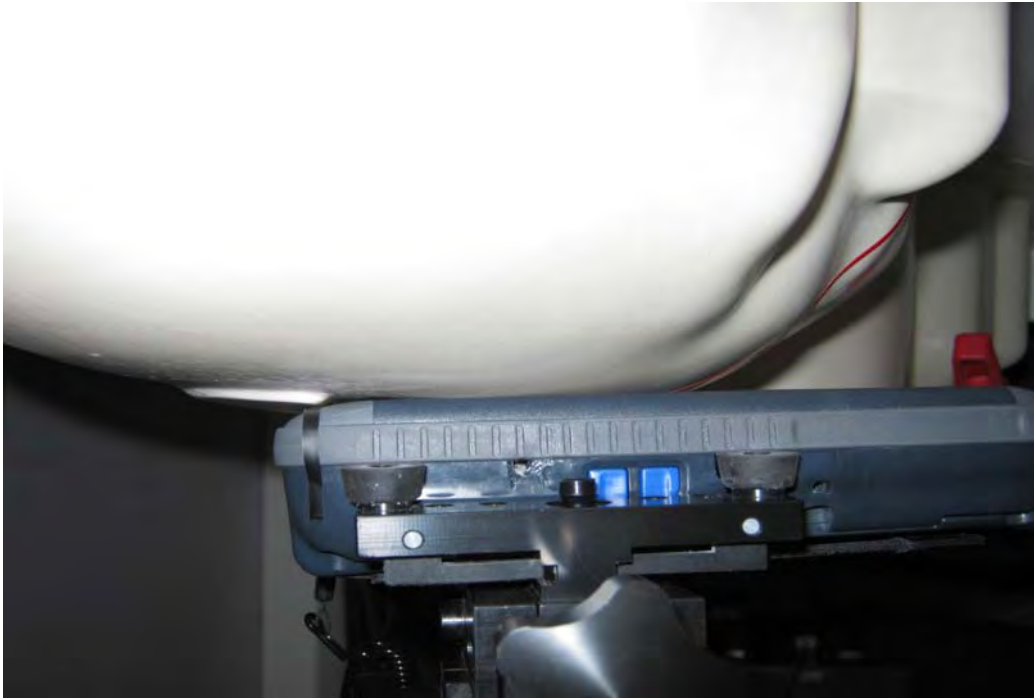


Left Tilt



SAR TEST SETUP PHOTOS - HEAD

Right Cheek



Right Tilt



SAR TEST SETUP PHOTOS - BODY

Back - Wrist Holster



Back - Wrist Holster



SAR TEST SETUP PHOTOS - BODY

Left Side of Wrist Holster with 12mm Spacer



Left Side of Wrist Holster with 12mm Spacer



SAR TEST SETUP PHOTOS - BODY

Right Side of Wrist Holster



Right Side of Wrist Holster

