

Intermec Technologies Corporation

Model: 1000CP01S

Evaluated to the following SAR Specifications:

FCC 2.1093: 2011
Health Safety Code 6:2009

Report No. ITRM0248.3

Report Prepared By



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

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SAR Evaluation Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Evaluation
Last Date of Test: August 8, 2011
Intermec Technologies Corporation
Model: 1000CP01S

Applicable Standards			
Test Description	Specification	Test Method	Pass/Fail
SAR Evaluation	FCC 2.1093:2011 FCC 15.247:2011 FCC 15.407:2011	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	.028	.174	1.6	General Population Uncontrolled
5.2, 5.3, 5.5. & 5.8	.058	.369		

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 Facteau, 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	None		

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



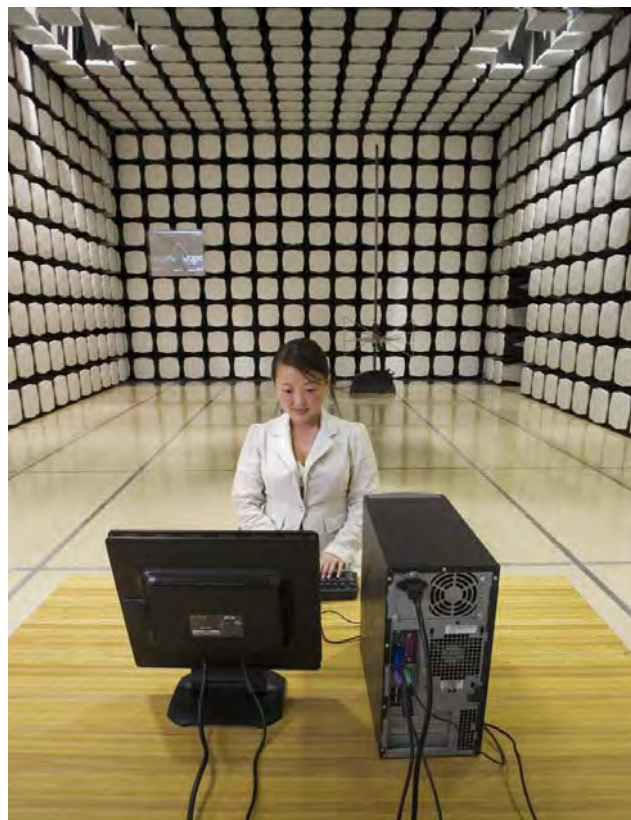
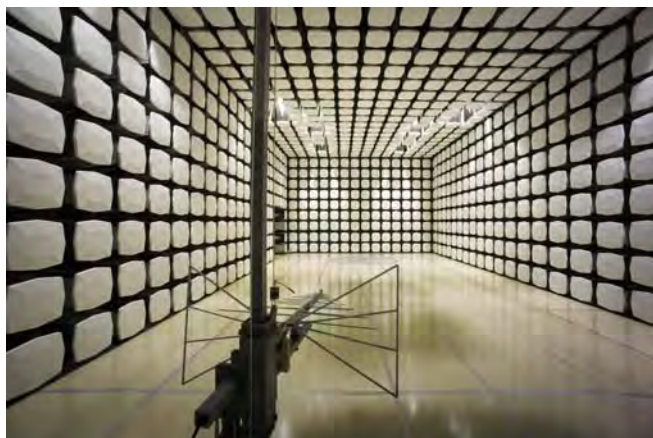
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(360) 793-8675

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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:	1000CP01S
First Date of Test:	July 26, 2011
Last Date of Test:	August 8, 2011
Receipt Date of Samples:	July 19, 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 a 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 UMTS radio. Its frequency range:

- 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)

The closest spacing between the UMTS antenna and 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 UMTS 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 body. The only Intermec approved accessory for body worn operation is a holster that contains metal. The EUT can only fit in the holster with the top end of the unit pointing down. The holster cup can be attached to the holster belt with either the keypad facing the user, or the side facing the user. In no case can the back of the EUT face the user.

An optional snap-on audio accessory is available. It connects to the bottom end of the unit and provides a standard audio jack for connection of a VR10 headset.

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.

Scope

The UMTS radio was evaluated under a separate SAR evaluation report.

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 $\frac{1}{2} \cdot (60/f_{GHz})$

	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 $2 \cdot P_{ref}$ 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 ITRM0248**Software/Firmware Running during test**

Description	Version
Regulatory Test Tool	1.01.00.0016

EUT

Description	Manufacturer	Model/Part Number	Serial Number
A1 Handheld Computer	Intermec Technologies Corporation	1000CP01S	28311047060
A1 Holster	Intermec Technologies Corporation	X11183-V1-R1	None
A1/B1 Battery	Intermec Technologies Corporation	1000AB01	16961001770
A1/B1 Battery	Intermec Technologies Corporation	1000AB01	24561000347

CONFIGURATION 2 ITRM0248**Software/Firmware Running during test**

Description	Version
Regulatory Test Tool	1.01.00.0016

EUT

Description	Manufacturer	Model/Part Number	Serial Number
A1 Handheld Computer	Intermec Technologies Corporation	1000CP01S	28311047060
A1 Holster	Intermec Technologies Corporation	X11183-V1-R1	None
Headset	Intermec Technologies Corporation	VR10	None
Standard Audio Snap-On	Intermec Technologies Corporation	225-771-001	Proto 2
A1/B1 Battery	Intermec Technologies Corporation	1000AB01	16961001770
A1/B1 Battery	Intermec Technologies Corporation	1000AB01	24561000347

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Audio Accessory	PA		PA	Audio Accessory - Headset	Handheld Computer

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

CONFIGURATION 3 ITRM0248**Software/Firmware Running during test**

Description	Version
Regulatory Test Tool	1.01.00.0016

EUT

Description	Manufacturer	Model/Part Number	Serial Number
A1 Handheld Computer	Intermec Technologies Corporation	1000CP01S	28311047060
A1/B1 Battery	Intermec Technologies Corporation	1000AB01	16961001770
A1/B1 Battery	Intermec Technologies Corporation	1000AB01	24561000347

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	7/26/2011	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	8/8/2010	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 in green below). Since 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.

NORTHWEST		EMC		Output Power		XMIT 2011.01.18	
EUT: 1000CP01S				Work Order: ITRM0248			
Serial Number: 28311047060				Date: 07/19/11			
Customer: Intermec Technologies Corporation				Temperature: 23			
Attendees: None				Humidity: 49%			
Project: ITRM0227				Barometric Pres.: 30.01"			
Tested by: Rod Peloquin		EUT Power		Battery		Job Site: EV12	
TEST SPECIFICATIONS				Test Method			
FCC 2.1093:2011				FCC OET 65C:2001			
COMMENTS							
Conducted output power							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	3	<i>Rocky Le Pelley</i> Signature					

Channel	Frequency (MHz)	Data Rate (Mbps)	Modulation	Conducted Power (Average)	
				dBm	W
1	2412	1	BPSK	16.2	0.041
		11	CCK	16.1	0.041
		6	OFDM	12.6	0.018
		36	OFDM	12.4	0.017
		54	OFDM	12.3	0.017
		7.2 (MCS0)	OFDM	12.5	0.018
		72.2 (MCS7)	OFDM	11.3	0.014
6	2437	1	BPSK	16.0	0.040
		11	CCK	15.9	0.039
		6	OFDM	12.3	0.017
		36	OFDM	12.2	0.016
		54	OFDM	12.0	0.016
		7.2 (MCS0)	OFDM	12.2	0.017
		72.2 (MCS7)	OFDM	11.6	0.014
11	2462	1	BPSK	16.3	0.043
		11	CCK	16.2	0.042
		6	OFDM	12.6	0.018
		36	OFDM	12.4	0.018
		54	OFDM	12.5	0.018
		7.2 (MCS0)	OFDM	12.6	0.018
		72.2 (MCS7)	OFDM	11.9	0.015

NORTHWEST		Output Power		XMIT 2011.01.18	
EMC					
EUT: 1000CP01S				Work Order: ITRM0248	
Serial Number: 28311047060				Date: 07/20/11	
Customer: Intermec Technologies Corporation				Temperature: 23	
Attendees: None				Humidity: 45%	
Project: ITRM0227				Barometric Pres.: 30.16"	
Tested by: Rod Peloquin		EUT Power		Battery	
TEST SPECIFICATIONS				Test Method	
FCC 2.1093:2011				FCC OET 65C:2001	
COMMENTS					
Conducted output power					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	3	 Signature			

Channel	Frequency (MHz)	Data Rate (Mbps)	Modulation	Conducted Power (Average)	
				dBm	W
36	5180	6	OFDM	12.4	0.017
		54	OFDM	11.6	0.015
		7.2 (MCS0)	OFDM	12.4	0.017
		7.2 (MCS7)	OFDM	10.2	0.010
40	5200	6	OFDM	12.3	0.017
		54	OFDM	11.6	0.014
		7.2 (MCS0)	OFDM	12.2	0.017
		7.2 (MCS7)	OFDM	10.1	0.010
44	5220	6	OFDM	12.2	0.017
		54	OFDM	11.4	0.014
		7.2 (MCS0)	OFDM	12.2	0.017
		7.2 (MCS7)	OFDM	9.9	0.010
48	5240	6	OFDM	12.1	0.016
		54	OFDM	11.3	0.013
		7.2 (MCS0)	OFDM	12.0	0.016
		7.2 (MCS7)	OFDM	9.8	0.010
52	5260	6	OFDM	12.2	0.017
		54	OFDM	11.4	0.014
		7.2 (MCS0)	OFDM	12.2	0.016
		7.2 (MCS7)	OFDM	10.0	0.010
56	5280	6	OFDM	12.0	0.016
		54	OFDM	11.2	0.013
		7.2 (MCS0)	OFDM	12.0	0.016
		7.2 (MCS7)	OFDM	9.8	0.009
60	5300	6	OFDM	11.8	0.015
		54	OFDM	11.1	0.013
		7.2 (MCS0)	OFDM	11.8	0.015
		7.2 (MCS7)	OFDM	9.7	0.009
64	5320	6	OFDM	11.8	0.015
		54	OFDM	10.9	0.012
		7.2 (MCS0)	OFDM	11.8	0.015
		7.2 (MCS7)	OFDM	9.5	0.009
100	5500	6	OFDM	12.0	0.016
		7.2 (MCS0)	OFDM	12.0	0.016
104	5520	6	OFDM	12.1	0.016
		7.2 (MCS0)	OFDM	12.1	0.016
108	5540	6	OFDM	12.1	0.016
		7.2 (MCS0)	OFDM	12.1	0.016
112	5560	6	OFDM	12.0	0.016
		7.2 (MCS0)	OFDM	12.0	0.016
116	5580	6	OFDM	12.0	0.016
		7.2 (MCS0)	OFDM	12.0	0.016
120	5600	6	OFDM	12.2	0.017
		7.2 (MCS0)	OFDM	12.1	0.016
124	5620	6	OFDM	12.0	0.016
		7.2 (MCS0)	OFDM	11.9	0.016
128	5640	6	OFDM	11.7	0.015
		7.2 (MCS0)	OFDM	11.7	0.015
132	5660	6	OFDM	11.5	0.014
		7.2 (MCS0)	OFDM	11.5	0.014
136	5680	6	OFDM	11.3	0.013
		7.2 (MCS0)	OFDM	11.2	0.013
140	5700	6	OFDM	11.1	0.013
		7.2 (MCS0)	OFDM	11.1	0.013
149	5745	6	OFDM	10.7	0.012
		7.2 (MCS0)	OFDM	10.5	0.011
153	5765	6	OFDM	10.5	0.011
		7.2 (MCS0)	OFDM	10.4	0.011
157	5785	6	OFDM	10.4	0.011
		7.2 (MCS0)	OFDM	10.4	0.011
161	5805	6	OFDM	10.5	0.011
		7.2 (MCS0)	OFDM	10.5	0.011
165	5825	6	OFDM	10.6	0.011
		7.2 (MCS0)	OFDM	10.6	0.012

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	Head		Body	
(MHz)	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

NORTHWEST		Tissue - Equivalent Liquid		SAR 2011.02.21	
EMC					
EUT: MSL501		Work Order: ITRM0248			
Serial Number: SAV		Date: 07/25/11			
Customer: Intermec Technologies Corporation		Temperature (°C): 22.2			
Attendees: None		Humidity: 52.1			
Project: ITRM0227		Barometric Pres. (mb): 1017			
Tested by: Jennifer Herrett		Power: None		Job Site: Cal Lab	
TEST SPECIFICATIONS		Test Method			
FCC 2.1093:2011		FCC OET 65C:2001			
COMMENTS					
None					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	None	Signature 			
Tissue: MSL501		Liquid Temperature (°C): 22.2			

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
5800	46.043	6.027	48.200	6.000	4.47	-0.45
3400.0	49.8	3.084				
3500.0	49.7	3.183				
3600.0	49.6	3.284				
3700.0	49.5	3.405				
3800.0	49.3	3.507				
3900.0	49.2	3.609				
4000.0	49.0	3.721				
4100.0	48.8	3.829				
4200.0	48.7	3.950				
4300.0	48.5	4.071				
4400.0	48.5	4.202				
4500.0	48.4	4.328				
4600.0	48.2	4.462				
4700.0	48.0	4.582				
4800.0	47.8	4.712				
4850.0	47.7	4.773				
4900.0	47.7	4.838				
4950.0	47.6	4.898				
5000.0	47.5	4.968				
5050.0	47.4	5.028				
5100.0	47.2	5.087				
5150.0	47.2	5.158				
5200.0	47.1	5.223				
5250.0	47.0	5.285				
5300.0	46.9	5.340				
5350.0	46.8	5.413				
5400.0	46.7	5.473				
5450.0	46.6	5.547				
5500.0	46.6	5.611				
5550.0	46.5	5.674				
5600.0	46.4	5.739				
5650.0	46.3	5.817				
5700.0	46.3	5.880				
5750.0	46.2	5.942				
5800.0	46.0	6.027				
5850.0	46.0	6.097				
5900.0	46.0	6.167				

NORTHWEST		SAR 2011.02.21	
EMC		Tissue - Equivalent Liquid	
EUT: MSL501		Work Order: ITRM0248	
Serial Number: SAV		Date: 07/27/2011	
Customer: Intermec Technologies Corporation		Temperature (°C): 23.4	
Attendees: None		Humidity: 44.5	
Project: ITRM0227		Barometric Pres. (mb): 1020.3	
Tested by: Jennifer Herrett		Power: None	
Job Site: Cal Lab			
TEST SPECIFICATIONS		Test Method	
FCC 2.1093:2011		FCC OET 65C:2001	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	None	Signature 	
Tissue: MSL501		Liquid Temperature (°C): 22.2	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
5800	46.685	6.054	48.200	6.000	3.14	-0.90
3400.0	50.5	3.148				
3500.0	50.4	3.245				
3600.0	50.3	3.348				
3700.0	50.2	3.461				
3800.0	50.0	3.555				
3900.0	49.9	3.658				
4000.0	49.7	3.770				
4100.0	49.5	3.885				
4200.0	49.4	4.012				
4300.0	49.2	4.136				
4400.0	49.1	4.267				
4500.0	49.1	4.393				
4600.0	48.9	4.518				
4700.0	48.7	4.642				
4800.0	48.5	4.769				
4850.0	48.4	4.828				
4900.0	48.4	4.889				
4950.0	48.4	4.946				
5000.0	48.3	5.009				
5050.0	48.2	5.065				
5100.0	48.0	5.129				
5150.0	48.0	5.190				
5200.0	47.8	5.246				
5250.0	47.7	5.309				
5300.0	47.6	5.368				
5350.0	47.5	5.431				
5400.0	47.4	5.500				
5450.0	47.3	5.572				
5500.0	47.3	5.636				
5550.0	47.2	5.704				
5600.0	47.1	5.774				
5650.0	47.0	5.846				
5700.0	46.9	5.917				
5750.0	46.8	5.975				
5800.0	46.7	6.054				
5850.0	46.6	6.124				
5900.0	46.6	6.203				

NORTHWEST

EMC

Tissue - Equivalent Liquid

SAR 2011.02.21

EUT: MSL501		Work Order: ITRM0248	
Serial Number: SAV		Date: 07/29/2011	
Customer: Intermec Technologies Corporation		Temperature (°C): 20.9	
Attendees: None		Humidity: 52.5	
Project: ITRM0227		Barometric Pres. (mb): 1019.2	
Tested by: Jennifer Herrett		Power: None	Job Site: Cal Lab
TEST SPECIFICATIONS		Test Method	
FCC 2.1093:2011		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	46.079	6.057	48.200	6.000	4.40	-0.95
3400.0	49.9	3.146				
3500.0	49.9	3.249				
3600.0	49.8	3.364				
3700.0	49.8	3.457				
3800.0	49.6	3.547				
3900.0	49.4	3.638				
4000.0	49.2	3.746				
4100.0	48.9	3.867				
4200.0	48.8	4.010				
4300.0	48.6	4.140				
4400.0	48.5	4.273				
4500.0	48.5	4.409				
4600.0	48.3	4.532				
4700.0	48.2	4.660				
4800.0	48.0	4.819				
4850.0	48.0	4.867				
4900.0	48.0	4.919				
4950.0	47.9	4.998				
5000.0	47.9	5.049				
5050.0	47.8	5.075				
5100.0	47.6	5.146				
5150.0	47.6	5.195				
5200.0	47.4	5.227				
5250.0	47.3	5.294				
5300.0	47.2	5.360				
5350.0	47.0	5.402				
5400.0	46.8	5.486				
5450.0	46.7	5.556				
5500.0	46.7	5.630				
5550.0	46.5	5.699				
5600.0	46.5	5.783				
5650.0	46.4	5.844				
5700.0	46.2	5.927				
5750.0	46.2	5.992				
5800.0	46.1	6.057				
5850.0	45.9	6.144				
5900.0	45.9	6.245				

NORTHWEST		SAR 2011.02.21	
EMC		Tissue - Equivalent Liquid	
EUT: HSL501		Work Order: ITRM0248	
Serial Number: SAU		Date: 08/01/2011	
Customer: Intermec Technologies Corporation		Temperature (°C): 23.3	
Attendees: None		Humidity: 46.8	
Project: ITRM0227		Barometric Pres. (mb): 1017.1	
Tested by: Jennifer Herrett		Power: None	
Job Site: Cal Lab			
TEST SPECIFICATIONS		Test Method	
FCC 2.1093:2011		FCC OET 65C:2001	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	None	 <i>Signature</i>	
Tissue: HSL501		Liquid Temperature (°C): 22.2	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
5800	35.076	5.351	35.300	5.270	0.63	-1.54
3400.0	38.5	2.919				
3450.0	38.4	2.955				
3500.0	38.4	2.996				
3550.0	38.4	3.034				
3600.0	38.3	3.070				
3650.0	38.3	3.110				
3700.0	38.3	3.148				
3750.0	38.2	3.181				
3800.0	38.1	3.218				
3850.0	38.1	3.261				
3900.0	38.0	3.301				
3950.0	37.9	3.346				
4000.0	37.9	3.392				
4050.0	37.8	3.441				
4100.0	37.7	3.493				
4150.0	37.6	3.547				
4200.0	37.6	3.603				
4250.0	37.5	3.661				
4300.0	37.5	3.716				
4350.0	37.4	3.770				
4400.0	37.3	3.831				
4450.0	37.3	3.894				
4500.0	37.2	3.944				
4550.0	37.2	3.998				
4600.0	37.1	4.055				
4650.0	37.1	4.105				
4700.0	37.0	4.156				
4750.0	37.0	4.210				
4800.0	36.9	4.259				
4850.0	36.8	4.308				
4900.0	36.7	4.363				
4950.0	36.7	4.414				
5000.0	36.6	4.459				
5050.0	36.5	4.509				
5100.0	36.4	4.563				
5150.0	36.4	4.603				
5200.0	36.3	4.649				
5250.0	36.2	4.700				
5300.0	36.1	4.746				
5350.0	35.9	4.797				
5400.0	35.8	4.857				
5450.0	35.7	4.910				
5500.0	35.6	4.971				
5550.0	35.5	5.036				
5600.0	35.4	5.099				
5650.0	35.3	5.160				
5700.0	35.2	5.228				
5750.0	35.2	5.293				
5800.0	35.1	5.351				
5850.0	35.0	5.418				
5900.0	34.9	5.482				

NORTHWEST		SAR 2011.02.21	
EMC		Tissue - Equivalent Liquid	
EUT: HSL501		Work Order: ITRM0248	
Serial Number: SAU		Date: 08/03/2011	
Customer: Intermec Technologies Corporation		Temperature (°C): 22.3	
Attendees: None		Humidity: 50.5	
Project: ITRM0227		Barometric Pres. (mb): 1015.8	
Tested by: Jennifer Herrett		Power: None	
Job Site: Cal Lab			
TEST SPECIFICATIONS		Test Method	
FCC 2.1093:2011		FCC OET 65C:2001	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	None	 Signature	
Tissue: HSL501		Liquid Temperature (°C): 22	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
5800	34.796	5.428	35.300	5.270	1.43	-2.99
3400.0	38.2	2.913				
3450.0	38.2	2.956				
3500.0	38.1	2.998				
3550.0	38.1	3.039				
3600.0	38.0	3.082				
3650.0	38.0	3.125				
3700.0	37.9	3.169				
3750.0	37.9	3.210				
3800.0	37.8	3.253				
3850.0	37.8	3.299				
3900.0	37.7	3.344				
3950.0	37.7	3.391				
4000.0	37.6	3.439				
4050.0	37.6	3.489				
4100.0	37.5	3.540				
4150.0	37.4	3.594				
4200.0	37.4	3.646				
4250.0	37.3	3.698				
4300.0	37.3	3.750				
4350.0	37.2	3.805				
4400.0	37.1	3.860				
4450.0	37.1	3.916				
4500.0	37.0	3.971				
4550.0	36.9	4.024				
4600.0	36.8	4.080				
4650.0	36.8	4.132				
4700.0	36.7	4.188				
4750.0	36.6	4.242				
4800.0	36.5	4.298				
4850.0	36.5	4.356				
4900.0	36.4	4.412				
4950.0	36.3	4.470				
5000.0	36.2	4.527				
5050.0	36.1	4.583				
5100.0	36.0	4.640				
5150.0	36.0	4.695				
5200.0	35.9	4.749				
5250.0	35.8	4.801				
5300.0	35.7	4.855				
5350.0	35.6	4.909				
5400.0	35.5	4.967				
5450.0	35.4	5.022				
5500.0	35.3	5.083				
5550.0	35.2	5.139				
5600.0	35.1	5.194				
5650.0	35.1	5.253				
5700.0	35.0	5.310				
5750.0	34.9	5.369				
5800.0	34.8	5.428				
5850.0	34.7	5.483				
5900.0	34.6	5.539				

NORTHWEST

EMC

Tissue - Equivalent Liquid

SAR 2011.02.21

EUT: HSL2450		Work Order: ITRM0248	
Serial Number: SAL		Date: 08/05/2011	
Customer: Intermec Technologies Corporation		Temperature (°C): 23.5	
Attendees: None		Humidity: 48.1	
Project: ITRM0227		Barometric Pres. (mb): 1018.90	
Tested by: Jennifer Herrett		Power: None	Job Site: Cal Lab
TEST SPECIFICATIONS		Test Method	
FCC 2.1093:2011		FCC OET 65C:2001	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	None	Signature <i>Jennifer Herrett</i>	
Tissue: HSL2450		Liquid Temperature (°C): 23.5	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
2450	37.705	1.832	39.200	1.800	3.82	-1.77
1900.0	40.0	1.234				
1925.0	39.9	1.259				
1950.0	39.8	1.285				
1975.0	39.7	1.311				
2000.0	39.6	1.338				
2025.0	39.5	1.365				
2050.0	39.3	1.393				
2075.0	39.2	1.421				
2100.0	39.1	1.448				
2125.0	39.0	1.475				
2150.0	38.9	1.503				
2175.0	38.8	1.529				
2200.0	38.7	1.556				
2225.0	38.6	1.582				
2250.0	38.5	1.609				
2275.0	38.4	1.636				
2300.0	38.3	1.664				
2325.0	38.2	1.691				
2350.0	38.1	1.719				
2375.0	38.0	1.747				
2400.0	37.9	1.775				
2425.0	37.8	1.803				
2450.0	37.7	1.832				
2475.0	37.6	1.861				
2500.0	37.5	1.890				
2525.0	37.4	1.920				
2550.0	37.3	1.950				
2575.0	37.2	1.979				
2600.0	37.1	2.009				
2625.0	37.0	2.039				
2650.0	36.9	2.069				
2675.0	36.8	2.098				
2700.0	36.7	2.129				

NORTHWEST

EMC

Tissue - Equivalent Liquid

SAR 2011.02.21

EUT: HSL2450		Work Order: ITRM0248	
Serial Number: SAL		Date: 08/08/2011	
Customer: Intermec Technologies Corporation		Temperature (°C): 23.1	
Attendees: None		Humidity: 43	
Project: ITRM0227		Barometric Pres. (mb): 1018.4	
Tested by: Jennifer Herrett		Power: None	Job Site: Cal Lab
TEST SPECIFICATIONS		Test Method	
FCC 2.1093:2011		FCC OET 65C:2001	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	None	Signature <i>Jennifer Herrett</i>	
Tissue: HSL2450		Liquid Temperature (°C): 22	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
2450	38.404	1.886	39.200	1.800	2.03	-4.79
1900.0	40.6	1.268				
1925.0	40.5	1.292				
1950.0	40.4	1.318				
1975.0	40.3	1.346				
2000.0	40.2	1.374				
2025.0	40.1	1.404				
2050.0	40.0	1.434				
2075.0	39.9	1.463				
2100.0	39.8	1.490				
2125.0	39.7	1.517				
2150.0	39.6	1.544				
2175.0	39.5	1.572				
2200.0	39.4	1.600				
2225.0	39.3	1.627				
2250.0	39.2	1.655				
2275.0	39.1	1.684				
2300.0	39.0	1.712				
2325.0	38.9	1.740				
2350.0	38.8	1.768				
2375.0	38.7	1.798				
2400.0	38.6	1.827				
2425.0	38.5	1.856				
2450.0	38.4	1.886				
2475.0	38.3	1.915				
2500.0	38.2	1.944				
2525.0	38.1	1.973				
2550.0	38.0	2.004				
2575.0	37.9	2.034				
2600.0	37.8	2.063				
2625.0	37.7	2.094				
2650.0	37.6	2.124				
2675.0	37.5	2.154				
2700.0	37.4	2.185				

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

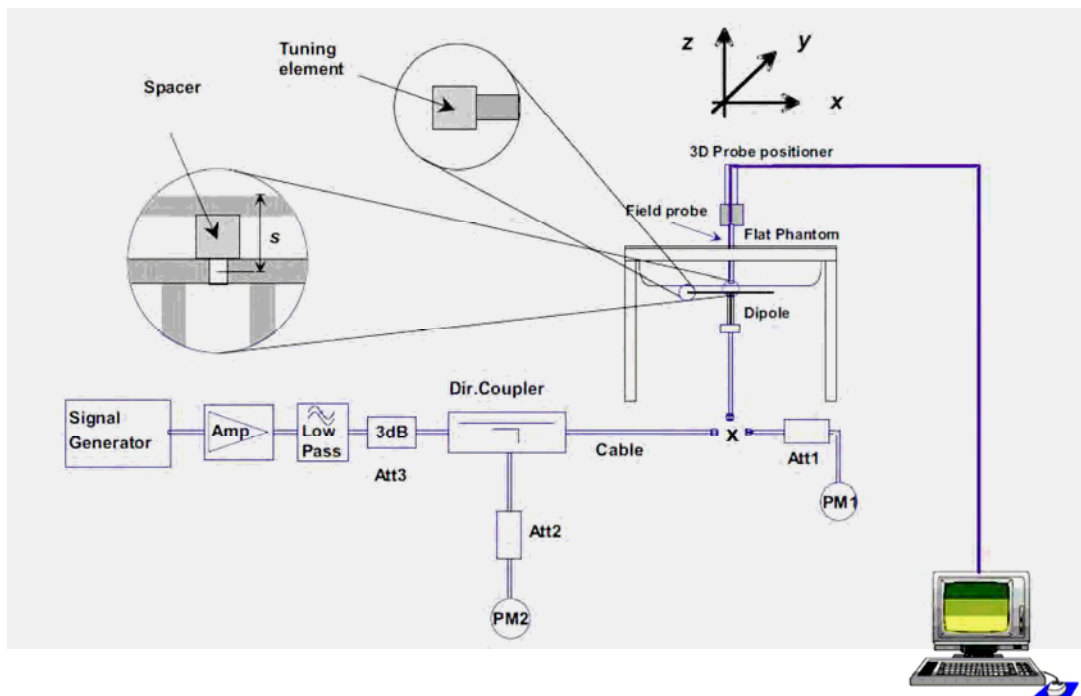
Within 24 hours of a measurement, Northwest EMC used the system validation kit (calibrated reference dipole) to test whether the system was operating within its specifications. The validation was performed in the indicated bands by making SAR measurements of the reference dipole with the phantom filled 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.



NORTHWEST		SAR 2011.02.07	
EMC		System Verification	
EUT:	System Verifications	Work Order:	ITRM0248
Serial Number:	Various	Date:	See Data Sheets
Customer:	Intermec Technologies Corporation	Temperature:	See Data Sheets
Attendees:	None	Humidity:	See Data Sheets
Project:	ITRM0227	Barometric Pres.:	See Data Sheets
Tested by:	Jennifer Herrett	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 #	None	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
7/27/2011	MSL501 5500MHz	19.19	12.05	6.68	1.89	80.50	22.78	89.30	25.00	-9.86	-8.90	
7/28/2011	MSL501 5800MHz	18.32	14.72	4.64	1.31	68.32	19.29	75.60	20.70	-9.64	-6.82	
7/29/2011	MSL501 5200MHz	19.65	10.84	6.93	1.98	75.12	21.46	78.10	21.60	-3.82	-0.64	
8/3/2011	HSL501 5500MHz	19.36	11.59	7.59	2.16	87.95	25.03	89.30	25.00	-1.51	0.12	
8/3/2011	HSL501 5800MHz	18.43	14.35	5.86	1.68	84.12	24.12	82.90	23.30	1.47	3.50	
8/4/2011	MSL2450 2450MHz	19.97	10.07	4.91	2.28	49.44	22.96	51.50	23.90	-4.00	-3.94	
8/5/2011	HSL2450 2450MHz	19.77	10.54	5.16	2.38	54.41	25.09	53.40	24.70	1.88	1.60	

EMC

System Verification

Room Temperature (°C):	23.4	Humidity (%):	47.9	Test Date:	07/27/11
Liquid Temperature (°C):	22.1	Barometric Pressure (mb):	1019.9	Tested by:	Jennifer Herrett

MSL501 System Checks_5500MHz 7-27-11b

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

Communication System: CW; Frequency: 5500 MHz

Medium parameters used: $f = 5500$ MHz; $\sigma = 5.611$ mho/m; $\epsilon = 46.622$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.61067$ mho/m, $\epsilon = 46.6218$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(3.69, 3.69, 3.69); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096

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) = 14.869 mW/g

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

Reference Value = 55.715 V/m; Power Drift = -0.28 dB

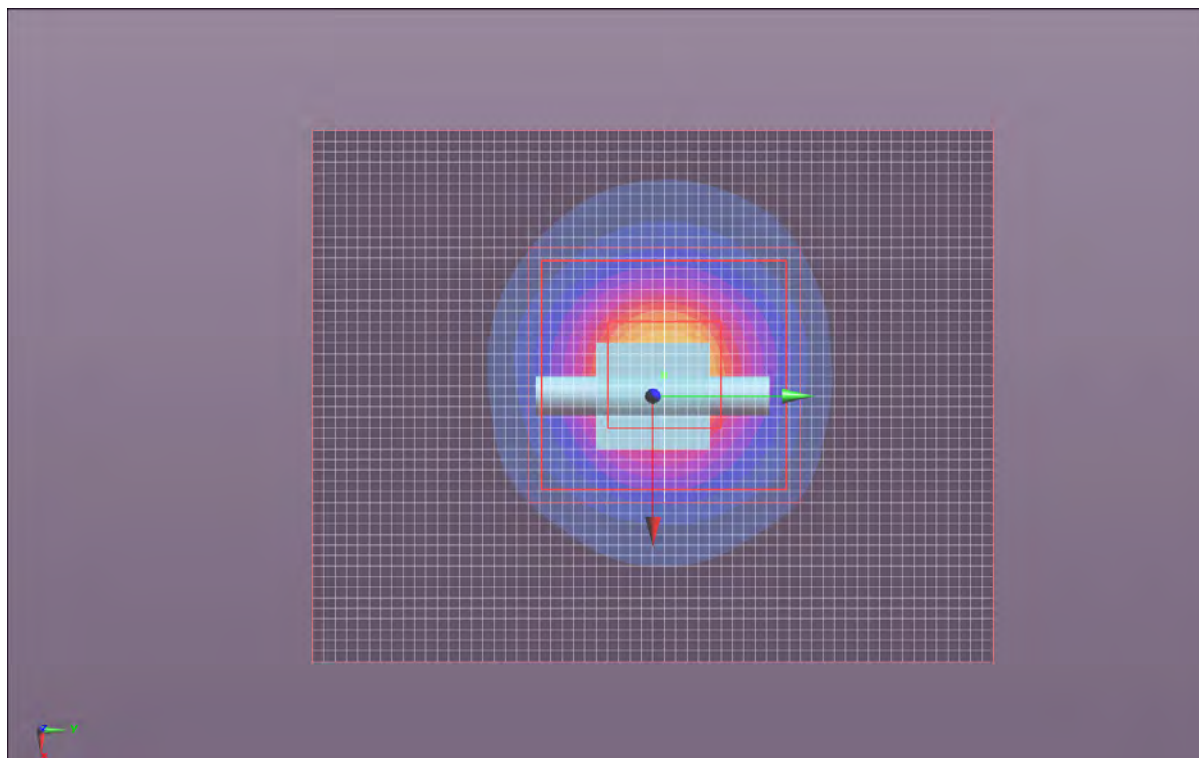
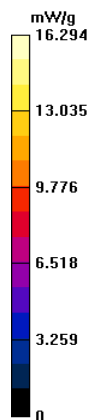
Peak SAR (extrapolated) = 25.977 W/kg

SAR(1 g) = 6.68 mW/g; SAR(10 g) = 1.89 mW/g

Maximum value of SAR (measured) = 14.283 mW/g

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

Maximum value of Total (measured) = 53.890 V/m



EMC

System Verification

Room Temperature (°C):	23.6	Humidity (%):	43.6	Test Date:	07/27/11
Liquid Temperature (°C):	22.2	Barometric Pressure (mb):	1021.6	Tested by:	Jennifer Herrett and Ethan Schoonover

MSL501 System Checks_5800MHz 7-28-11b

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

Communication System: CW; Frequency: 5800 MHz

Medium parameters used: $f = 5800$ MHz; $\sigma = 6.054$ mho/m; $\epsilon = 46.685$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 6.05394$ mho/m, $\epsilon = 46.6849$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(3.87, 3.87, 3.87); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096

Measurement SW: DASY52, 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) = 10.275 mW/g

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

Maximum value of Total (measured) = 36.222 V/m

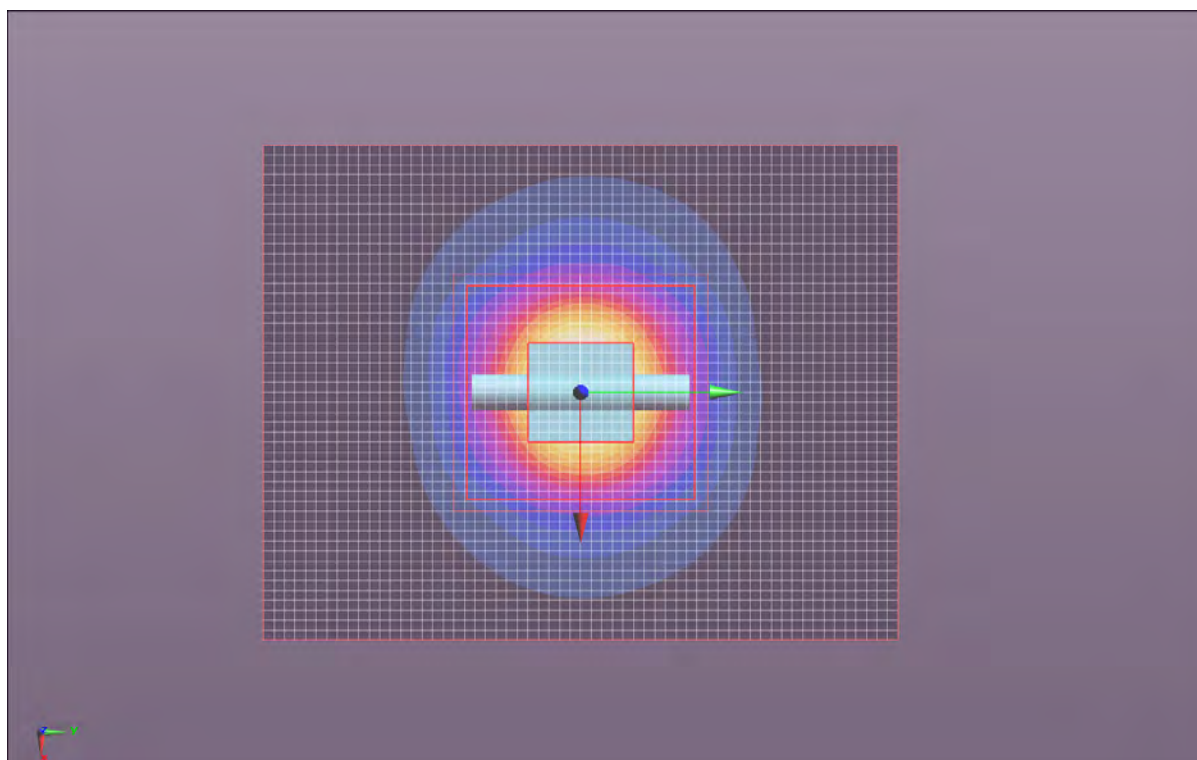
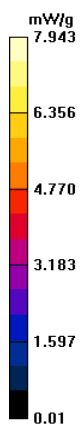
System Check/System Check - High Channel/Zoom Scan (7x9x7) (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 36.652 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 19.395 W/kg

SAR(1 g) = 4.64 mW/g; SAR(10 g) = 1.31 mW/g

Maximum value of SAR (measured) = 9.994 mW/g



EMC

System Verification

Room Temperature (°C):	23.3	Humidity (%):	50.5	Test Date:	07/29/11
Liquid Temperature (°C):	21.9	Barometric Pressure (mb):	1018.5	Tested by:	Ethan Schoonover

MSL501 System Checks_5200MHz 7-29-11

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

Communication System: CW; Frequency: 5200 MHz

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.245$ mho/m; $\epsilon = 47.849$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.24548$ mho/m, $\epsilon = 47.8493$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.16, 4.16, 4.16); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096

Measurement SW: DASYS2, 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 = 55.349 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 26.264 W/kg

SAR(1 g) = 6.93 mW/g; SAR(10 g) = 1.98 mW/g

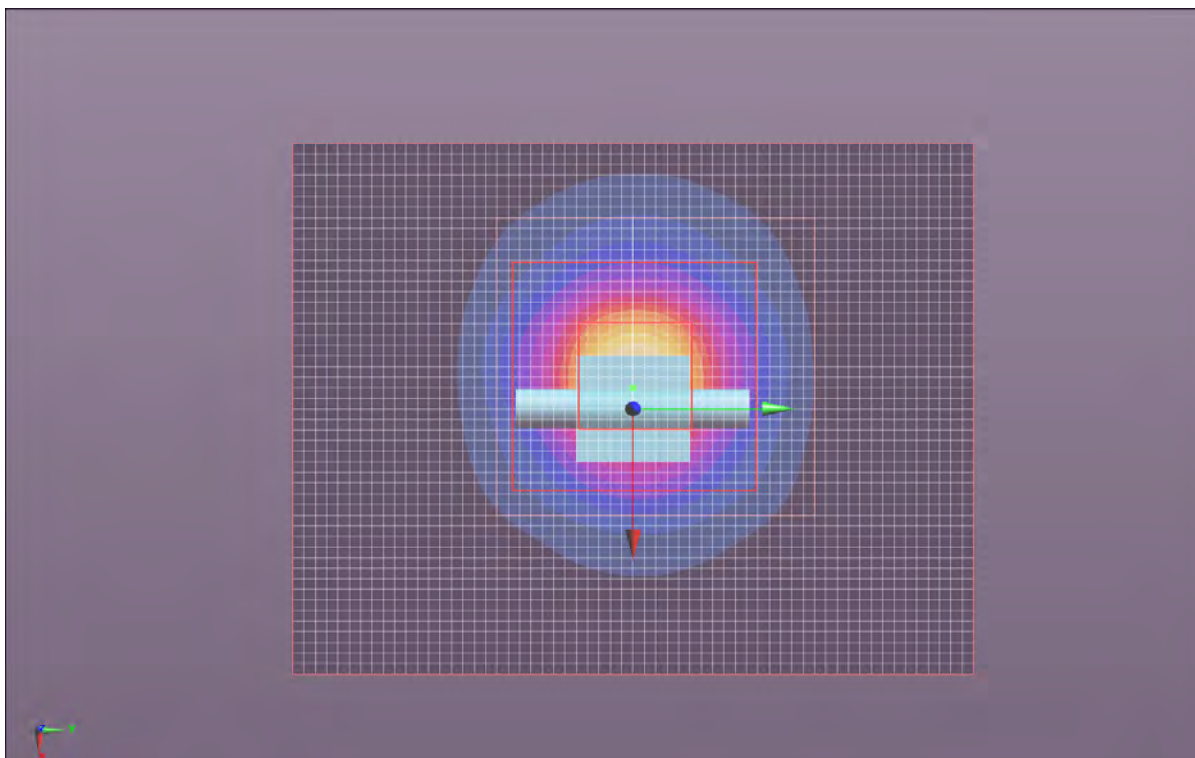
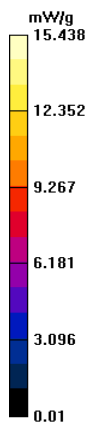
Maximum value of SAR (measured) = 14.420 mW/g

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

Maximum value of SAR (interpolated) = 15.055 mW/g

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

Maximum value of Total (measured) = 54.250 V/m



EMC

System Verification

Room Temperature (°C):	23.4	Humidity (%):	48.5	Test Date:	08/02/11
Liquid Temperature (°C):	21	Barometric Pressure (mb):	1017	Tested by:	Jennifer Herrett

HSL501 System Checks_5200MHz 8-2-11

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

Communication System: CW; Frequency: 5200 MHz

Medium parameters used: $\sigma = 4.64872$ mho/m, $\epsilon = 36.266$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5200$ MHz; $\sigma = 4.649$ mho/m; $\epsilon = 36.266$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(5.08, 5.08, 5.08); Calibrated: 11/11/2010

Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 2mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: SAM with CRP; Type: SAM; Serial: 1598

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

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

Maximum value of Total (measured) = 67.547 V/m

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

Reference Value = 58.797 V/m; Power Drift = -0.10 dB

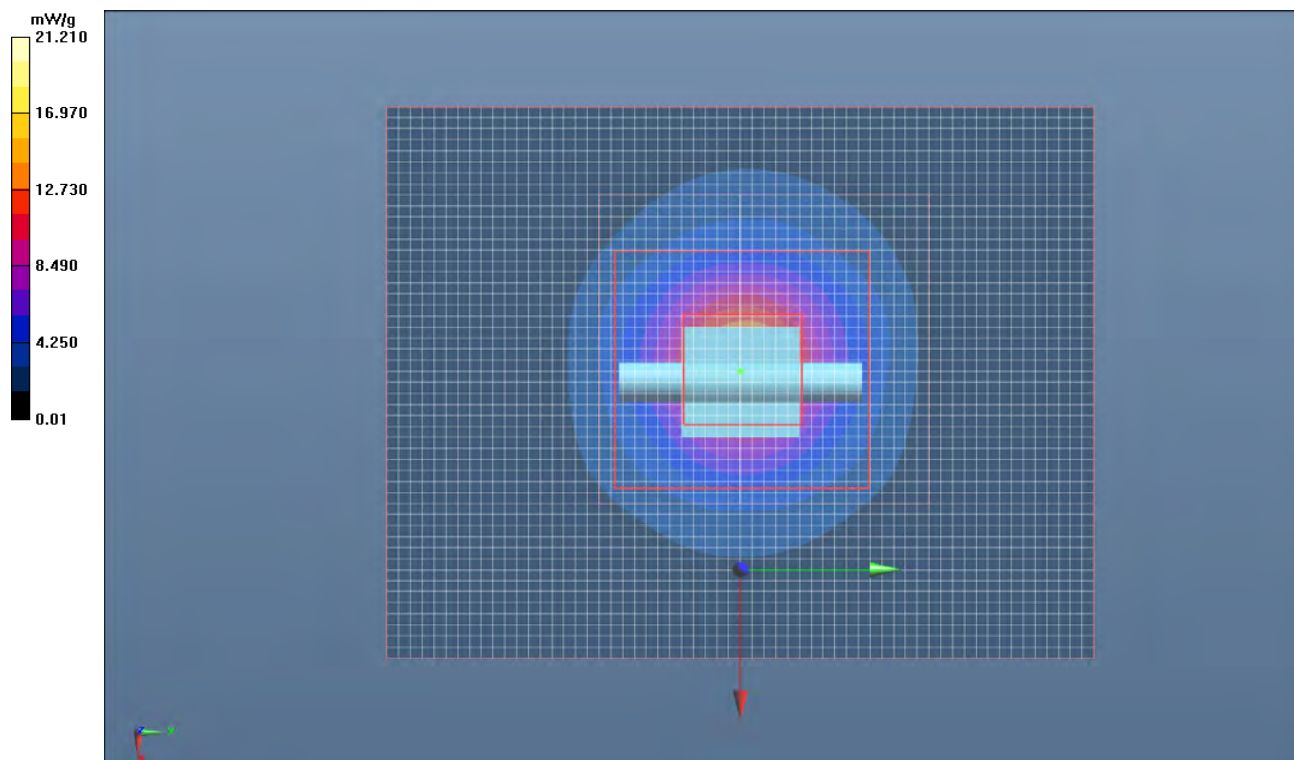
Peak SAR (extrapolated) = 31.802 W/kg

SAR(1 g) = 7.34 mW/g; SAR(10 g) = 2.1 mW/g

Maximum value of SAR (measured) = 15.345 mW/g

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

Maximum value of SAR (interpolated) = 15.697 mW/g



EMC

System Verification

Room Temperature (°C):	23.6	Humidity (%):	47.7	Test Date:	08/03/11
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1015.8	Tested by:	Jennifer Herrett

HSL501 System Checks_5500MHz 8-3-11

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

Communication System: CW; Frequency: 5500 MHz

Medium parameters used: $f = 5500$ MHz; $\sigma = 4.97$ mho/m; $\epsilon = 35.61$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 4.97046$ mho/m, $\epsilon = 35.6104$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASYS Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.37, 4.37, 4.37); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: SAM with CRP; Type: SAM; Serial: 1598

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) = 17.052 mW/g

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

Maximum value of Total (measured) = 70.355 V/m

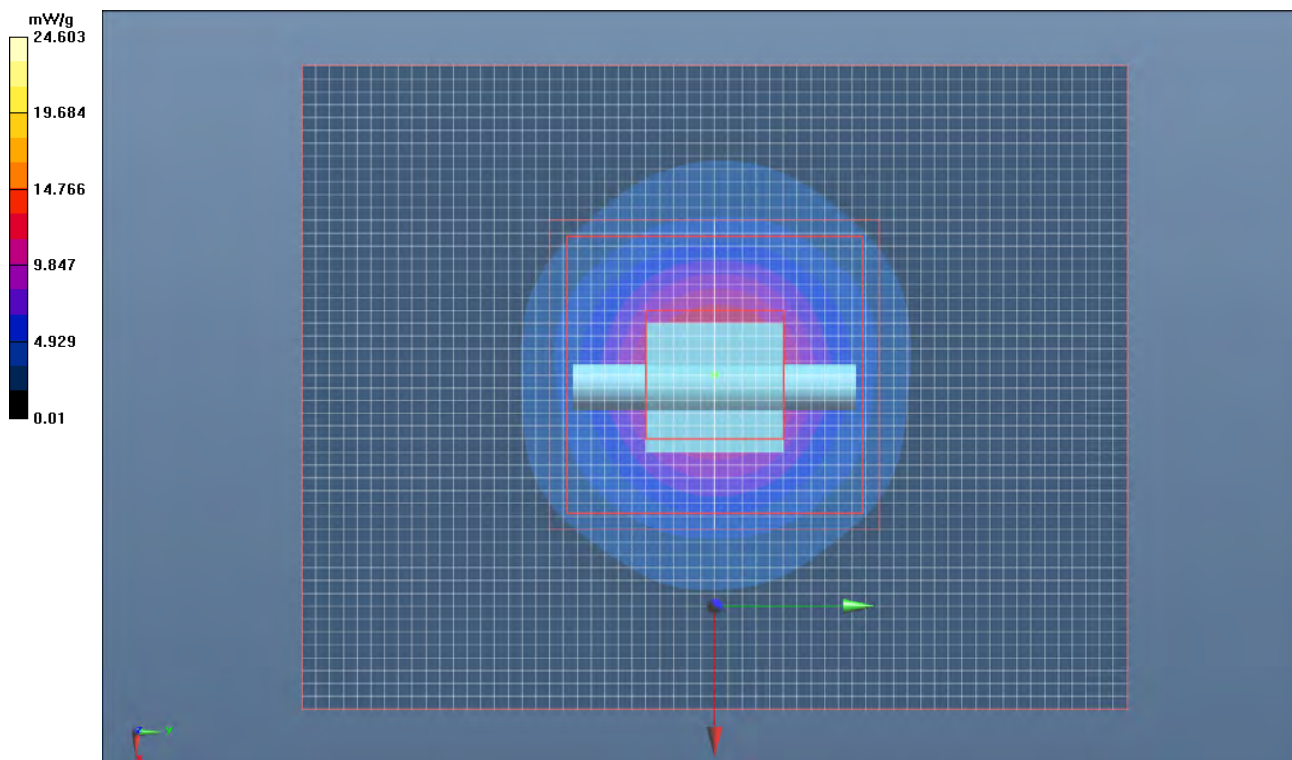
System Check/System Check - Mid Channel/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 61.580 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 30.931 W/kg

SAR(1 g) = 7.59 mW/g; SAR(10 g) = 2.16 mW/g

Maximum value of SAR (measured) = 16.078 mW/g



NORTHWEST					SAR 2011.02.07	
EMC		System Verification				
Room Temperature (°C):	23.6	Humidity (%):	47.7	Test Date:	08/03/11	
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1015.8	Tested by:	Jennifer Herrett	

HSL501 System Checks_5800MHz 8-3-11

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

Communication System: CW; Frequency: 5800 MHz
Medium parameters used: $\sigma = 5.35086$ mho/m, $\epsilon = 35.0764$; $\rho = 1000$ kg/m³ , Medium parameters used: f = 5800 MHz; $\sigma = 5.351$ mho/m; $\epsilon = 35.076$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

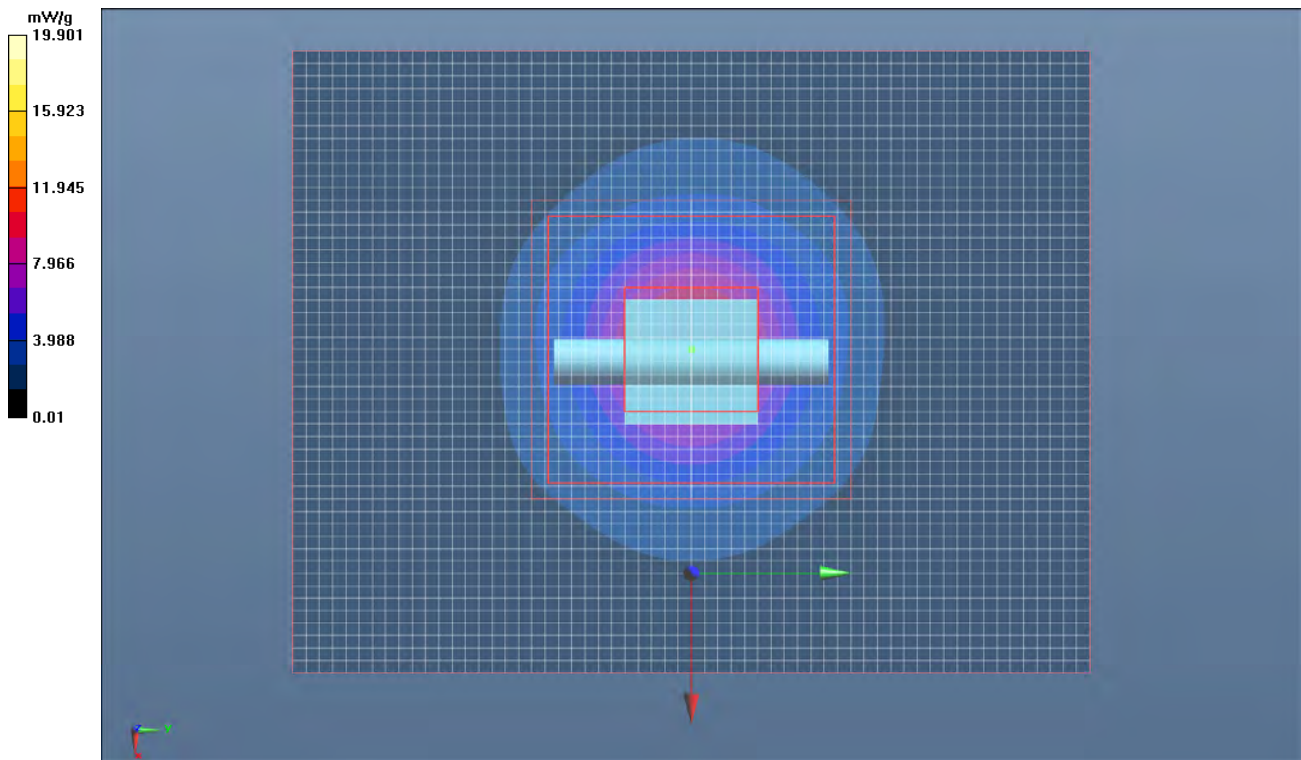
DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.14, 4.14, 4.14); Calibrated: 11/11/2010
Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

System Check/System Check - High Channel/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 60.986 V/m

System Check/System Check - High Channel/Area Scan (51x61x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 12.366 mW/g

System Check/System Check - High Channel/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 52.445 V/m; Power Drift = 0.0086 dB
Peak SAR (extrapolated) = 25.115 W/kg
SAR(1 g) = 5.86 mW/g; SAR(10 g) = 1.68 mW/g
Maximum value of SAR (measured) = 12.619 mW/g



EMC

System Verification

Room Temperature (°C):	21.8	Humidity (%):	47.2	Test Date:	08/04/11
Liquid Temperature (°C):	21.2	Barometric Pressure (mb):	1014.4	Tested by:	Jennifer Herrett

MSL2450 System Check_2450MHz 8-4-11

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

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.995$ mho/m; $\epsilon = 50.233$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.99534$ mho/m, $\epsilon = 50.233$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(6.81, 6.81, 6.81); Calibrated: 11/11/2010

Sensor-Surface: 5mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096

Measurement SW: DASY52, 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) = 5.151 mW/g

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

Maximum value of Total (measured) = 61.739 V/m

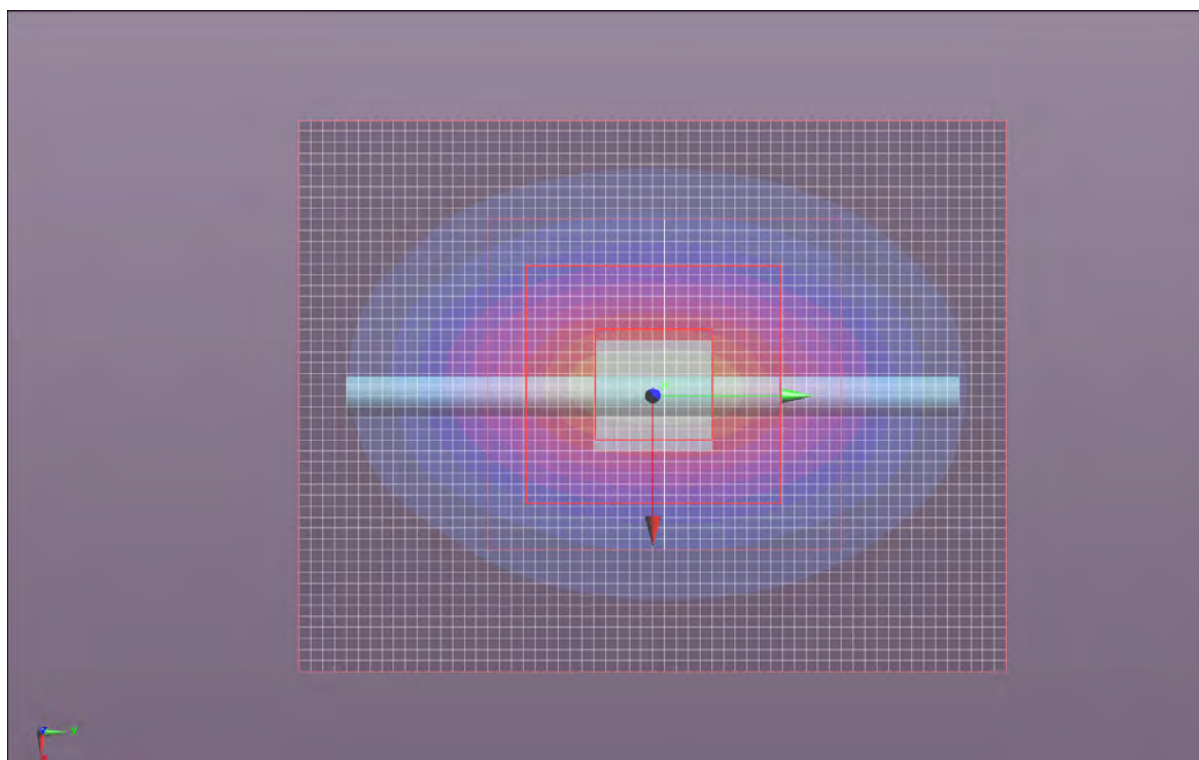
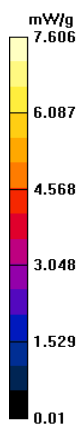
System Check/System Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 50.121 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 10.049 W/kg

SAR(1 g) = 4.91 mW/g; SAR(10 g) = 2.28 mW/g

Maximum value of SAR (measured) = 4.915 mW/g



EMC

System Verification

Room Temperature (°C):	25.2	Humidity (%):	45.6	Test Date:	08/05/11
Liquid Temperature (°C):	23.7	Barometric Pressure (mb):	1018.9	Tested by:	Jennifer Herrett

HSL2450 System Check_2450MHz 8-5-11

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

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.832$ mho/m; $\epsilon = 37.705$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.83175$ mho/m; $\epsilon = 37.7045$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(6.69, 6.69, 6.69); Calibrated: 11/11/2010

Sensor-Surface: 5mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: SAM with CRP; Type: SAM; Serial: 1598

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) = 5.232 mW/g

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

Maximum value of Total (measured) = 72.673 V/m

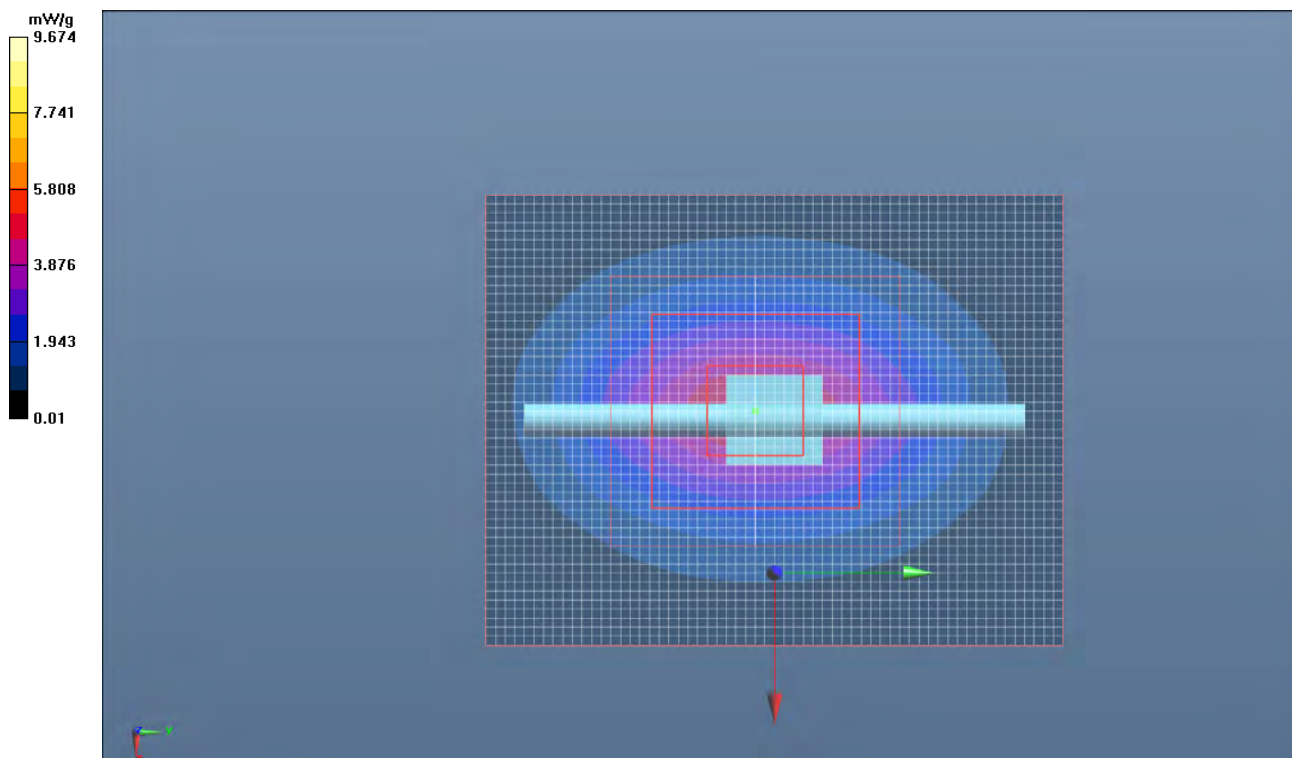
System Check/System Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.283 V/m; Power Drift = 0.0097 dB

Peak SAR (extrapolated) = 10.977 W/kg

SAR(1 g) = 5.16 mW/g; SAR(10 g) = 2.38 mW/g

Maximum value of SAR (measured) = 5.061 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 body. The only Intermec approved accessory for body worn operation is a holster that contains metal. The EUT can only fit in the holster with the top end of the unit pointing down. The holster cup can be attached to the holster belt with either the keypad facing the user, or the side facing the user. In no case can the back of the EUT face the user. For body worn operation, the keypad side was tested. The holster provides 1.5 cm spacing from the keypad side to the flat phantom.

The 802.11a/b/g/n antenna is on the right side of the EUT. Preliminary testing showed the SAR distribution to be localized to the antenna so for body worn operation, the right side was also tested. The holster provides 1.2 cm spacing from the right side to the flat phantom.

An optional snap-on audio accessory is available. It connects to the bottom end of the unit and provides a standard audio jack for connection of a VR10 headset. Measurements were made with and without the headset. Its contribution to measured SAR was determined to be of no consequence.

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

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 $< 0.8 \text{ W/kg}$, 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		SAR TEST DATA		SAR 2011.02.07	
EMC					
EUT: 1000CP01S			Work Order: ITRM0248		
Serial Number: 28311047060			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: Jennifer Herrett			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 #	3	<i>Signature</i> 			

Test Configuration	Frequency Band	Body-Worn Accessory	Transmit Frequency	Transmit Channel	Transmit Mode	Data Rate (Mbps)	Audio Accessory	EUT Position	Start Power (Conducted)	SAR Drift During Test (dB)	1g SAR Level	Test #
Head	2450	None	2462	11	BPSK	1	None	Left Head-Cheek	16.3	0.0054	0.028	13
								Left Head-Tilt	16.3	0.016	0.024	14
								Right Head-Cheek	16.3	0.04	0.019	15
								Right Head-Tilt	16.3	0.5	0.022	16

Note 1: Zoom scan not performed, no hot spots detected, area scan results were less than the required system sensitivity of 0.01mW/g.

Note 2: Due to the low value of measured SAR, the SAR drift measurement was made close to the measurement noise floor and is therefore inaccurate.

NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	26.8	Humidity (%):	43.4	Test Date:	08/05/11	
Liquid Temperature (°C):	23.8	Barometric Pressure (mb):	1018.9	Tested by:	Jennifer Herrett	

Head Test 1 8-5-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 2462 MHz
Medium parameters used: $\sigma = 1.82023$ mho/m, $\epsilon = 39.1635$; $\rho = 1000$ kg/m³ , Medium parameters used (interpolated): f = 2462 MHz; $\sigma = 1.835$ mho/m; $\epsilon = 39.115$; $\rho = 1000$ kg/m³
Phantom section: Left Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(6.69, 6.69, 6.69); Calibrated: 11/11/2010
Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, 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) = 3.287 V/m

Head - Left/Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.242 V/m; Power Drift = 0.0054 dB
Peak SAR (extrapolated) = 0.053 W/kg
SAR(1 g) = 0.028 mW/g; SAR(10 g) = 0.014 mW/g

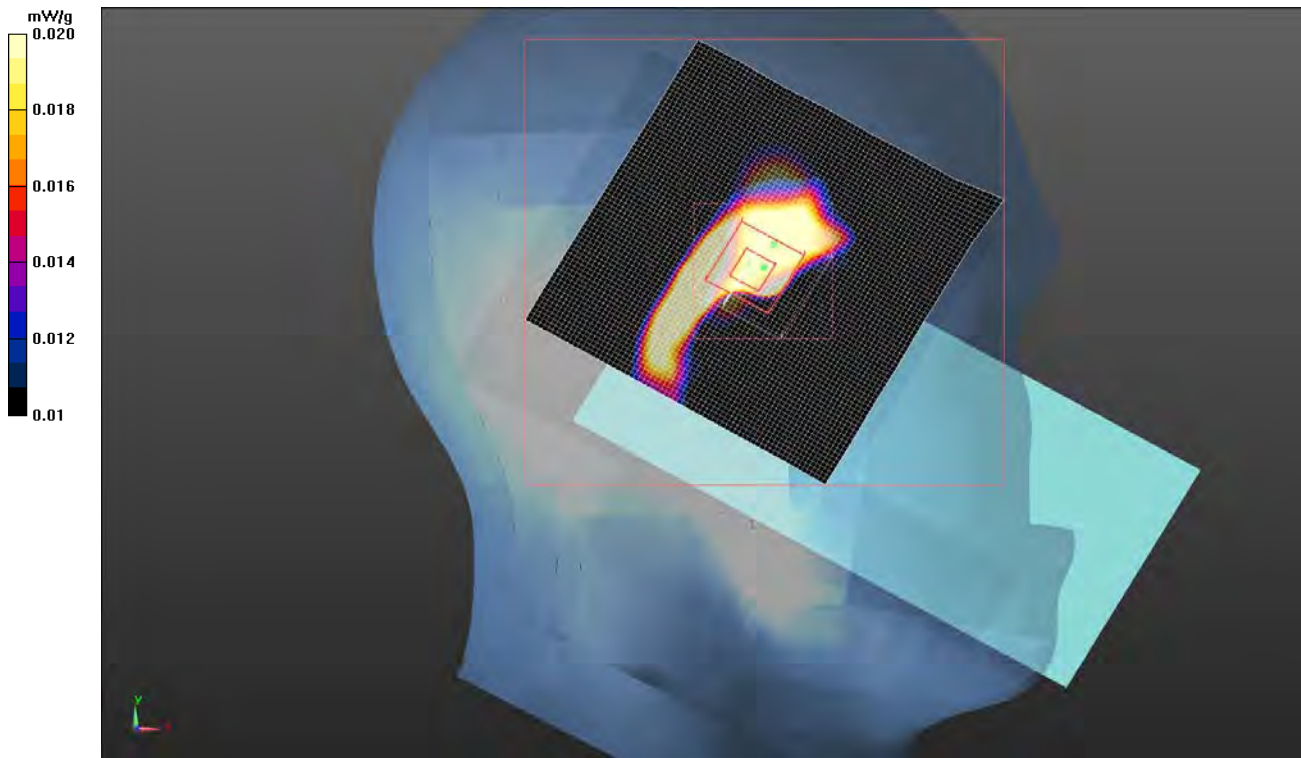
Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.035 mW/g

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.023 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) = 0.053 mW/g



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	26.8	Humidity (%):	43.4	Test Date:	08/05/11	
Liquid Temperature (°C):	23.8	Barometric Pressure (mb):	1018.9	Tested by:	Jennifer Herrett	

Head Test 2 8-5-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 2462 MHz
Medium parameters used: $\sigma = 1.82023$ mho/m, $\epsilon = 39.1635$; $\rho = 1000$ kg/m³ , Medium parameters used (interpolated): f = 2462 MHz; $\sigma = 1.835$ mho/m; $\epsilon = 39.115$; $\rho = 1000$ kg/m³
Phantom section: Left Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(6.69, 6.69, 6.69); Calibrated: 11/11/2010
Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head - Left/Tilt/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 2.968 V/m

Head - Left/Tilt/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.169 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.043 W/kg
SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.013 mW/g

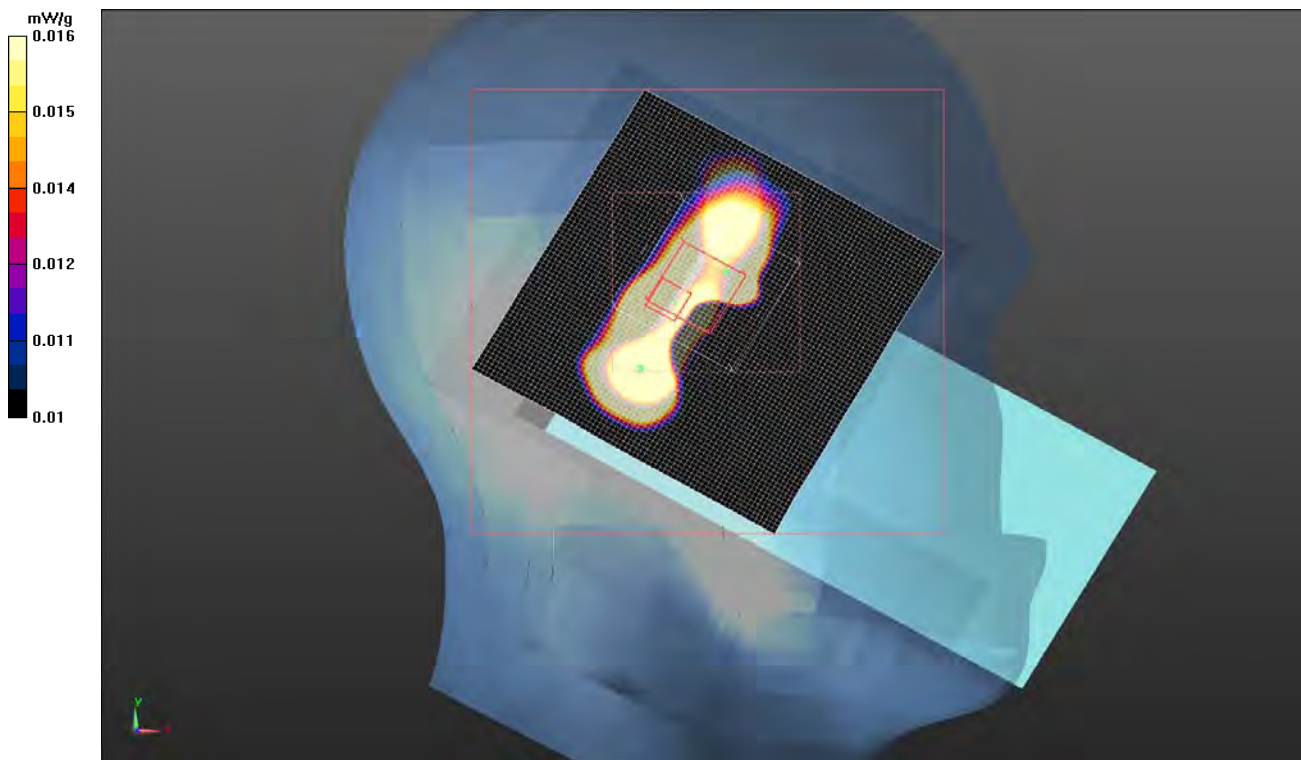
Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.030 mW/g

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.030 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) = 0.037 mW/g



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	25.2	Humidity (%):	44	Test Date:	08/05/11	
Liquid Temperature (°C):	23.6	Barometric Pressure (mb):	1018.9	Tested by:	Jennifer Herrett	

Head Test 3 8-5-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 2462 MHz
Medium parameters used (interpolated): $f = 2462\text{ MHz}$; $\sigma = 1.835\text{ mho/m}$; $\epsilon = 39.115$; $\rho = 1000\text{ kg/m}^3$, Medium parameters used: $\sigma = 1.82023\text{ mho/m}$, $\epsilon = 39.1635$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Right Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(6.69, 6.69, 6.69); Calibrated: 11/11/2010
Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head - Right/Cheek - Low/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.776 V/m; Power Drift = 0.40 dB
Peak SAR (extrapolated) = 0.040 W/kg
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.00968 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.023 mW/g

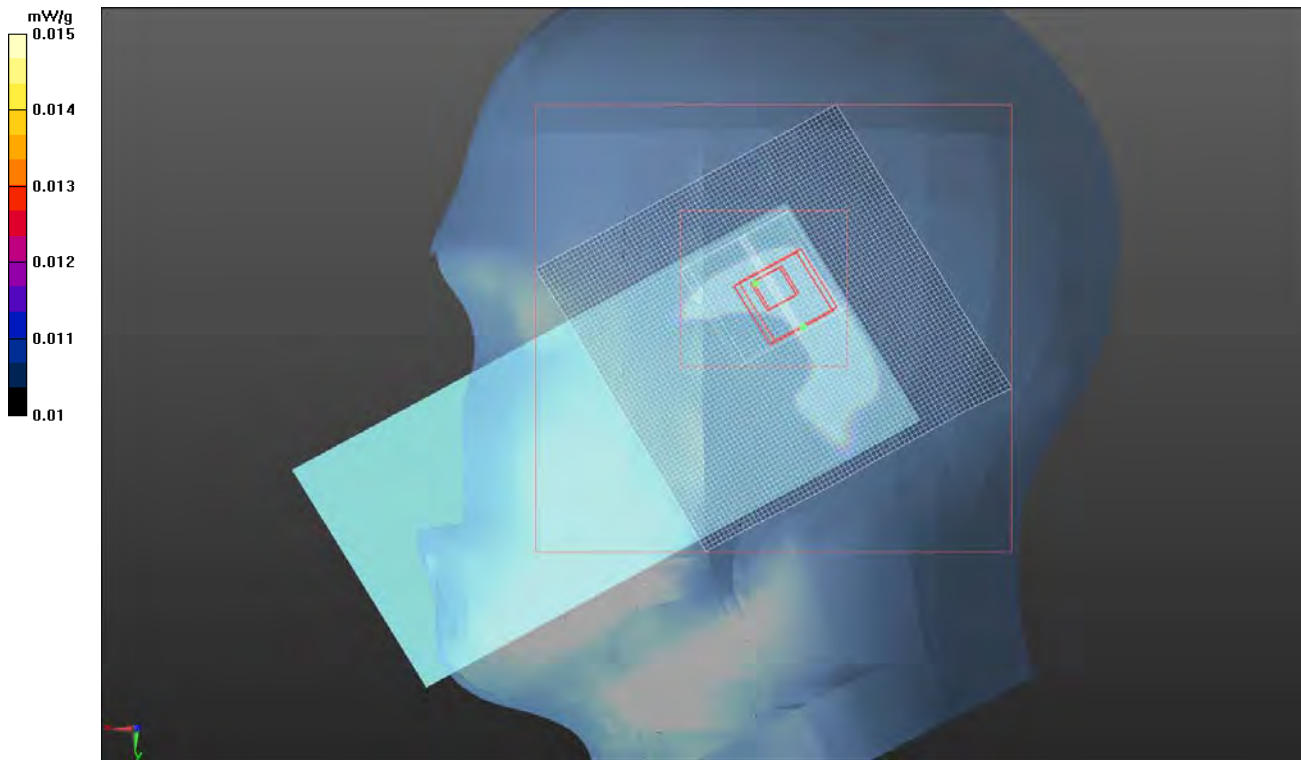
Head - Right/Cheek - Low/Area scan (71x71x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.043 mW/g

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

[Info: Interpolation.](#)
Maximum value of SAR (interpolated) = 0.042 mW/g

Head - Right/Cheek - Low/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 2.880 V/m



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	25.2	Humidity (%):	44	Test Date:	08/05/11	
Liquid Temperature (°C):	23.6	Barometric Pressure (mb):	1018.9	Tested by:	Jennifer Herrett	

Head Test 4 8-5-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 2462 MHz
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.835 mho/m; ϵ = 39.115; ρ = 1000 kg/m³ , Medium parameters used: σ = 1.82023 mho/m, ϵ = 39.1635; ρ = 1000 kg/m³
Phantom section: Right Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(6.69, 6.69, 6.69); Calibrated: 11/11/2010
Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.034 mW/g

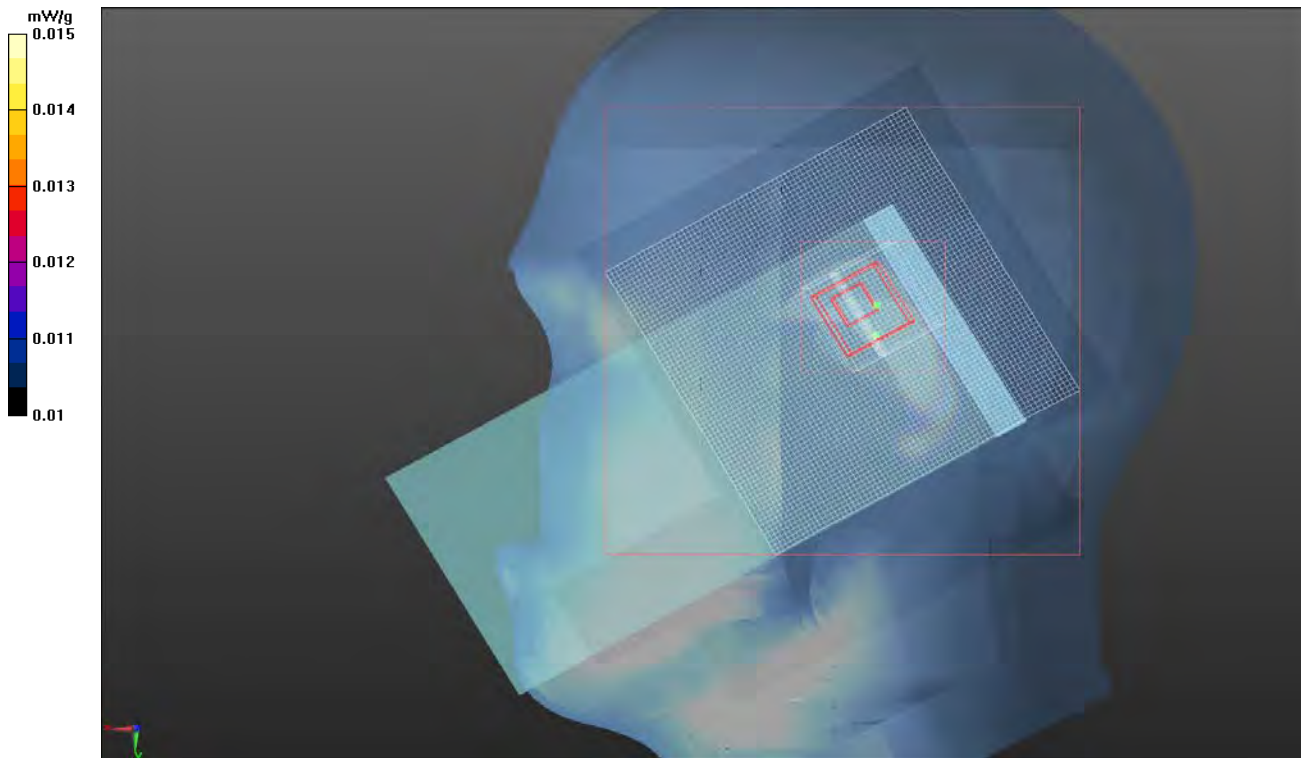
Head - Right/Tilt - Low/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 2.818 V/m

Head - Right/Tilt - Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.975 V/m; Power Drift = 0.59 dB
Peak SAR (extrapolated) = 0.034 W/kg
SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.011 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.028 mW/g

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.042 mW/g



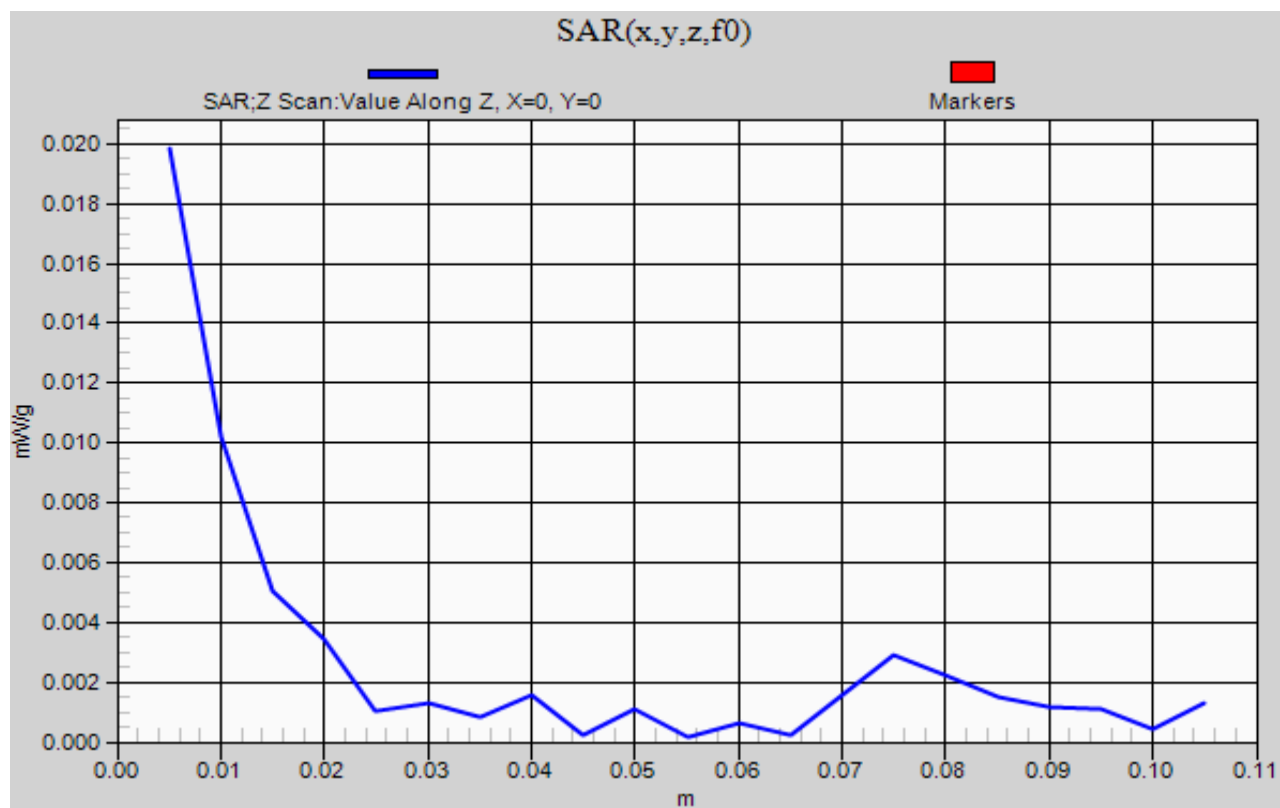
EMC

SAR TEST DATA

Room Temperature (°C):	26.8	Humidity (%):	43.4	Test Date:	08/05/11
Liquid Temperature (°C):	23.8	Barometric Pressure (mb):	1018.9	Tested by:	Jennifer Herrett

Head Test 1 8-5-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060



NORTHWEST		SAR TEST DATA		SAR 2011.02.07
EMC				
EUT:	1000CP01S	Work Order:	ITRM0248	
Serial Number:	28311047060	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:	Jennifer Herrett and 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 #	1 & 2	Signature 		

Test Configuration	Frequency Band	Body-Worn Accessory	Transmit Frequency	Transmit Channel	Transmit Mode	Data Rate (Mbps)	Audio Accessory	EUT Position	Start Power (Conducted)	SAR Drift During Test (dB)	1g SAR Level	Test #
Body	2450MHz	Holster	2462MHz	Ch 11	BPSK	1Mbps	None	Right	16.3	-0.25	0.174	1
								Front	16.3	0.05	0.007	2
							VR Headset	Right	16.3	-0.39	0.150	3
								Front	16.3	0.98	0.012	4

Note 1: Zoom scan not performed, no hot spots detected, area scan results were less than the required system sensitivity of 0.01mW/g.

Note 2: Due to the low value of measured SAR, the SAR drift measurement was made close to the measurement noise floor and is therefore inaccurate.

NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	22.8	Humidity (%):	56.7	Test Date:	08/03/11	
Liquid Temperature (°C):	22.6	Barometric Pressure (mb):	1013.9	Tested by:	Ethan Schoonover	

Body Test 1 8-3-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2462 MHz;Communication System PAR: 0 dB
Medium parameters used: $\sigma = 1.99534$ mho/m, $\epsilon = 50.233$; $\rho = 1000$ kg/m³ , Medium parameters used (interpolated): f = 2462 MHz; $\sigma = 2.011$ mho/m; $\epsilon = 50.188$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(6.81, 6.81, 6.81); Calibrated: 11/11/2010
Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096
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) = 7.720 V/m

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

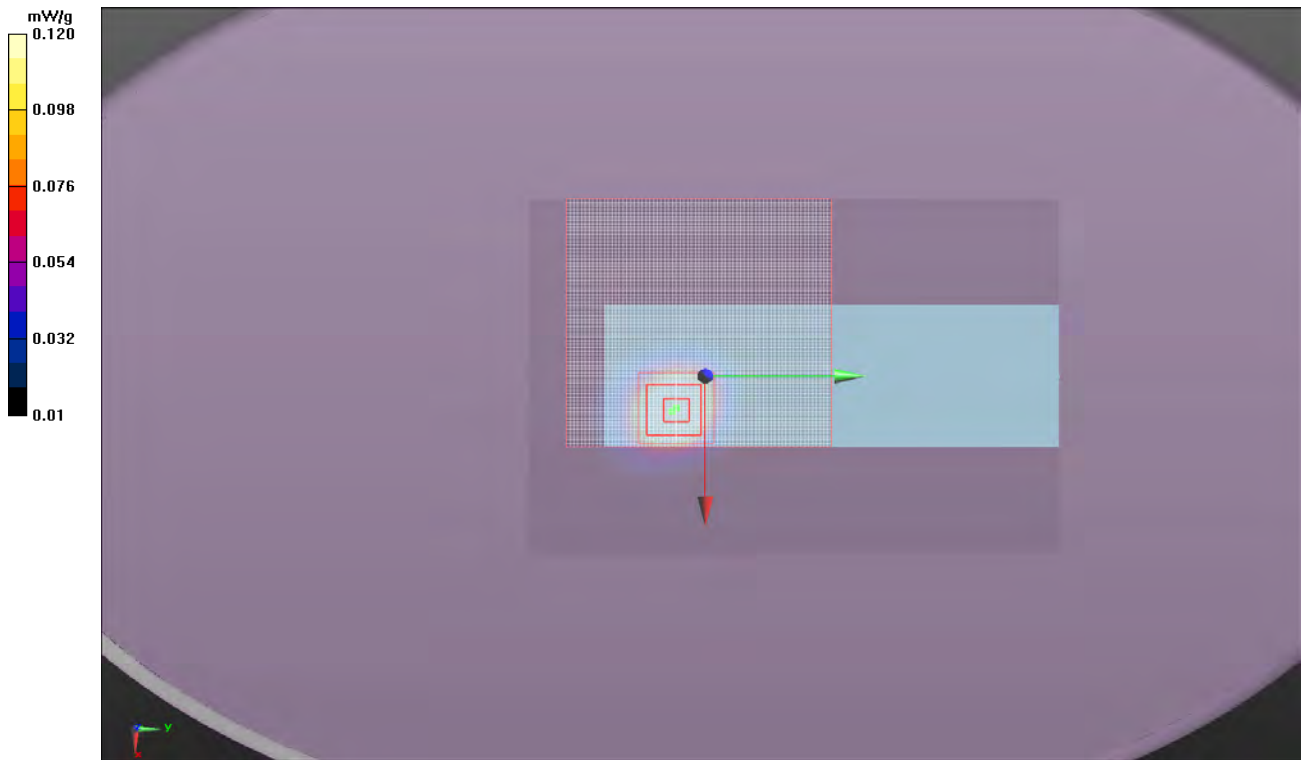
Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.260 mW/g

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.245 mW/g

Body/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.862 V/m; Power Drift = -0.25 dB
Peak SAR (extrapolated) = 0.334 W/kg
SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.083 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.224 mW/g



NORTHWEST				SAR 2011.02.07	
EMC		SAR TEST DATA			
Room Temperature (°C):	22.6	Humidity (%):	45.5	Test Date:	08/03/11
Liquid Temperature (°C):	21.9	Barometric Pressure (mb):	1013.9	Tested by:	Ethan Schoonover

Body Test 2 8-3-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2462 MHz;Communication System PAR: 0 dB
Medium parameters used: $\sigma = 1.99534$ mho/m, $\epsilon = 50.233$; $\rho = 1000$ kg/m³ , Medium parameters used (interpolated): f = 2462 MHz; $\sigma = 2.011$ mho/m; $\epsilon = 50.188$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(6.81, 6.81, 6.81); Calibrated: 11/11/2010
Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096
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) = 1.725 V/m

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

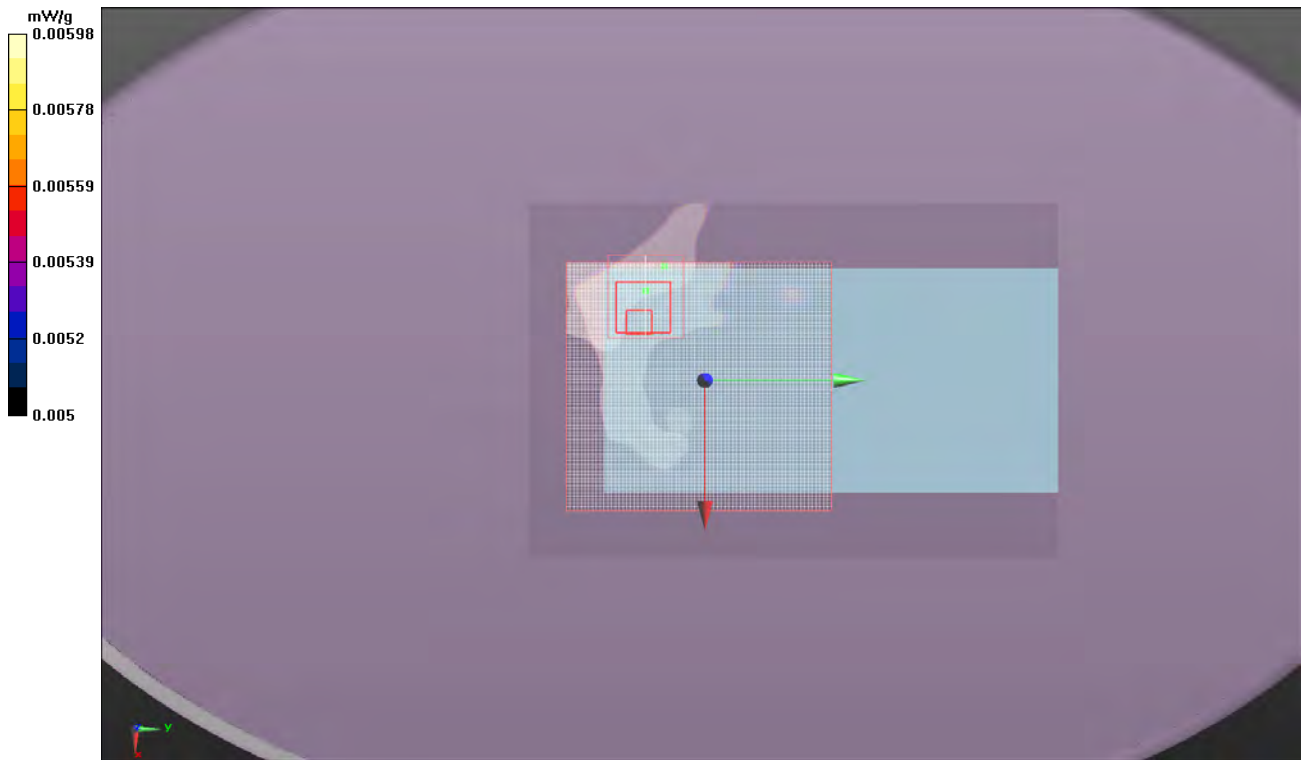
Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.014 mW/g

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.016 mW/g

Body/Body/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.454 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.041 W/kg
SAR(1 g) = 0.00727 mW/g; SAR(10 g) = 0.00245 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.010 mW/g



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	24.1	Humidity (%):	47.1	Test Date:	08/04/11	
Liquid Temperature (°C):	23	Barometric Pressure (mb):	1014.4	Tested by:	Jennifer Herrett	

Body Test 3 8-4-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 2462 MHz
Medium parameters used: $\sigma = 1.99534$ mho/m, $\epsilon = 50.233$; $\rho = 1000$ kg/m³ , Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 2.011$ mho/m; $\epsilon = 50.188$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(6.81, 6.81, 6.81); Calibrated: 11/11/2010
Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096
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) = 6.943 V/m

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

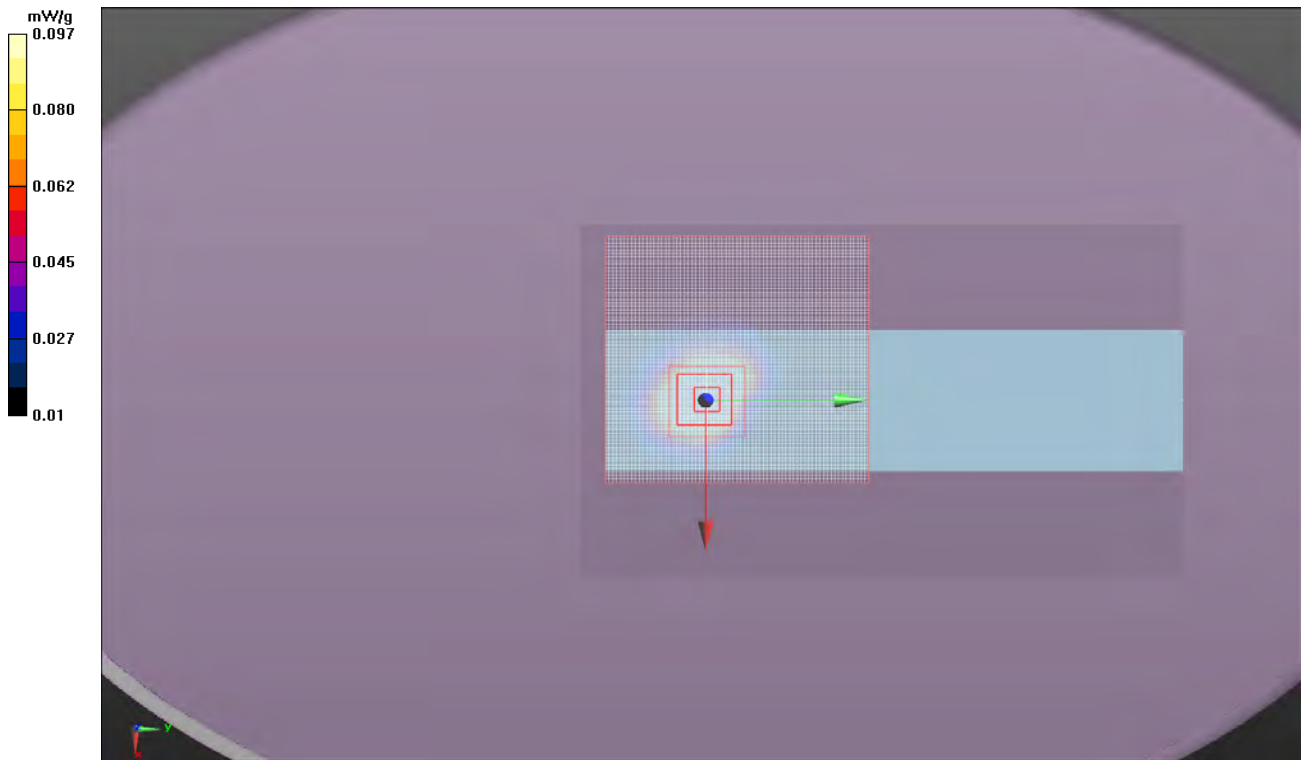
Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.213 mW/g

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.218 mW/g

Body/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.864 V/m; Power Drift = -0.39 dB
Peak SAR (extrapolated) = 0.283 W/kg
SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.074 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.191 mW/g



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	23	Humidity (%):	47.1	Test Date:	08/04/11	
Liquid Temperature (°C):	23	Barometric Pressure (mb):	1014.4	Tested by:	Jennifer Herrett	

Body Test 4 8-4-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2462 MHz;Communication System PAR: 0 dB
Medium parameters used: $\sigma = 1.99534$ mho/m, $\epsilon = 50.233$; $\rho = 1000$ kg/m³ , Medium parameters used (interpolated): f = 2462 MHz; $\sigma = 2.011$ mho/m; $\epsilon = 50.188$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(6.81, 6.81, 6.81); Calibrated: 11/11/2010
Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096
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) = 2.124 V/m

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.012 mW/g

Body/Body/Area scan (101x71x1): Measurement grid: dx=15mm, dy=15mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.016 mW/g

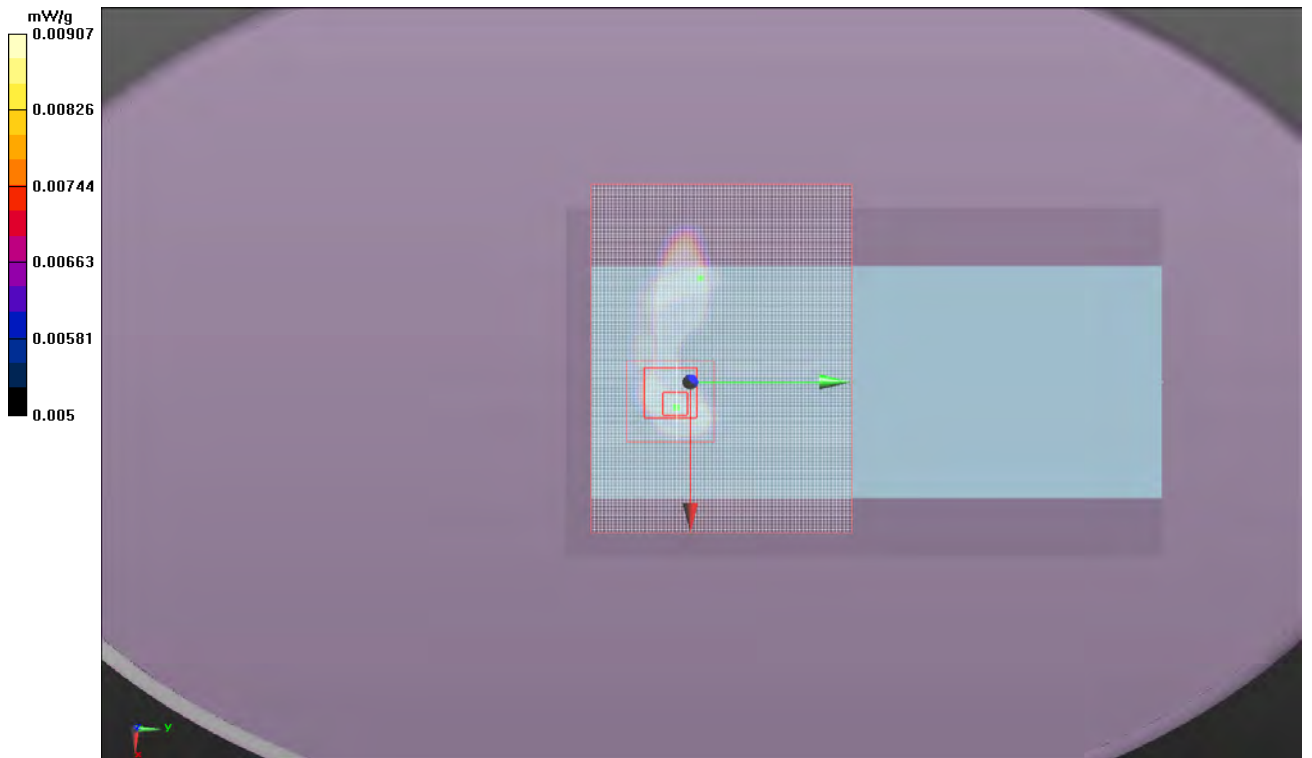
Body/Body/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.767 V/m; Power Drift = 0.98 dB
Peak SAR (extrapolated) = 0.034 W/kg
SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00663 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.014 mW/g

Date/Time: 8/4/2011 9:14:43 AM

Test Laboratory: Northwest EMC Inc.

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060



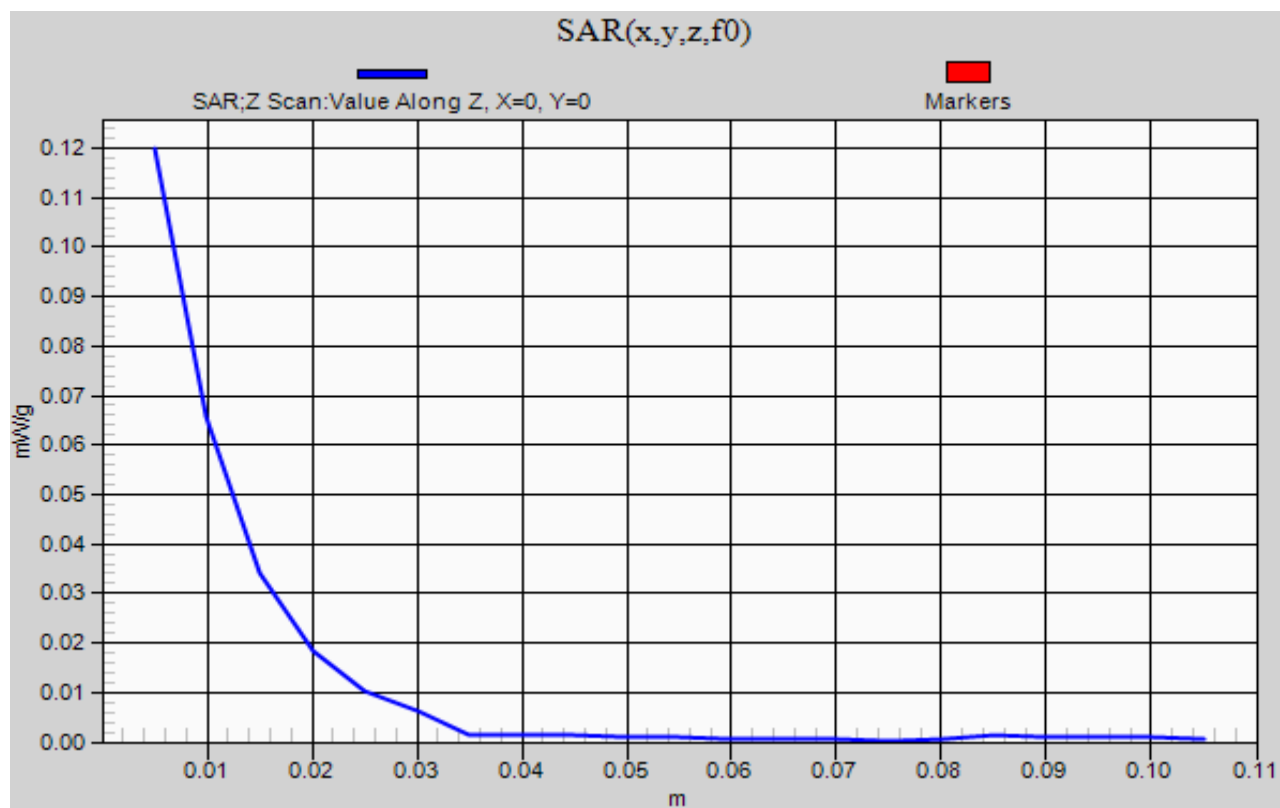
EMC

SAR TEST DATA

Room Temperature (°C):	22.8	Humidity (%):	56.7	Test Date:	08/03/11
Liquid Temperature (°C):	22.6	Barometric Pressure (mb):	1013.9	Tested by:	Ethan Schoonover

Body Test 1 8-3-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060



NORTHWEST		SAR TEST DATA		SAR 2011.02.07
EMC				
EUT: 1000CP01S		Work Order: ITRM0248		
Serial Number: 28311047060		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: Jennifer Herrett and 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 #	3	Signature 		

Test Configuration	Frequency Band	Body-Worn Accessory	Transmit Frequency	Transmit Channel	Transmit Mode	Data Rate (Mbps)	Audio Accessory	EUT Position	Start Power (Conducted)	SAR Drift During Test (dB)	1g SAR Level	Test #
Head	5200	None	5180	36	OFDM	6	None	Left Head-Cheek	12.4	-0.02	0.044	13
								Left Head-Tilt	12.4	1.16	0.019	14
								Right Head-Cheek	12.4	1.48	0.012	15
								Right Head-Tilt	12.4	0.94	0.005	16
	5300		5260	52				Left Head-Cheek	12.2	-0.14	0.043	25
								Left Head-Tilt	12.2	0.6	0.012	26
								Right Head-Cheek	12.2	-0.07	0.017	27
								Right Head-Tilt	12.2	Note 1	Note 1	28
	5600		5600	120				Left Head-Cheek	12.2	0.06	0.040	37
								Left Head-Tilt	12.2	Note 2	0.018	38
								Right Head-Cheek	12.2	0.64	0.019	39
								Right Head-Tilt	12.2	-0.15	0.012	40
	5800		5745	149				Left Head-Cheek	10.7	0.08	0.058	49
								Left Head-Tilt	10.7	0.63	0.026	50
								Right Head-Cheek	10.7	0.0012	0.021	51
								Right Head-Tilt	10.7	1.69	0.015	52

Note 1: Zoom scan not performed, no hot spots detected, area scan results were less than the required system sensitivity of 0.01mW/g.
Note 2: Due to the low value of measured SAR, the SAR drift measurement was made close to the measurement noise floor and is therefore inaccurate.

NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	23.9	Humidity (%):	48.3	Test Date:	08/01/11	
Liquid Temperature (°C):	21.9	Barometric Pressure (mb):	1017.1	Tested by:	Jennifer Herrett	

Head Test 13 8-1-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5180 MHz
Medium parameters used (interpolated): $f = 5180\text{ MHz}$; $\sigma = 4.63\text{ mho/m}$; $\epsilon = 36.31$; $\rho = 1000\text{ kg/m}^3$, Medium parameters used: $\sigma = 4.64872\text{ mho/m}$, $\epsilon = 36.266$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Left Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(5.08, 5.08, 5.08); Calibrated: 11/11/2010
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
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) = 0.061 mW/g

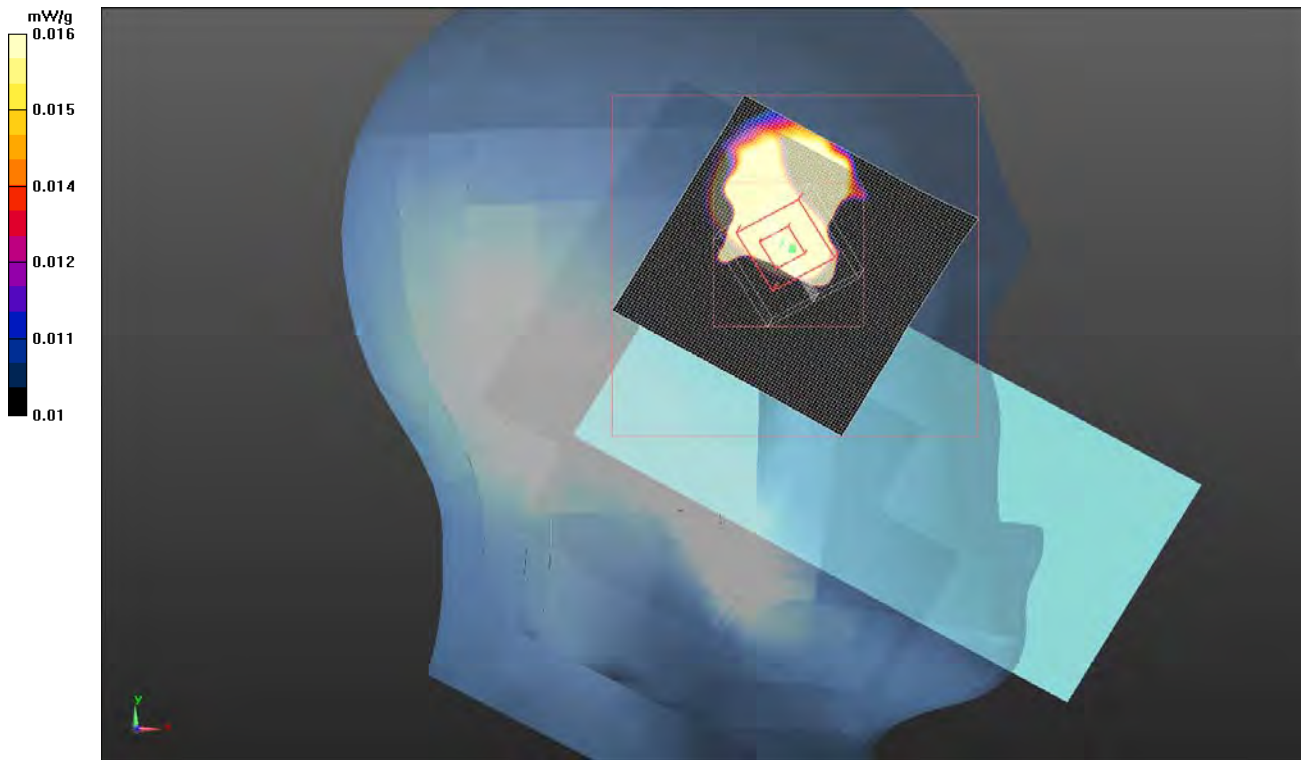
Head/Cheek/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 3.765 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.122 W/kg
SAR(1 g) = 0.044 mW/g; SAR(10 g) = 0.022 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.074 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) = 0.121 mW/g

Head/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 1.868 V/m



EMC**SAR TEST DATA**

Room Temperature (°C):	23.9	Humidity (%):	48.3	Test Date:	08/01/11
Liquid Temperature (°C):	21.8	Barometric Pressure (mb):	1017.1	Tested by:	Jennifer Herrett

Head Test 14 8-1-11

DUT: Handheld Computer (A1); Type: TBD; Serial: 28311047060

Communication System: CW; Frequency: 5180 MHz

Medium parameters used (interpolated): $f = 5180$ MHz; $\sigma = 4.63$ mho/m; $\epsilon = 36.31$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 4.64872$ mho/m, $\epsilon = 36.266$; $\rho = 1000$ kg/m³

Phantom section: Left Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(5.08, 5.08, 5.08); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: SAM with CRP; Type: SAM; Serial: 1598

Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

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

Maximum value of SAR (interpolated) = 0.022 mW/g

Head/Tilt/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 1.436 V/m

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

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

Maximum value of SAR (interpolated) = 0.078 mW/g

Head/Tilt/Zoom Scan (11x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

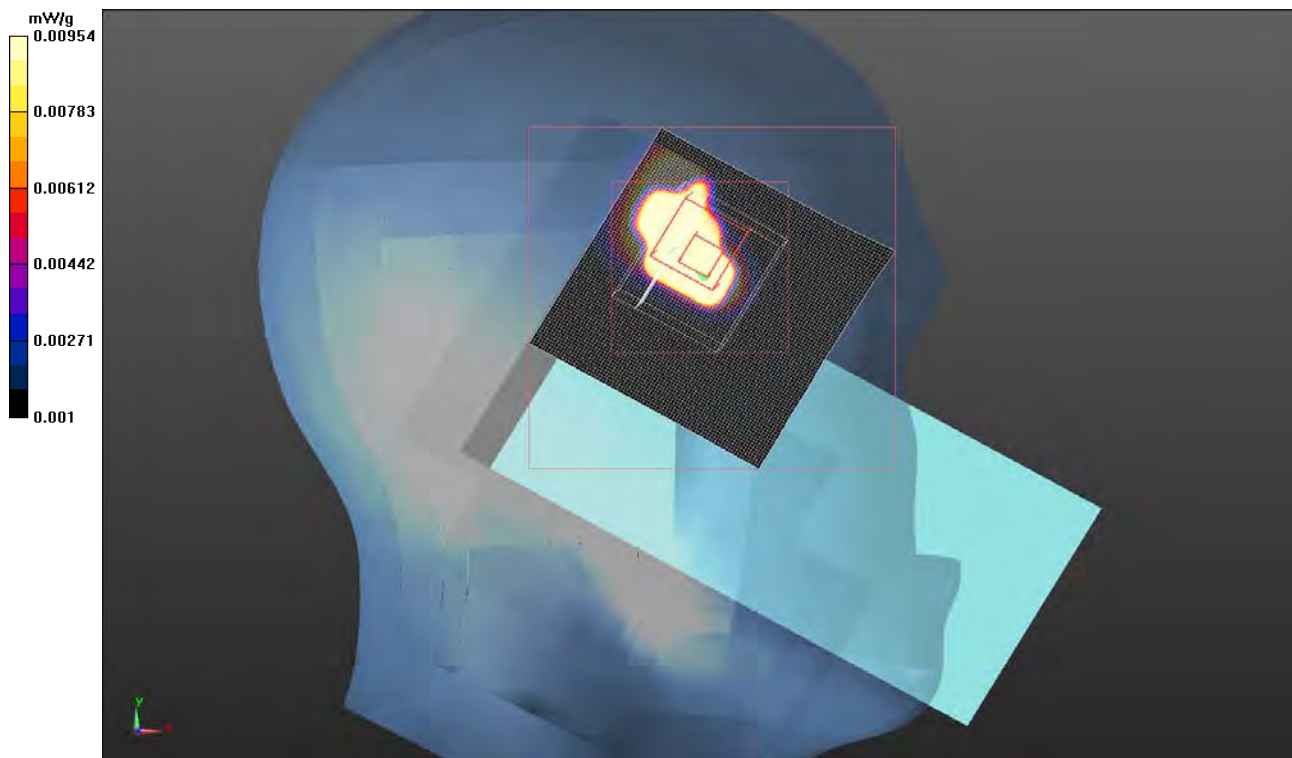
Reference Value = 2.418 V/m; Power Drift = 1.16 dB

Peak SAR (extrapolated) = 0.115 W/kg

SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.010 mW/g

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

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



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	24.2	Humidity (%):	48.5	Test Date:	08/01/11	
Liquid Temperature (°C):	22.1	Barometric Pressure (mb):	1017.1	Tested by:	Jennifer Herrett	

Head Test 15 8-1-11

DUT: Handheld Computer (A1); Type: TBD; Serial: 28311047060

Communication System: CW; Frequency: 5180 MHz
Medium parameters used (interpolated): $f = 5180\text{ MHz}$; $\sigma = 4.63\text{ mho/m}$; $\epsilon = 36.31$; $\rho = 1000\text{ kg/m}^3$, Medium parameters used: $\sigma = 4.64872\text{ mho/m}$, $\epsilon = 36.266$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Right Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(5.08, 5.08, 5.08); Calibrated: 11/11/2010
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.018 mW/g

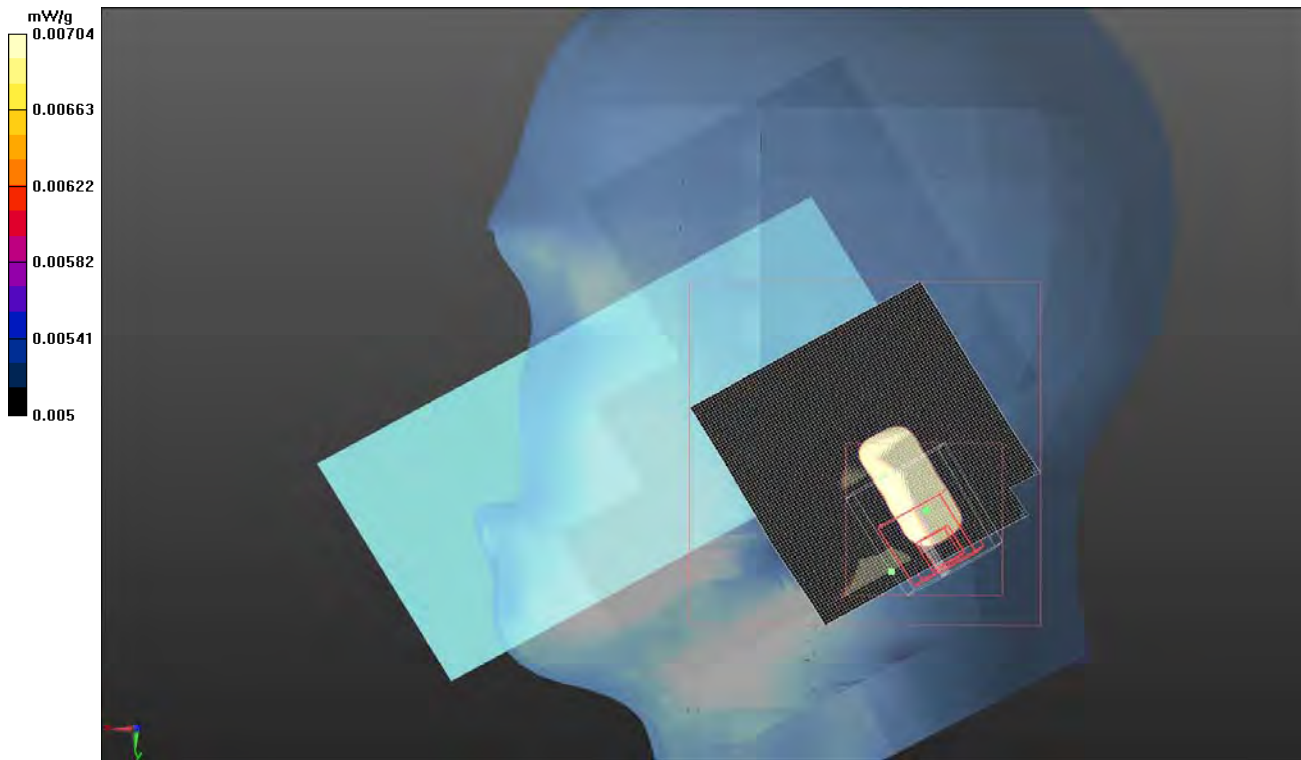
Head/Head/Zoom Scan (10x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.975 V/m; Power Drift = 1.48 dB
Peak SAR (extrapolated) = 0.114 W/kg
SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00616 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.019 mW/g

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.020 mW/g

Head/Head/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 1.233 V/m



NORTHWEST				SAR 2011.02.07	
EMC		SAR TEST DATA			
Room Temperature (°C):	24.2	Humidity (%):	48.5	Test Date:	08/01/11
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1017.1	Tested by:	Jennifer Herrett

Head Test 16 8-1-11

DUT: Handheld Computer (A1); Type: TBD; Serial: 28311047060

Communication System: CW; Frequency: 5180 MHz
Medium parameters used (interpolated): $f = 5180\text{ MHz}$; $\sigma = 4.63\text{ mho/m}$; $\epsilon = 36.31$; $\rho = 1000\text{ kg/m}^3$, Medium parameters used: $\sigma = 4.64872\text{ mho/m}$, $\epsilon = 36.266$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(5.08, 5.08, 5.08); Calibrated: 11/11/2010
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.040 mW/g

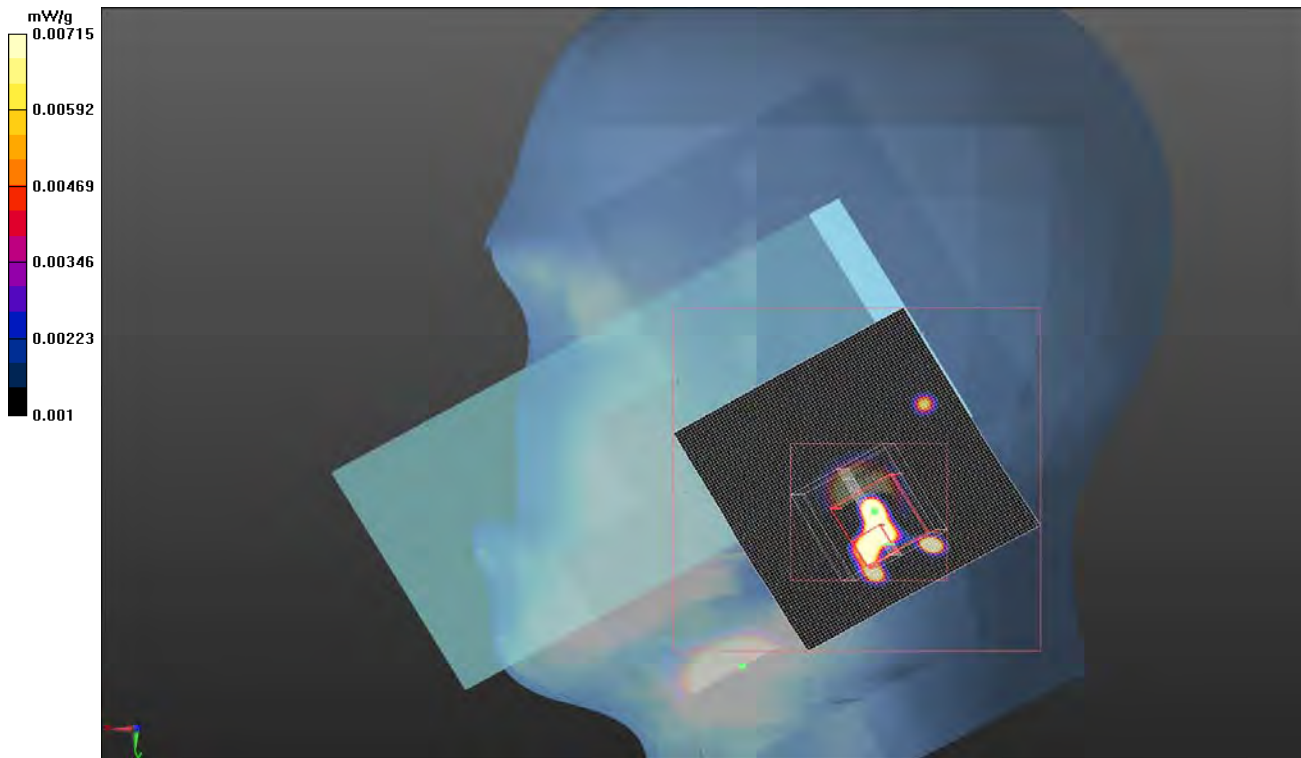
Head/Head/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 1.743 V/m; Power Drift = 0.94 dB
Peak SAR (extrapolated) = 0.072 W/kg
SAR(1 g) = 0.00522 mW/g; SAR(10 g) = 0.00149 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.015 mW/g

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.017 mW/g

Head/Head/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 1.243 V/m



NORTHWEST				SAR 2011.02.07	
EMC		SAR TEST DATA			
Room Temperature (°C):	24.2	Humidity (%):	48	Test Date:	08/02/11
Liquid Temperature (°C):	21.4	Barometric Pressure (mb):	1017	Tested by:	Jennifer Herrett

Head Test 25 8-2-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5260 MHz
Medium parameters used: $\sigma = 4.70019$ mho/m, $\epsilon = 36.1677$; $\rho = 1000$ kg/m³ , Medium parameters used (interpolated): f = 5260 MHz; $\sigma = 4.709$ mho/m; $\epsilon = 36.146$; $\rho = 1000$ kg/m³
Phantom section: Left Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.59, 4.59, 4.59); Calibrated: 11/11/2010
Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 1.903 V/m

Head/Cheek/Zoom Scan (9x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 4.785 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.124 W/kg
SAR(1 g) = 0.043 mW/g; SAR(10 g) = 0.015 mW/g

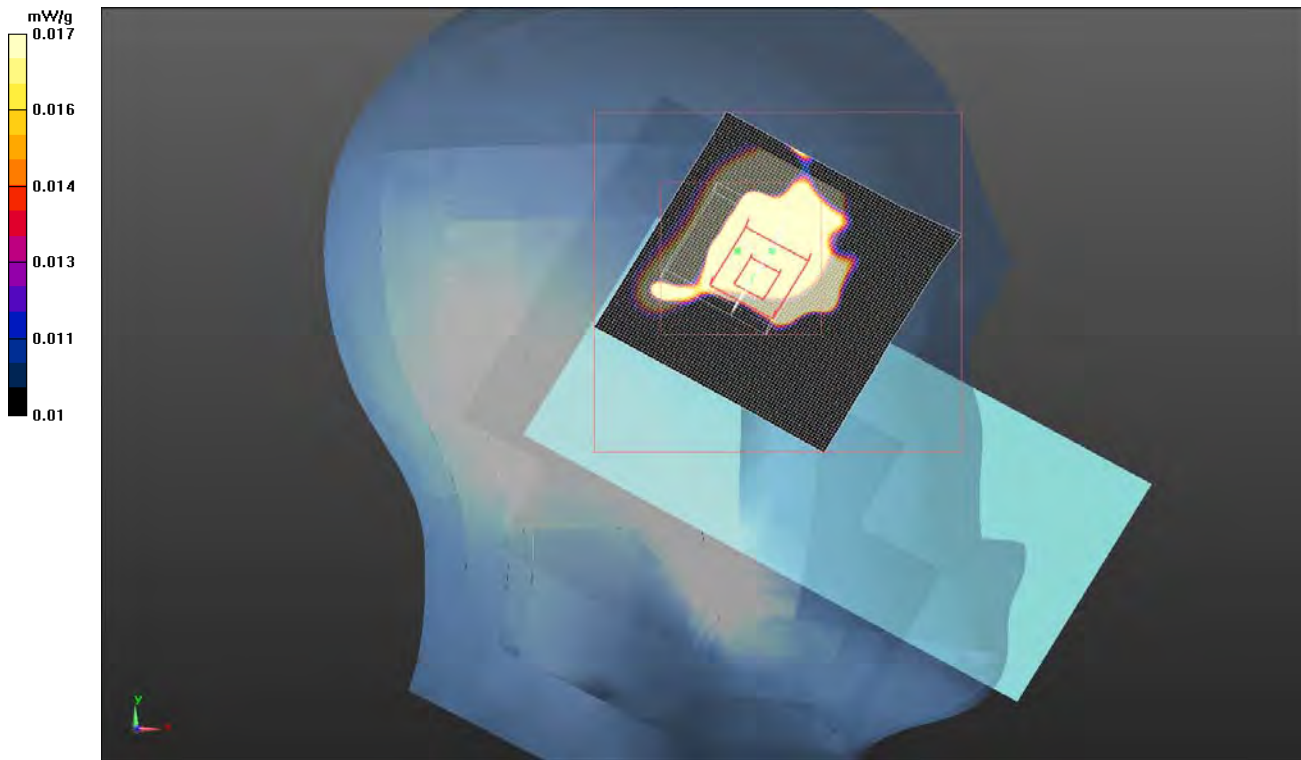
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.091 mW/g

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

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.104 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) = 0.110 mW/g



EMC**SAR TEST DATA**

Room Temperature (°C):	24.2	Humidity (%):	48.2	Test Date:	08/02/11
Liquid Temperature (°C):	21.4	Barometric Pressure (mb):	1017	Tested by:	Jennifer Herrett

Head Test 26 8-2-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5260 MHz

Medium parameters used (interpolated): $f = 5260$ MHz; $\sigma = 4.709$ mho/m; $\epsilon = 36.146$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 4.70019$ mho/m, $\epsilon = 36.1677$; $\rho = 1000$ kg/m³

Phantom section: Left Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.59, 4.59, 4.59); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection); Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: SAM with CRP; Type: SAM; Serial: 1598

Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

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

Maximum value of SAR (interpolated) = 0.059 mW/g

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

Reference Value = 2.677 V/m; Power Drift = 0.60 dB

Peak SAR (extrapolated) = 0.125 W/kg

SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00427 mW/g

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

Maximum value of SAR (measured) = 0.024 mW/g

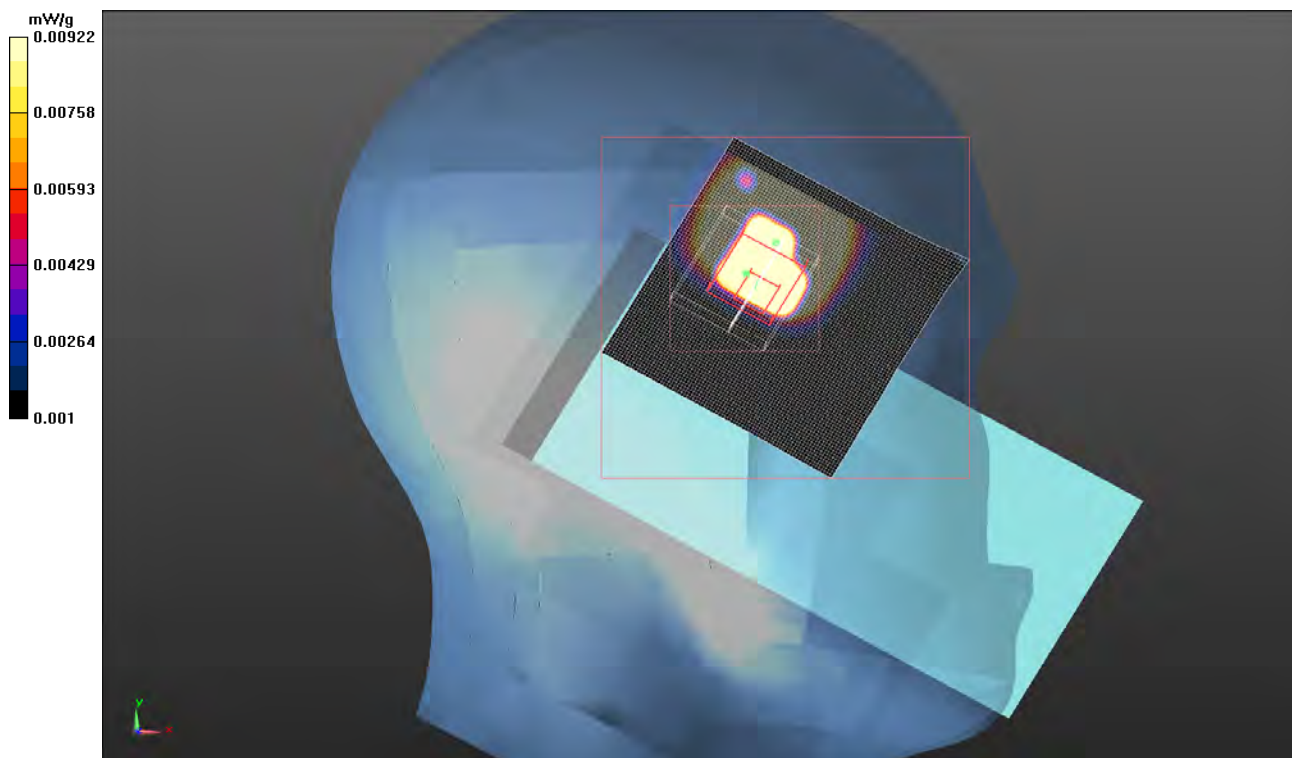
Head/Tilt/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 1.399 V/m

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

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

Maximum value of SAR (interpolated) = 0.082 mW/g



EMC

SAR TEST DATA

Room Temperature (°C):	24.4	Humidity (%):	48.1	Test Date:	08/02/11
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1016.6	Tested by:	Jennifer Herrett

Head Test 27 8-2-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5260 MHz

Medium parameters used (interpolated): $f = 5260$ MHz; $\sigma = 4.709$ mho/m; $\epsilon = 36.146$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 4.70019$ mho/m, $\epsilon = 36.1677$; $\rho = 1000$ kg/m³

Phantom section: Right Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.59, 4.59, 4.59); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: SAM with CRP; Type: SAM; Serial: 1598

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) = 0.033 mW/g

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

Maximum value of Total (measured) = 1.506 V/m

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.034 mW/g

Head/Cheek/Zoom Scan (10x11x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

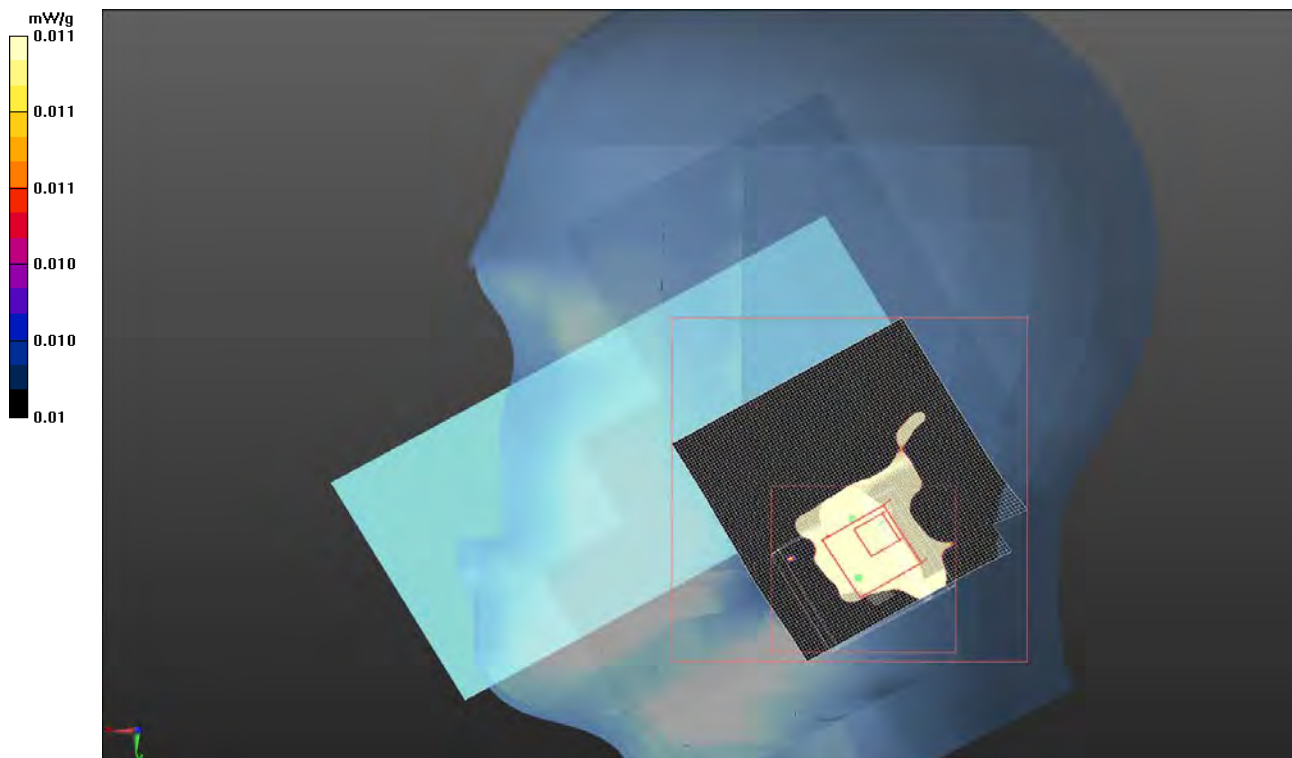
Reference Value = 2.649 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.053 W/kg

SAR(1 g) = 0.017 mW/g; SAR(10 g) = 0.00644 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.036 mW/g



NORTHWEST				SAR 2011.02.07	
EMC		SAR TEST DATA			
Room Temperature (°C):	22.9	Humidity (%):	47.8	Test Date:	08/02/11
Liquid Temperature (°C):	21.4	Barometric Pressure (mb):	1016.6	Tested by:	Ethan Schoonover

Head Test 37 8-2-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5600 MHz
Medium parameters used: f = 5600 MHz; σ = 5.099 mho/m; ϵ = 35.415; ρ = 1000 kg/m³ , Medium parameters used: σ = 5.09884 mho/m, ϵ = 35.4148; ρ = 1000 kg/m³
Phantom section: Left Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

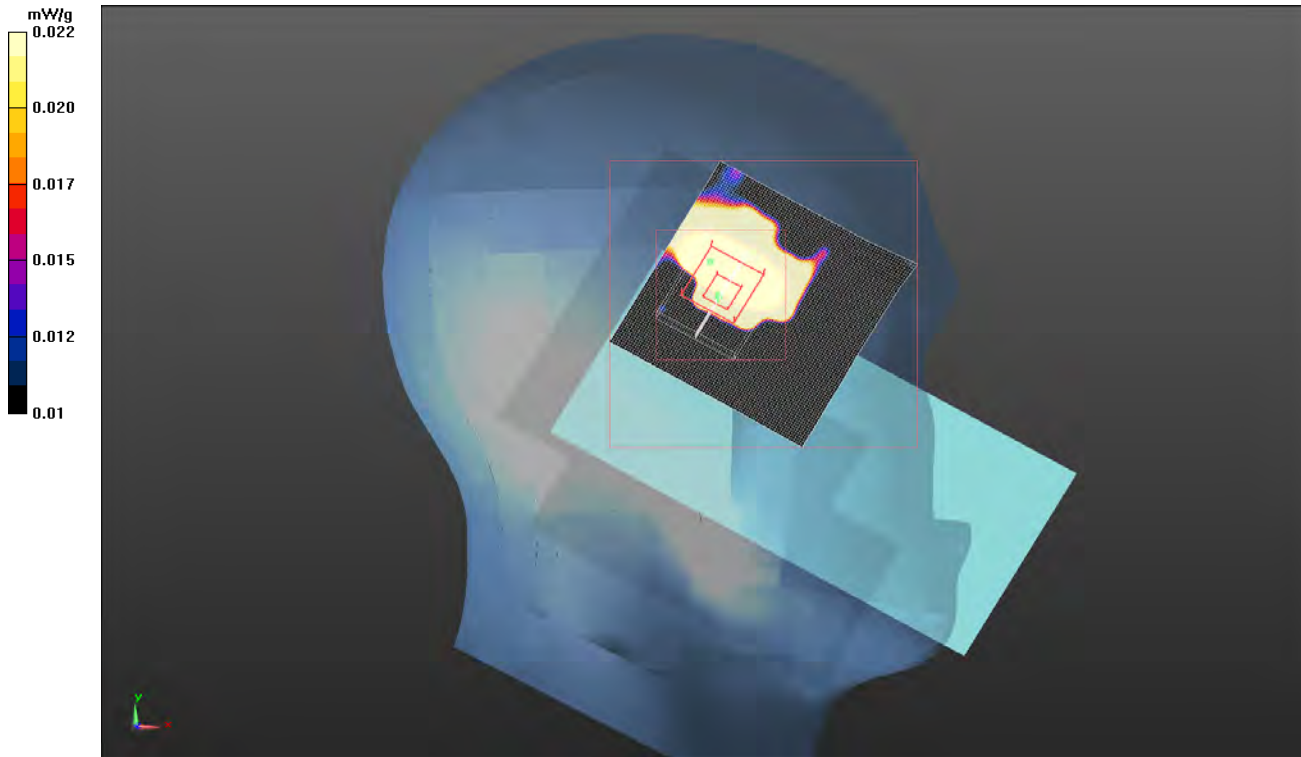
Probe: EX3DV4 - SN3746; ConvF(4.37, 4.37, 4.37); Calibrated: 11/11/2010
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Cheek/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm
Maximum value of SAR (interpolated) = 0.055 mW/g

Head/Cheek/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.129 mW/g

Head/Cheek/Zoom Scan (10x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 4.000 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.118 W/kg
SAR(1 g) = 0.040 mW/g; SAR(10 g) = 0.013 mW/g
Maximum value of SAR (measured) = 0.074 mW/g

Head/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 2.094 V/m



EMC**SAR TEST DATA**

Room Temperature (°C):	23.2	Humidity (%):	47.8	Test Date:	08/02/11
Liquid Temperature (°C):	21.3	Barometric Pressure (mb):	1016.6	Tested by:	Ethan Schoonover

Head Test 38 8-2-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5600 MHz

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.099$ mho/m; $\epsilon = 35.415$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.09884$ mho/m, $\epsilon = 35.4148$; $\rho = 1000$ kg/m³

Phantom section: Left Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.37, 4.37, 4.37); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: SAM with CRP; Type: SAM; Serial: 1598

Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Tilt/Zoom Scan (16x11x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 0 V/m; Power Drift = 999.0 dB

Peak SAR (extrapolated) = 0.183 W/kg

SAR(1 g) = 0.018 mW/g; SAR(10 g) = 0.00539 mW/g

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

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

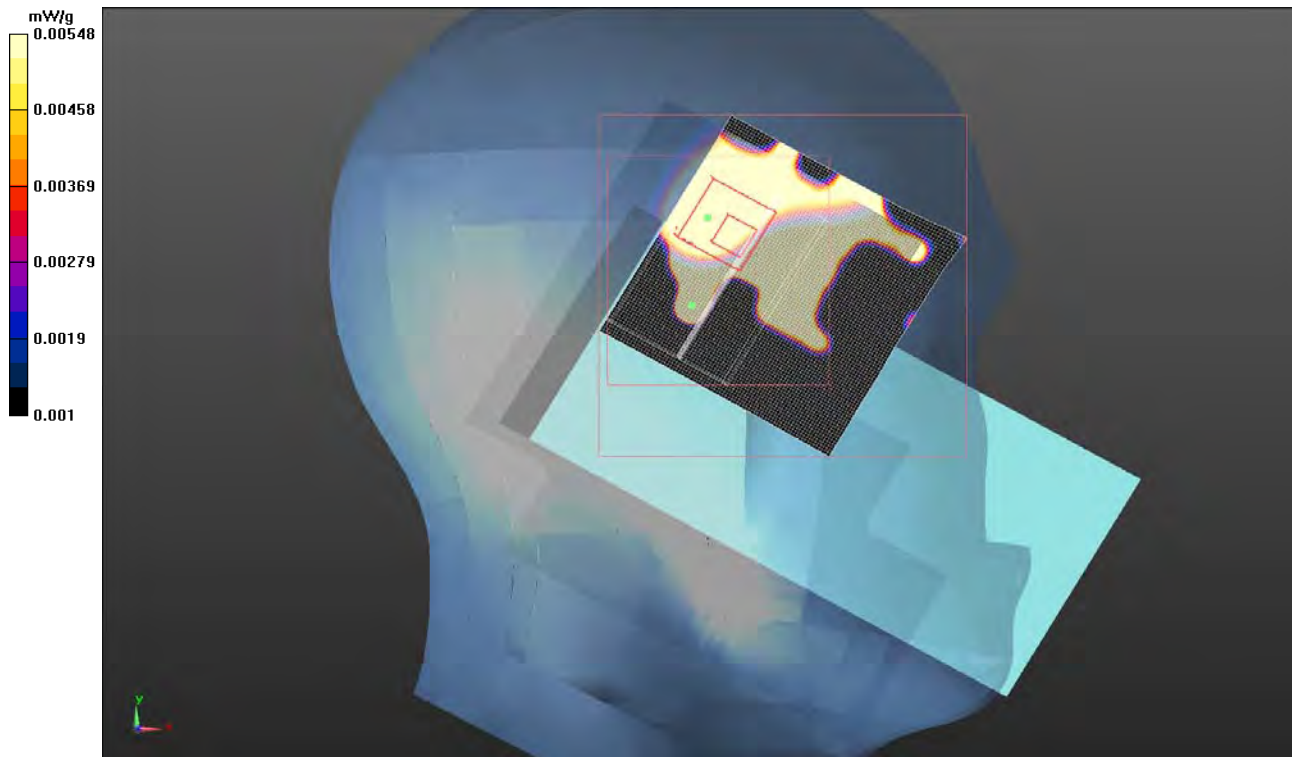
Maximum value of SAR (interpolated) = 0.074 mW/g

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) = 1.037 V/m



NORTHWEST				SAR 2011.02.07	
EMC		SAR TEST DATA			
Room Temperature (°C):	23.2	Humidity (%):	47.9	Test Date:	08/02/11
Liquid Temperature (°C):	21.6	Barometric Pressure (mb):	1016.6	Tested by:	Ethan Schoonover

Head Test 39 8-2-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5600 MHz
Medium parameters used: f = 5600 MHz; σ = 5.099 mho/m; ϵ = 35.415; ρ = 1000 kg/m³ , Medium parameters used: σ = 5.09884 mho/m, ϵ = 35.4148; ρ = 1000 kg/m³
Phantom section: Right Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

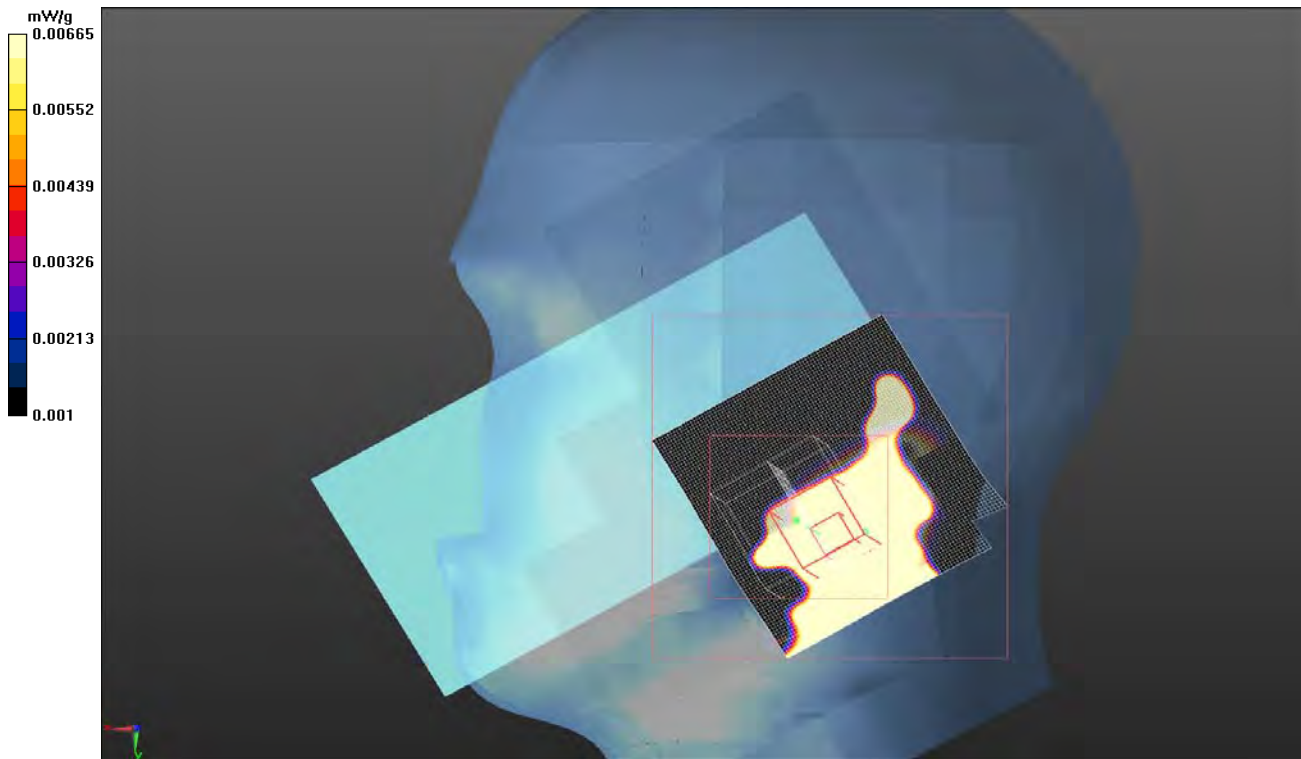
Probe: EX3DV4 - SN3746; ConvF(4.37, 4.37, 4.37); Calibrated: 11/11/2010
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Cheek/Reference scan (51x71x1): Measurement grid: dx=30mm, dy=30mm
Maximum value of SAR (interpolated) = 0.041 mW/g

Head/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 1.142 V/m

Head/Cheek/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.034 mW/g

Head/Cheek/Zoom Scan (10x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 2.092 V/m; Power Drift = 0.64 dB
Peak SAR (extrapolated) = 0.186 W/kg
SAR(1 g) = 0.019 mW/g; SAR(10 g) = 0.00731 mW/g
Maximum value of SAR (measured) = 0.035 mW/g



EMC

SAR TEST DATA

Room Temperature (°C):	22.9	Humidity (%):	47.9	Test Date:	08/02/11
Liquid Temperature (°C):	21.5	Barometric Pressure (mb):	1016.6	Tested by:	Ethan Schoonover

Head Test 40 8-2-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5600 MHz

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.099$ mho/m; $\epsilon = 35.415$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.09884$ mho/m, $\epsilon = 35.4148$; $\rho = 1000$ kg/m³

Phantom section: Right Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.37, 4.37, 4.37); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: SAM with CRP; Type: SAM; Serial: 1598

Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

Maximum value of SAR (interpolated) = 0.00766 mW/g

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

Maximum value of Total (measured) = 1.247 V/m

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

Maximum value of SAR (interpolated) = 0.029 mW/g

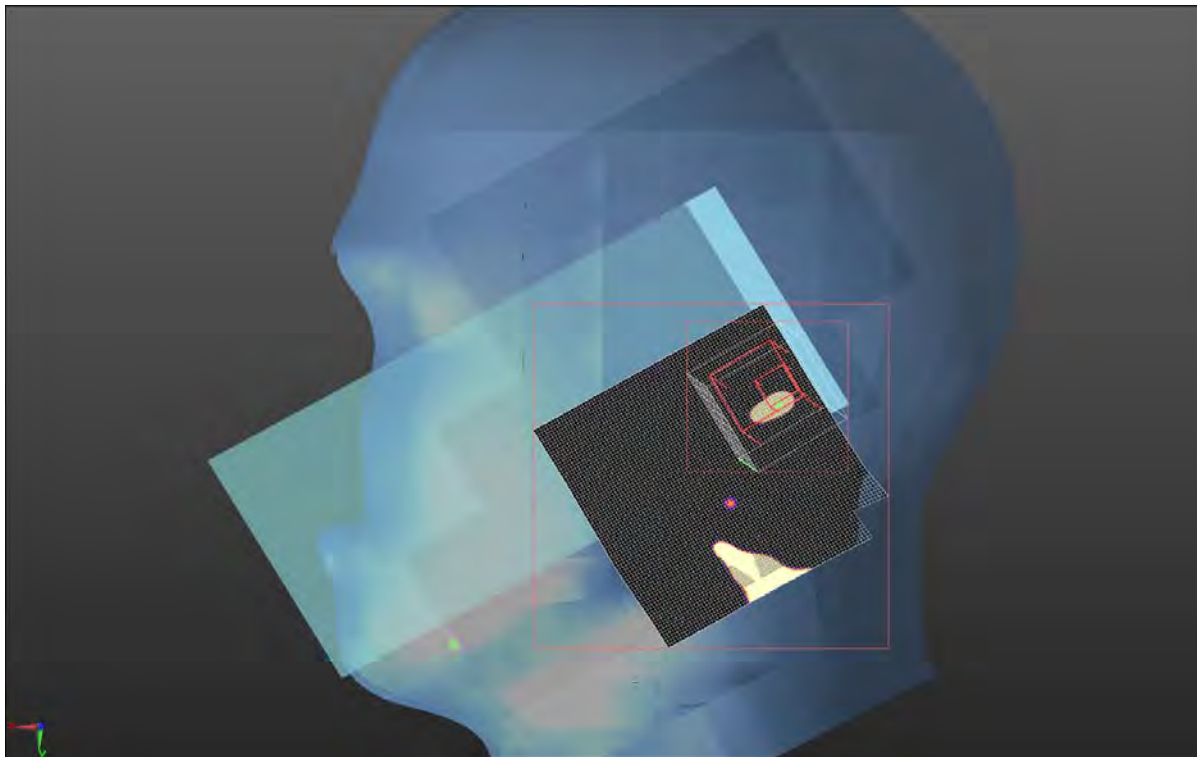
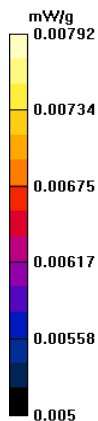
Head/Tilt/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm

Reference Value = 2.375 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.098 W/kg

SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00334 mW/g

Maximum value of SAR (measured) = 0.034 mW/g



NORTHWEST		SAR TEST DATA				SAR 2011.02.07
EMC						
Room Temperature (°C):	23.8	Humidity (%):	48.5	Test Date:	08/03/11	
Liquid Temperature (°C):	21.9	Barometric Pressure (mb):	1015.8	Tested by:	Jennifer Herrett	

Head Test 49 8-3-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5745 MHz
Medium parameters used (interpolated): $f = 5745\text{ MHz}$; $\sigma = 5.363\text{ mho/m}$; $\epsilon = 34.888$; $\rho = 1000\text{ kg/m}^3$, Medium parameters used: $\sigma = 5.36925\text{ mho/m}$, $\epsilon = 34.8799$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Left Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.14, 4.14, 4.14); Calibrated: 11/11/2010
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
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) = 0.062 mW/g

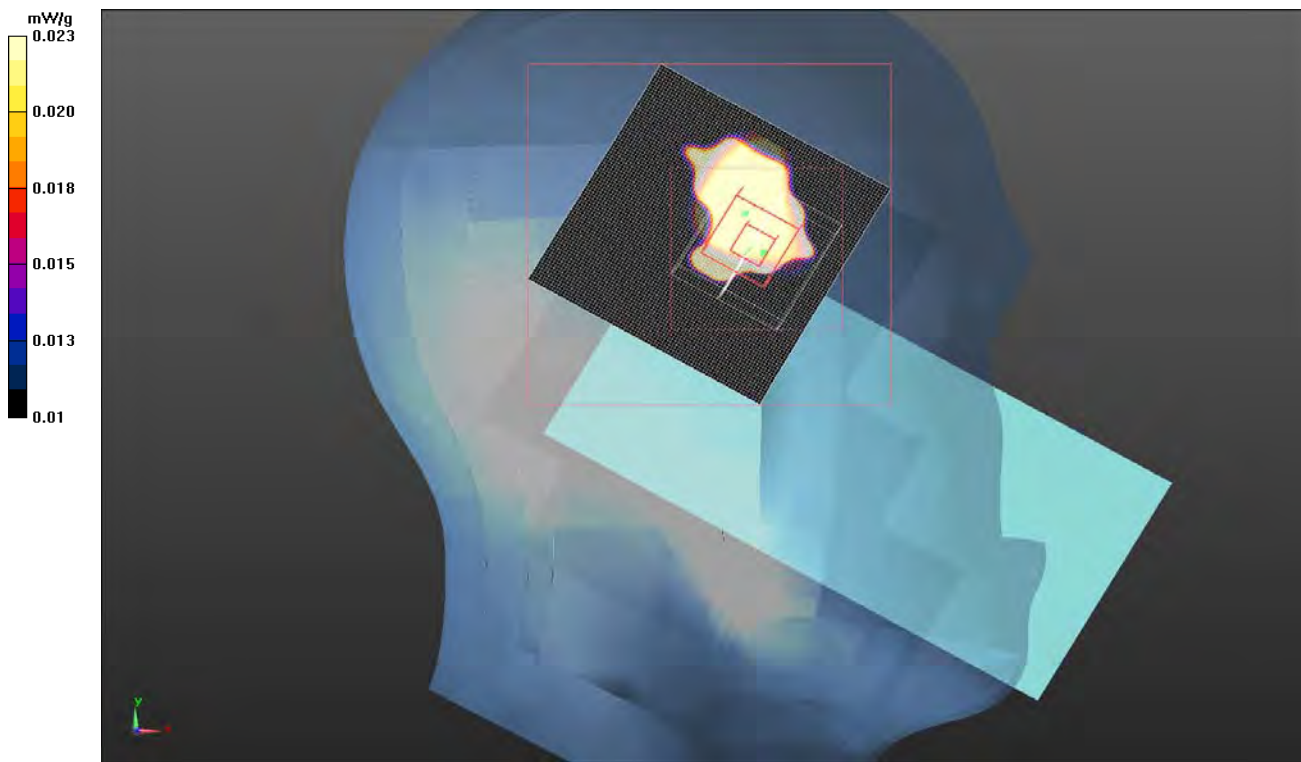
Head/Cheek/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.186 mW/g

Head/Cheek/Zoom Scan (10x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 4.473 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.173 W/kg
SAR(1 g) = 0.058 mW/g; SAR(10 g) = 0.022 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.107 mW/g

Head/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 2.081 V/m



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	23.9	Humidity (%):	48.3	Test Date:	08/03/11	
Liquid Temperature (°C):	21.7	Barometric Pressure (mb):	1015.8	Tested by:	Jennifer Herrett	

Head Test 50 8-3-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5745 MHz
Medium parameters used (interpolated): $f = 5745\text{ MHz}$; $\sigma = 5.363\text{ mho/m}$; $\epsilon = 34.888$; $\rho = 1000\text{ kg/m}^3$, Medium parameters used: $\sigma = 5.36925\text{ mho/m}$, $\epsilon = 34.8799$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Left Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.14, 4.14, 4.14); Calibrated: 11/11/2010
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Tilt/Zoom Scan (10x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 3.627 V/m; Power Drift = 0.63 dB
Peak SAR (extrapolated) = 0.201 W/kg
SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.00985 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.068 mW/g

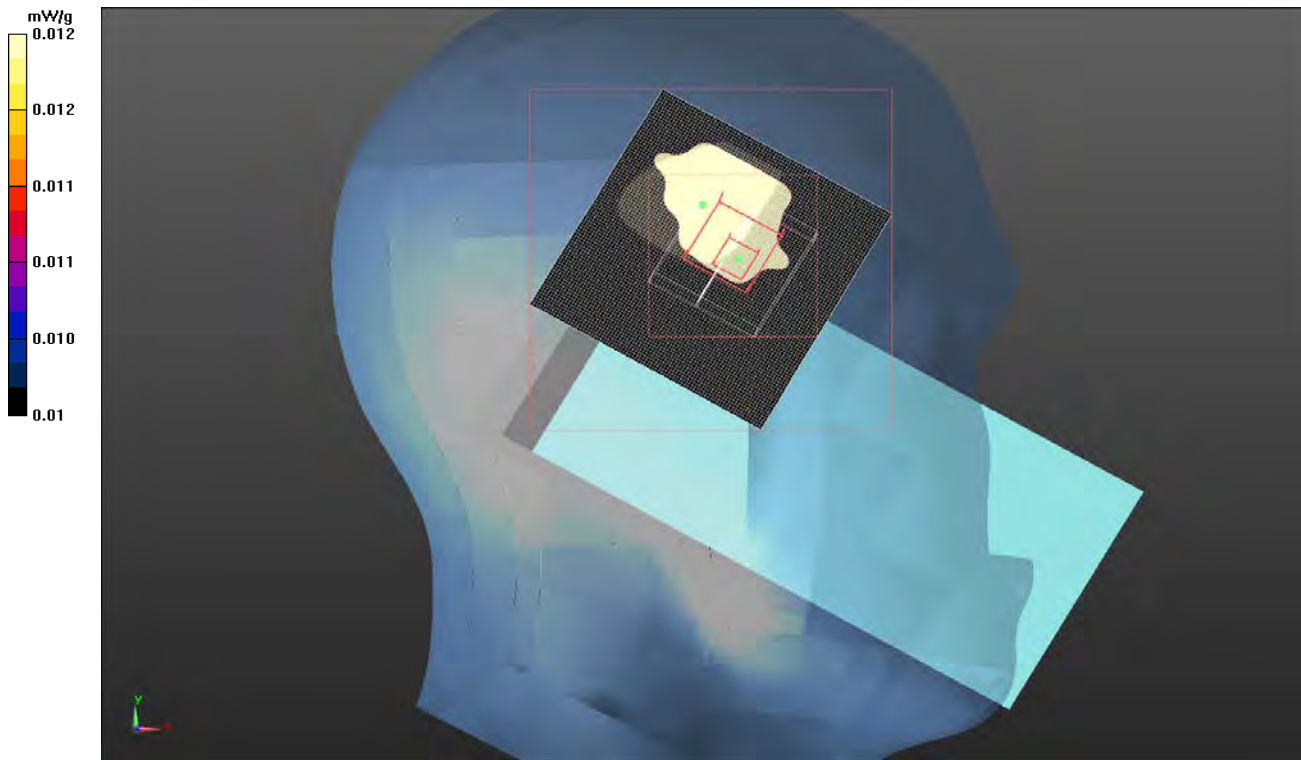
Head/Tilt/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.125 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) = 0.064 mW/g

Head/Tilt/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 1.511 V/m



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	23.8	Humidity (%):	48.5	Test Date:	08/03/11	
Liquid Temperature (°C):	22.1	Barometric Pressure (mb):	1015.8	Tested by:	Jennifer Herrett	

Head Test 51 8-3-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5745 MHz
Medium parameters used (interpolated): f = 5745 MHz; σ = 5.363 mho/m; ϵ = 34.888; ρ = 1000 kg/m³ , Medium parameters used: σ = 5.36925 mho/m, ϵ = 34.8799; ρ = 1000 kg/m³
Phantom section: Right Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.14, 4.14, 4.14); Calibrated: 11/11/2010
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
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) = 0.020 mW/g

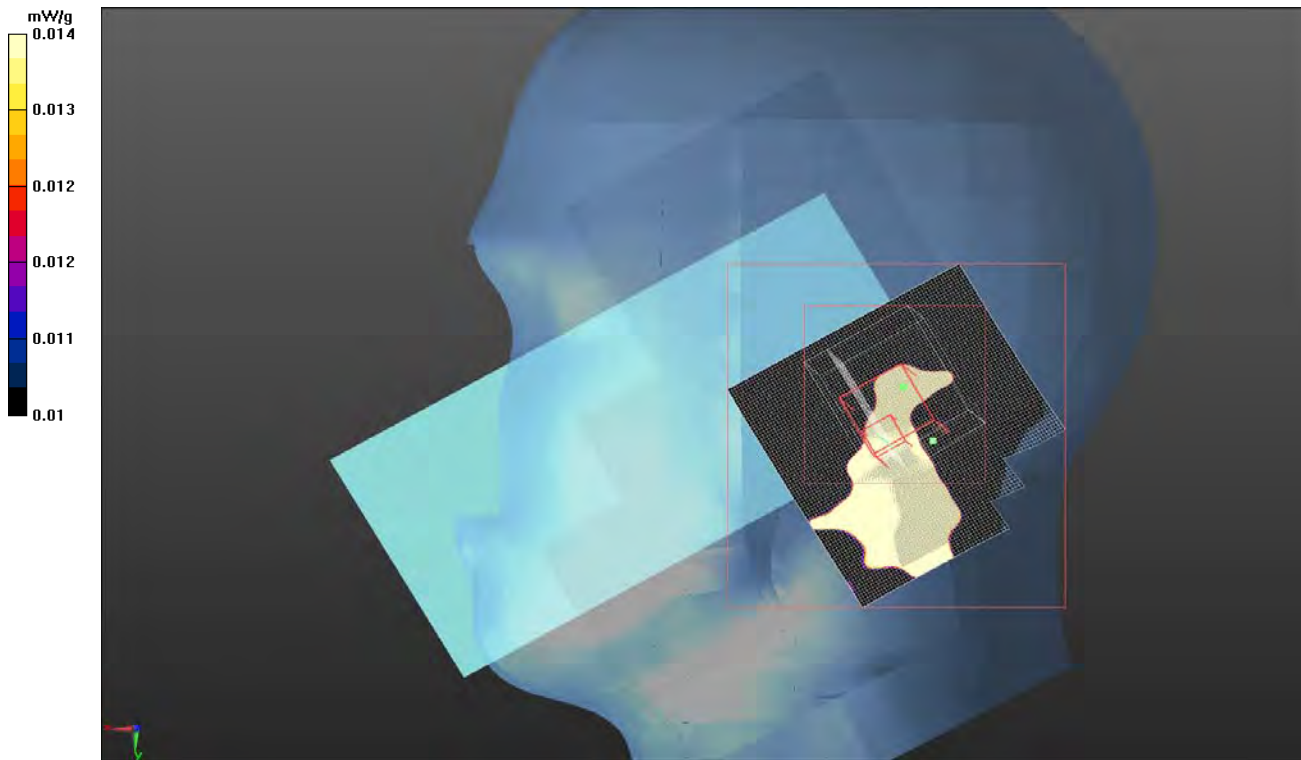
Head/Cheek/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.073 mW/g

Head/Cheek/Zoom Scan (11x10x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 2.663 V/m; Power Drift = 0.0012 dB
Peak SAR (extrapolated) = 0.087 W/kg
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.00726 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.042 mW/g

Head/Cheek/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 1.632 V/m



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	23.8	Humidity (%):	48.5	Test Date:	08/03/11	
Liquid Temperature (°C):	22.1	Barometric Pressure (mb):	1015.8	Tested by:	Jennifer Herrett	

Head Test 52 8-3-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5745 MHz
Medium parameters used: $\sigma = 5.36925$ mho/m, $\epsilon = 34.8799$; $\rho = 1000$ kg/m³ , Medium parameters used (interpolated): f = 5745 MHz; $\sigma = 5.363$ mho/m; $\epsilon = 34.888$; $\rho = 1000$ kg/m³
Phantom section: Right Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.14, 4.14, 4.14); Calibrated: 11/11/2010
Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: SAM with CRP; Type: SAM; Serial: 1598
Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head/Tilt/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 1.481 V/m

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

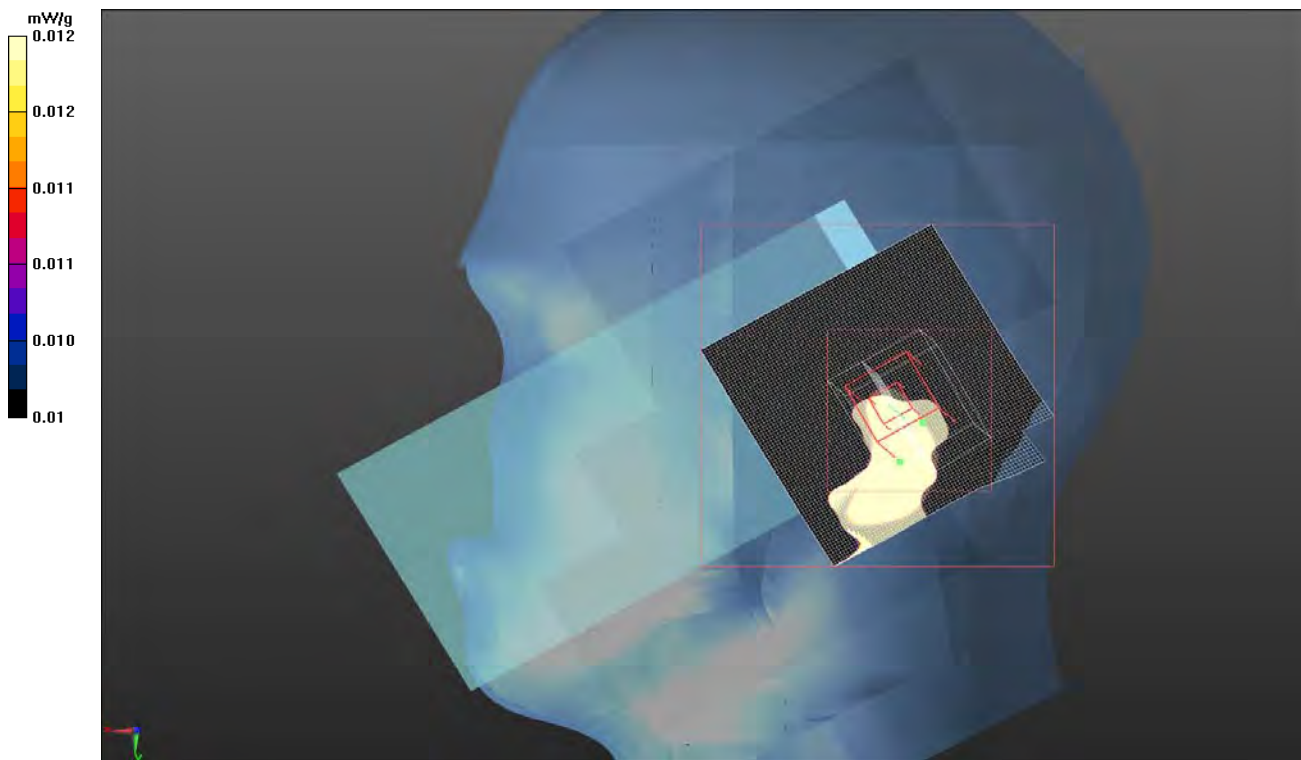
[Info: Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.075 mW/g

Head/Tilt/Zoom Scan (10x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 2.091 V/m; Power Drift = 1.69 dB
Peak SAR (extrapolated) = 0.164 W/kg
SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00292 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.041 mW/g

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

[Info: Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.027 mW/g



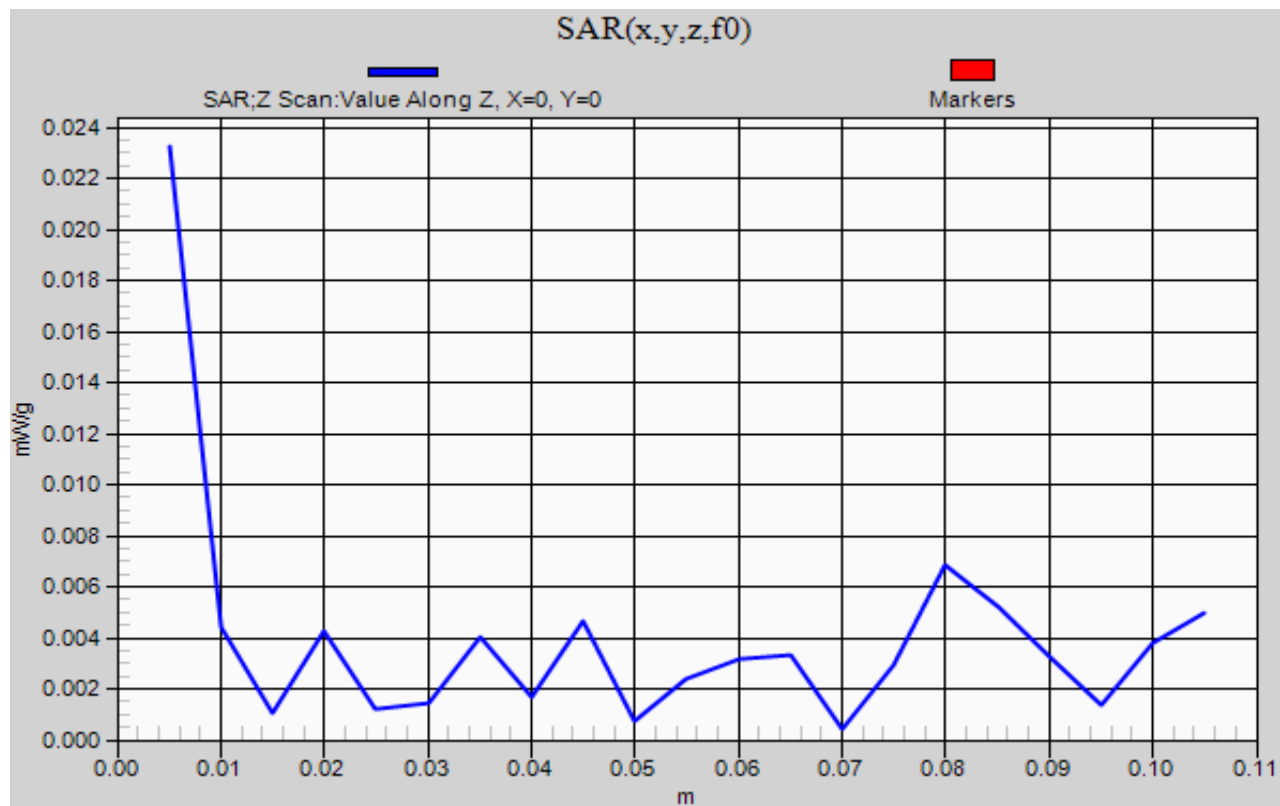
EMC

SAR TEST DATA

Room Temperature (°C):	23.8	Humidity (%):	48.5	Test Date:	08/03/11
Liquid Temperature (°C):	21.9	Barometric Pressure (mb):	1015.8	Tested by:	Jennifer Herrett

Head Test 49 8-3-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060



NORTHWEST		SAR TEST DATA		SAR 2011.02.07
EMC				
EUT:	1000CP01S	Work Order:	ITRM0248	
Serial Number:	28311047060	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:	Jennifer Herrett and 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 #	1	Signature 		

Test Configuration	Frequency Band	Body-Worn Accessory	Transmit Frequency	Transmit Channel	Transmit Mode	Data Rate (Mbps)	Audio Accessory	EUT Position	Start Power (Conducted)	SAR Drift During Test (dB)	1g SAR Level	Test #
Body	5.2, 5.3, 5.6, 5.8 GHz	Holster	5180MHz	36	OFDM	6Mbps	none	Right	12.4	0.02	0.369	13
								Front	12.4	Note 1	Note 1	14
			5260MHz	52				Right	12.2	-0.11	0.319	19
								Front	12.2	0.019	0.028	20
			5600MHz	120				Right	12.2	-0.023	0.282	25
								Front	12.2	Note 1	Note 1	26
			5745MHz	149				Right	10.7	0.39	0.200	31
								Front	10.7	Note 1	Note 1	32

Note 1: Zoom scan not performed, no hot spots detected, area scan results were less than the required system sensitivity of 0.01mW/g.

Note 2: Due to the low value of measured SAR, the SAR drift measurement was made close to the measurement noise floor and is therefore inaccurate.

NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	23.1	Humidity (%):	43.5	Test Date:	07/28/11	
Liquid Temperature (°C):	21.8	Barometric Pressure (mb):	1020	Tested by:	Ethan Schoonover and Jennifer Herrett	

Body Test 13

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5180 MHz
Medium parameters used (interpolated): $f = 5180\text{ MHz}$; $\sigma = 5.223\text{ mho/m}$; $\epsilon = 47.895$; $\rho = 1000\text{ kg/m}^3$, Medium parameters used: $\sigma = 5.24548\text{ mho/m}$, $\epsilon = 47.8493$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(4.16, 4.16, 4.16); Calibrated: 11/11/2010
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096
Measurement SW: DASY52, 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) = 0.459 mW/g

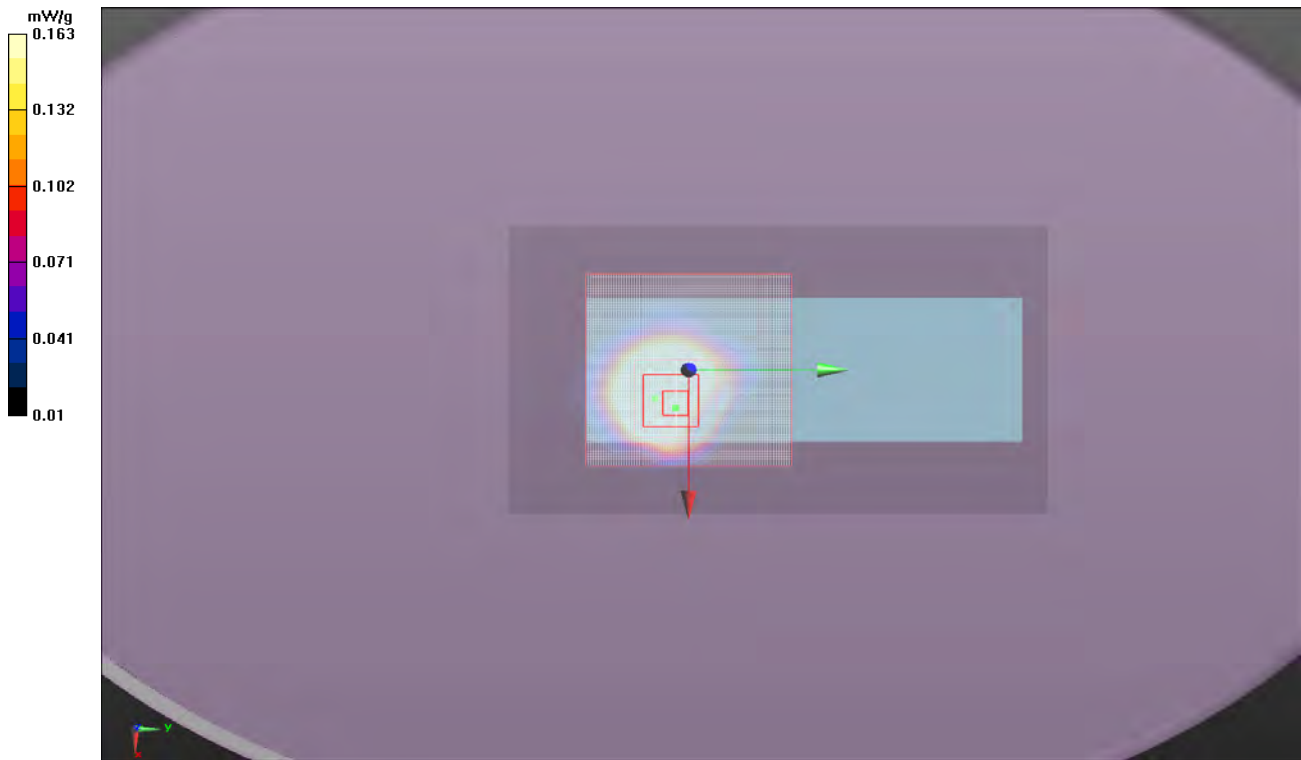
Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 5.585 V/m

Body/Body/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 8.018 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.475 W/kg
SAR(1 g) = 0.369 mW/g; SAR(10 g) = 0.146 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.681 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) = 0.687 mW/g



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	22.9	Humidity (%):	52.1	Test Date:	07/29/11	
Liquid Temperature (°C):	21.9	Barometric Pressure (mb):	1018.5	Tested by:	Ethan Schoonover	

Body Test 19

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5260 MHz
Medium parameters used (interpolated): $f = 5260\text{ MHz}$; $\sigma = 5.307\text{ mho/m}$; $\epsilon = 47.256$; $\rho = 1000\text{ kg/m}^3$, Medium parameters used: $\sigma = 5.29425\text{ mho/m}$, $\epsilon = 47.2743$; $\rho = 1000\text{ kg/m}^3$
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(3.8, 3.8, 3.8); Calibrated: 11/11/2010
Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096
Measurement SW: DASY52, 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) = 0.482 mW/g

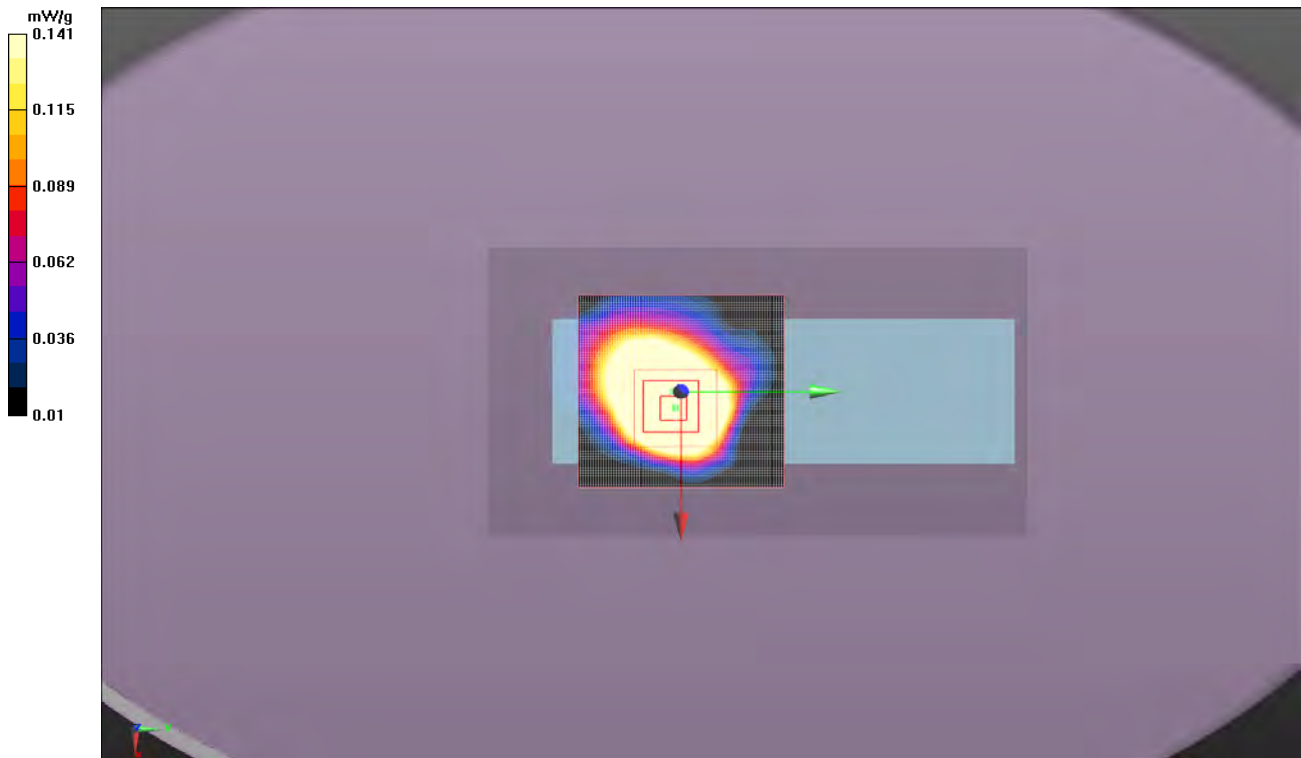
Body/Body/Area scan (81x81x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.605 mW/g

Body/Body/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 11.482 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.058 W/kg
SAR(1 g) = 0.319 mW/g; SAR(10 g) = 0.124 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.589 mW/g

Body/Body/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
Maximum value of Total (measured) = 5.146 V/m



EMC

SAR TEST DATA

Room Temperature (°C):	22.8	Humidity (%):	49.3	Test Date:	07/29/11
Liquid Temperature (°C):	21.7	Barometric Pressure (mb):	1018.5	Tested by:	Ethan Schoonover

Body Test 20

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5260 MHz

Medium parameters used (interpolated): $f = 5260$ MHz; $\sigma = 5.307$ mho/m; $\epsilon = 47.256$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.29425$ mho/m, $\epsilon = 47.2743$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(3.8, 3.8, 3.8); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096

Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.048 mW/g

Body/Body/Area scan (121x81x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.

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

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

Reference Value = 3.235 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.094 W/kg

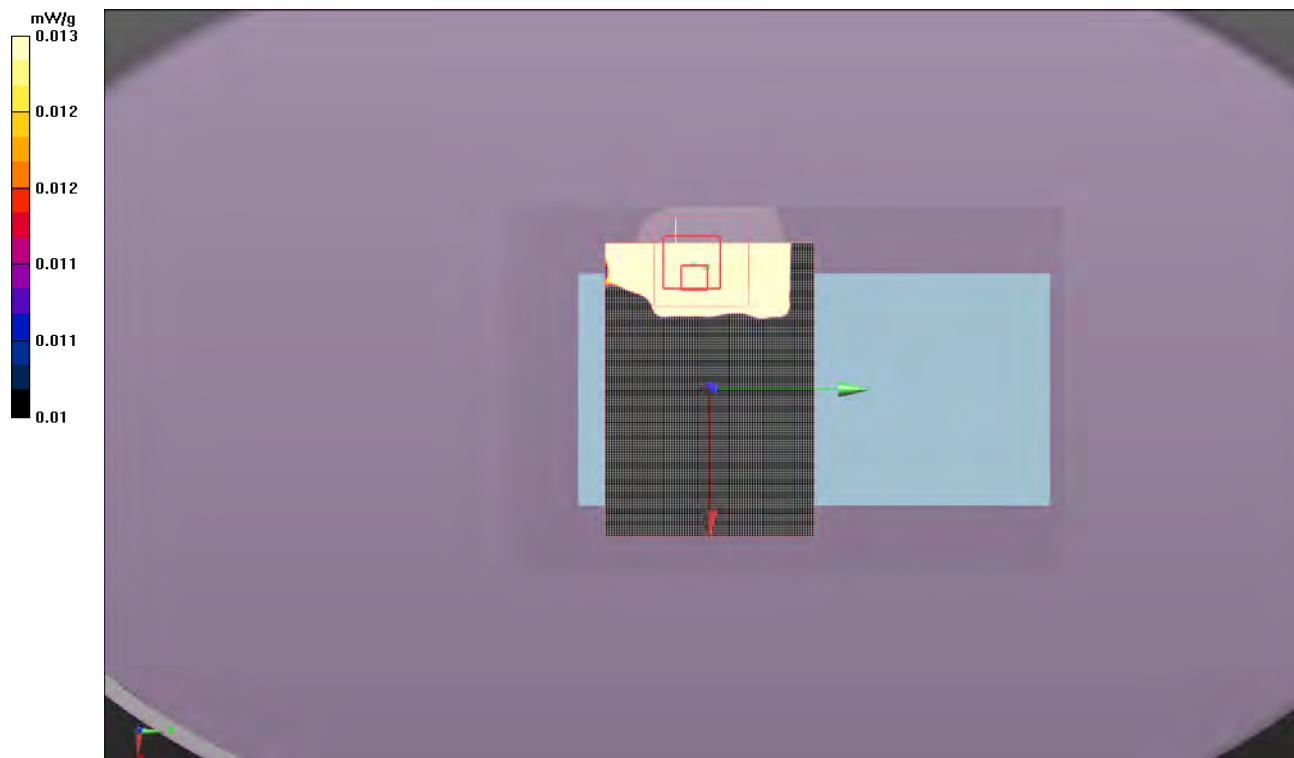
SAR(1 g) = 0.028 mW/g; SAR(10 g) = 0.013 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

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

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

Maximum value of Total (measured) = 1.554 V/m



EMC**SAR TEST DATA**

Room Temperature (°C):	23.1	Humidity (%):	46.8	Test Date:	07/26/11
Liquid Temperature (°C):	22.1	Barometric Pressure (mb):	1017.5	Tested by:	Jennifer Herrett

Body Test 25 7-26-11

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5600 MHz

Medium parameters used: $f = 5600$ MHz; $\sigma = 5.739$ mho/m; $\epsilon = 46.411$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 5.73929$ mho/m, $\epsilon = 46.4107$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(3.69, 3.69, 3.69); Calibrated: 11/11/2010

Sensor-Surface: 2mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)

Electronics: DAE4 Sn1237; Calibrated: 11/10/2010

Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096

Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

Reference Value = 6.704 V/m; Power Drift = -0.23 dB

Peak SAR (extrapolated) = 0.956 W/kg

SAR(1 g) = 0.282 mW/g; SAR(10 g) = 0.107 mW/g

Maximum value of SAR (measured) = 0.527 mW/g

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

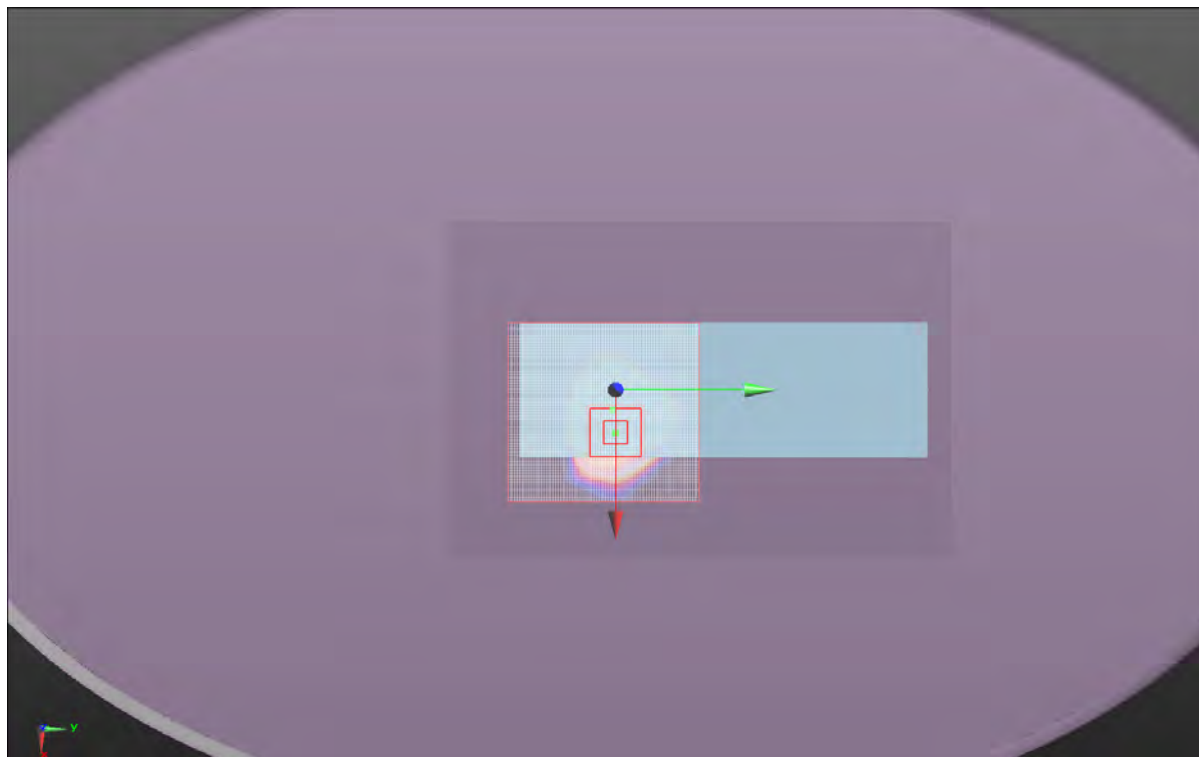
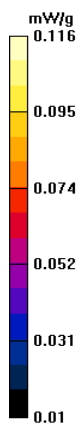
Maximum value of SAR (interpolated) = 0.630 mW/g

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

Maximum value of Total (measured) = 4.498 V/m

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

Maximum value of SAR (interpolated) = 0.560 mW/g



NORTHWEST					SAR 2011.02.07	
EMC		SAR TEST DATA				
Room Temperature (°C):	23.2	Humidity (%):	49.9	Test Date:	07/28/11	
Liquid Temperature (°C):	22.5	Barometric Pressure (mb):	1021.6	Tested by:	Jennifer Herrett	

Body Test 31

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

Communication System: CW; Frequency: 5745 MHz
Medium parameters used: $\sigma = 5.97517$ mho/m, $\epsilon = 46.7914$; $\rho = 1000$ kg/m³ , Medium parameters used (interpolated): f = 5745 MHz; $\sigma = 5.969$ mho/m; $\epsilon = 46.799$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: EX3DV4 - SN3746; ConvF(3.87, 3.87, 3.87); Calibrated: 11/11/2010
Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1237; Calibrated: 11/10/2010
Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096
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) = 3.784 V/m

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

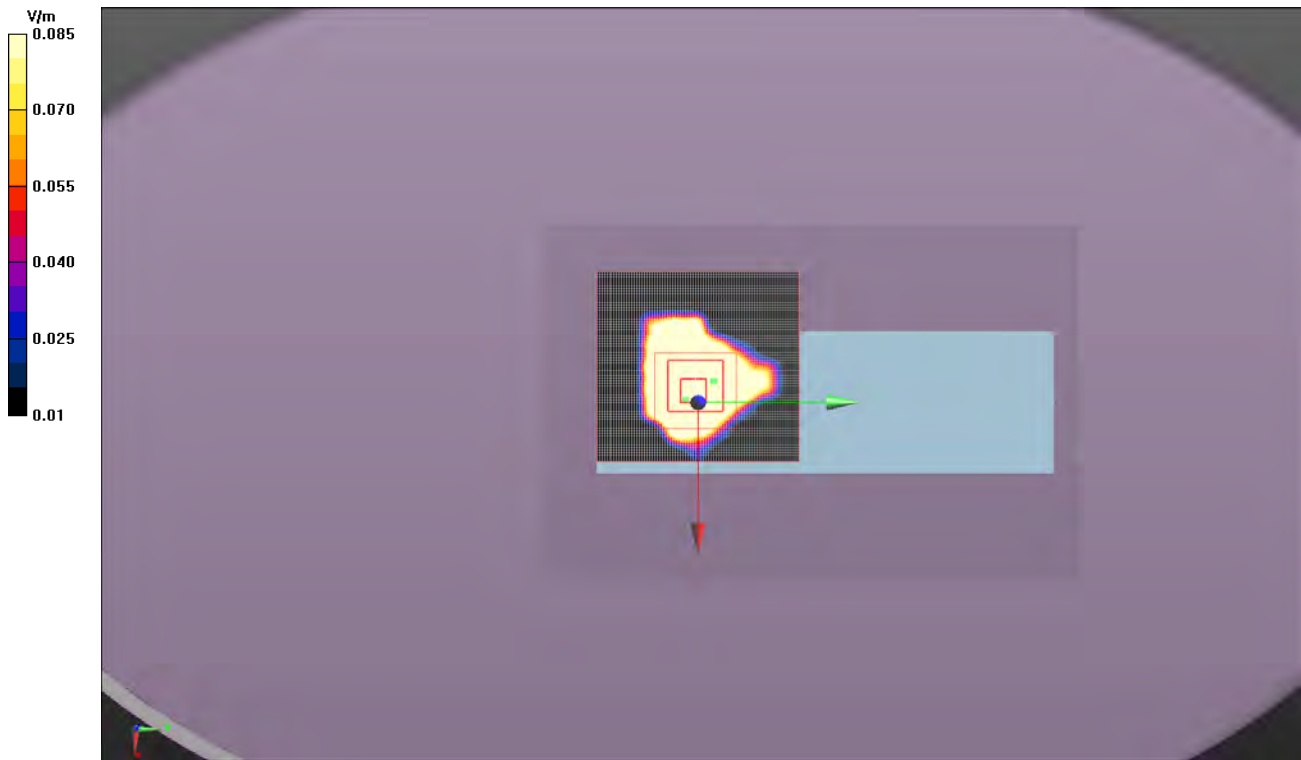
Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.453 mW/g

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (interpolated) = 0.359 mW/g

Body/Body/Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Reference Value = 8.911 V/m; Power Drift = 0.39 dB
Peak SAR (extrapolated) = 0.712 W/kg
SAR(1 g) = 0.200 mW/g; SAR(10 g) = 0.073 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)
Maximum value of SAR (measured) = 0.401 mW/g



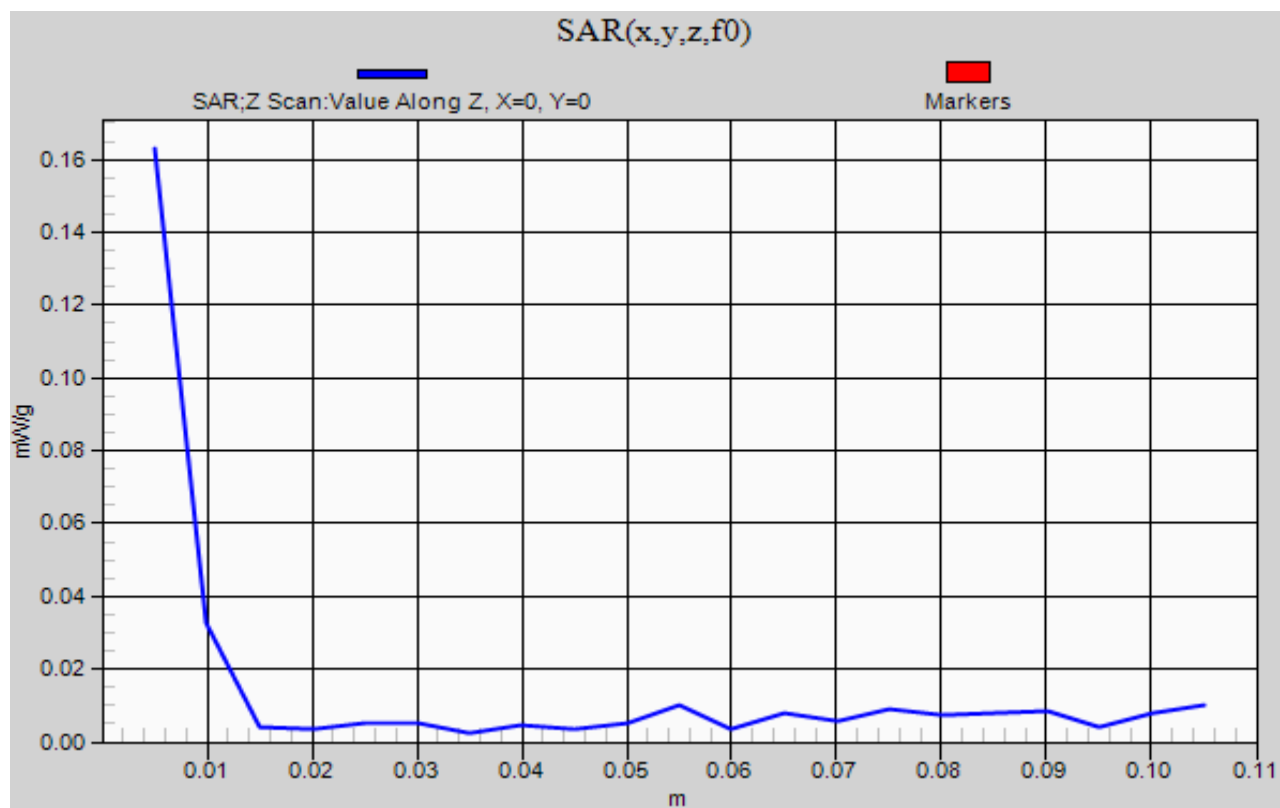
EMC

SAR TEST DATA

Room Temperature (°C):	23.1	Humidity (%):	43.5	Test Date:	07/28/11
Liquid Temperature (°C):	21.8	Barometric Pressure (mb):	1020	Tested by:	Ethan Schoonover and Jennifer Herrett

Body Test 13

DUT: Handheld Computer (A1); Type: 1000CP01S; Serial: 28311047060

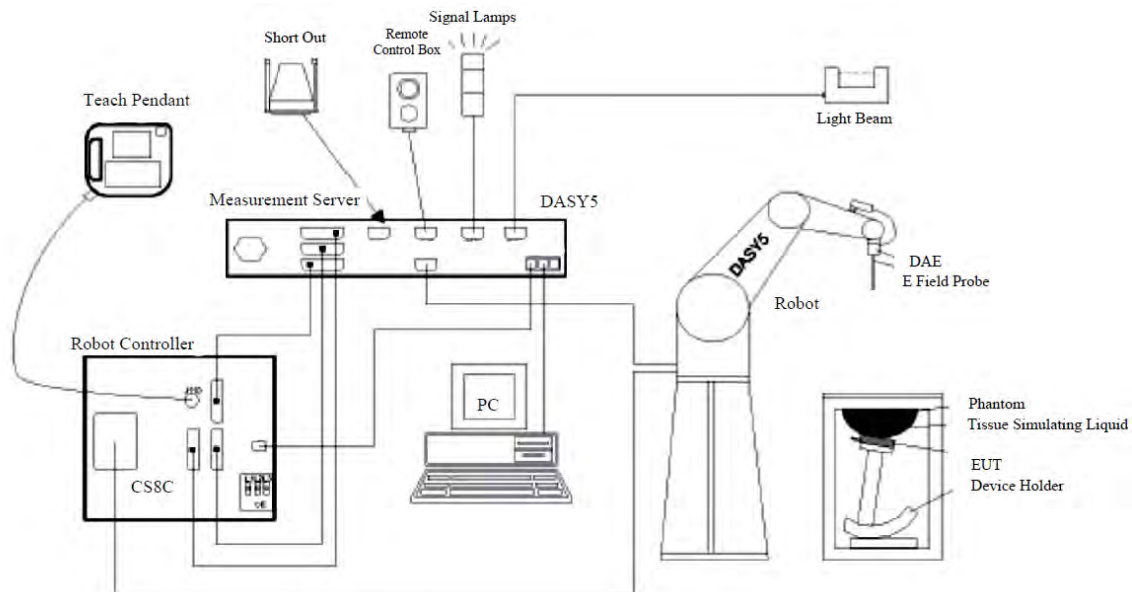


SAR Measurement System

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:

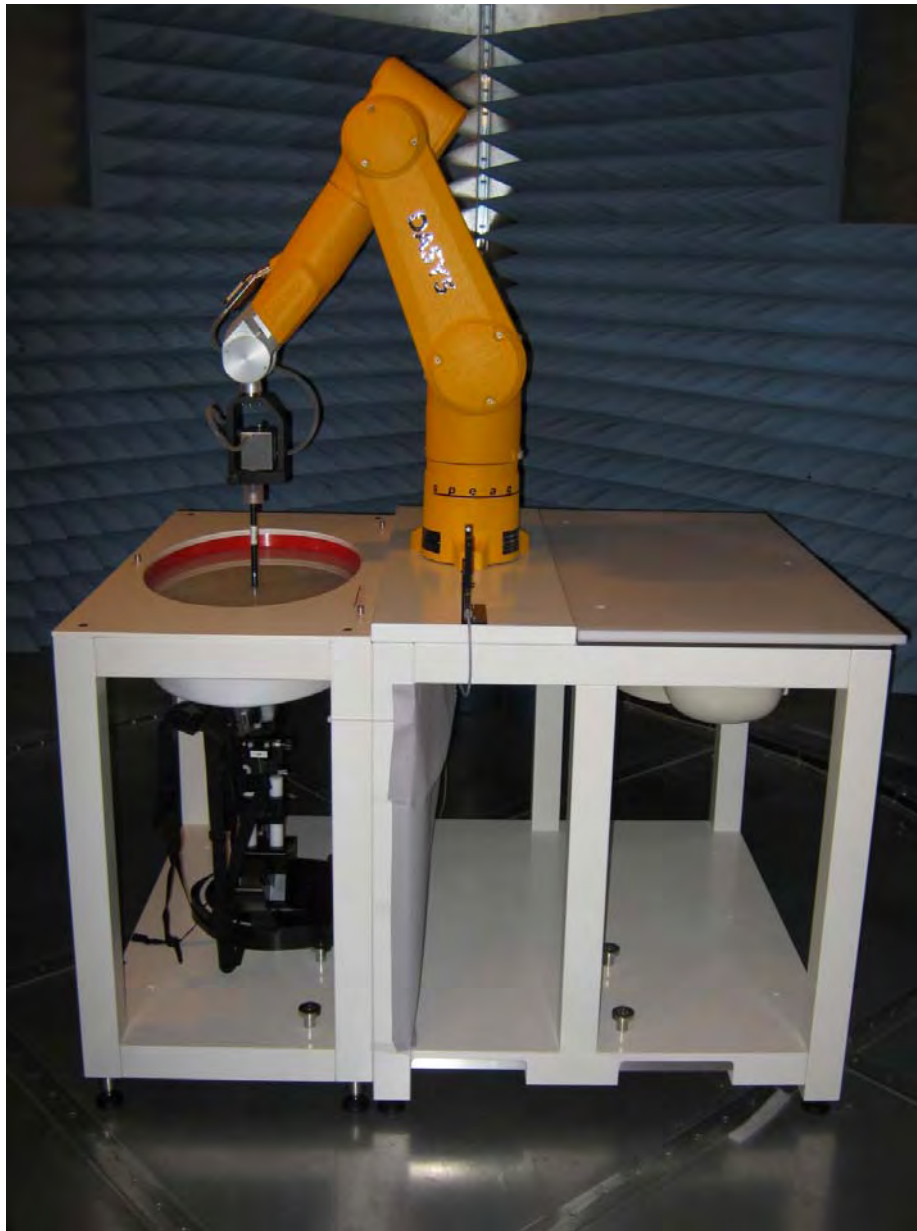


- A standard high precision 6-axis robot (Staubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) 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	11/11/2010	12 mo
DAE	Schid & Partner Engineering	SD 000 D04 EJ	SAH	11/11/2010	12 mo
Robot Controller	Staeubli	CS8C	SAI	11/11/2010	12 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	11/11/2010	12 mo
Antenna, Dipole 5.1-5.8GHz SAR	SPEAG	D5GHzV2	ADM	11/16/2010	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	Omagaette	HH311	DTX	3/29/2011	24 mo
Humidity Temperature Meter	Omagaette	HH311	DTY	3/29/2011	24 mo
Wireless Communication Test Set	Agilent	E5515C	BSV	NCR	0 mo

Using the mode of operation and configuration noted within this report, an EFT/Burst Immunity test was performed. The test is intended to demonstrate the immunity of electrical and electronic equipment when subjected to types of transient disturbances such as those originating from switching transients (interruption of inductive loads, relay contact bounce, etc.). The repetitive fast transient test is a test with burts consisting of a number of fast transients, coupled into power supply, control and signal ports of electrical and electronic equipment. Significant for the test is short rise time, the repetition rate and the low energy of the transients.

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



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

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client Northwest EMC

Certificate No: EX3-3746_Nov10

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3746

Calibration procedure(s) QA CAL-01.v6, QA CAL-14.v3, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes

Calibration date: November 11, 2010

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	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: November 11, 2010

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



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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ 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 effect 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.
- 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 11, 2010

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	0.47	0.49	0.50	± 10.1%
DCP (mV) ^B	94.5	94.5	95.5	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	110.5	± 2.9 %
			Y	0.00	0.00	1.00	114.3	
			Z	0.00	0.00	1.00	111.2	
10061	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	3.60	X	3.86	70.08	19.28	77.9	± 2.1 %
			Y	2.62	65.07	16.74	78.0	
			Z	3.03	66.48	17.70	77.6	
10069	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	12.20	X	11.72	66.82	21.98	80.1	± 6.1 %
			Y	10.64	65.22	21.04	73.9	
			Z	11.40	66.10	21.47	79.3	
10077	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	13.12	X	11.10	65.64	21.82	69.7	± 6.9 %
			Y	11.26	67.57	23.06	93.9	
			Z	10.95	65.59	21.88	69.1	

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

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).
^B Numerical linearization parameter: uncertainty not required.
^E Uncertainty is determined using the maximum deviation from linear response applying recatangular 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]	Validity [MHz] ^c	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	6.69	6.69	6.69	0.43	0.76 ± 11.0%
5200	± 50 / ± 100	36.0 ± 5%	4.66 ± 5%	5.08	5.08	5.08	0.99	0.67 ± 13.1%
5300	± 50 / ± 100	35.9 ± 5%	4.76 ± 5%	4.59	4.59	4.59	0.49	1.39 ± 13.1%
5500	± 50 / ± 100	35.6 ± 5%	4.96 ± 5%	4.37	4.37	4.37	0.47	1.59 ± 13.1%
5800	± 50 / ± 100	35.3 ± 5%	5.27 ± 5%	4.14	4.14	4.14	0.47	1.76 ± 13.1%

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

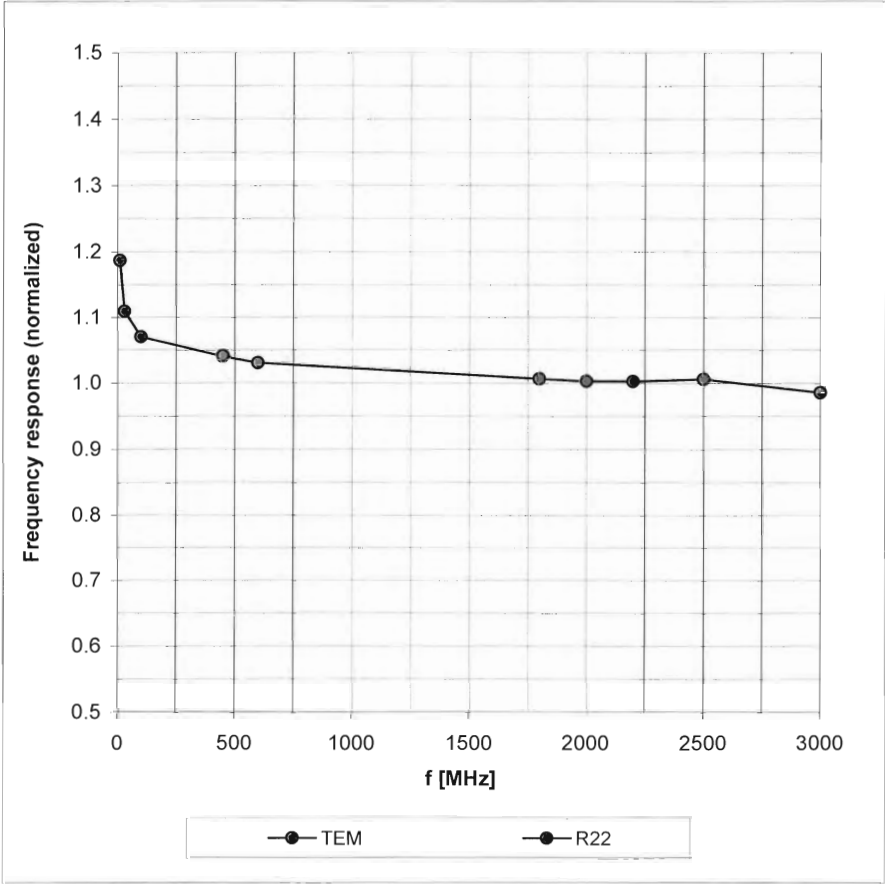
DASY/EASY - Parameters of Probe: EX3DV4 SN:3746

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz] ^c	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	6.81	6.81	6.81	0.48	0.73 ± 11.0%
5200	± 50 / ± 100	49.0 ± 5%	5.30 ± 5%	4.16	4.16	4.16	0.51	1.76 ± 13.1%
5300	± 50 / ± 100	48.9 ± 5%	5.42 ± 5%	3.80	3.80	3.80	0.54	1.88 ± 13.1%
5500	± 50 / ± 100	48.6 ± 5%	5.65 ± 5%	3.69	3.69	3.69	0.54	2.02 ± 13.1%
5800	± 50 / ± 100	48.2 ± 5%	6.00 ± 5%	3.87	3.87	3.87	0.53	1.94 ± 13.1%

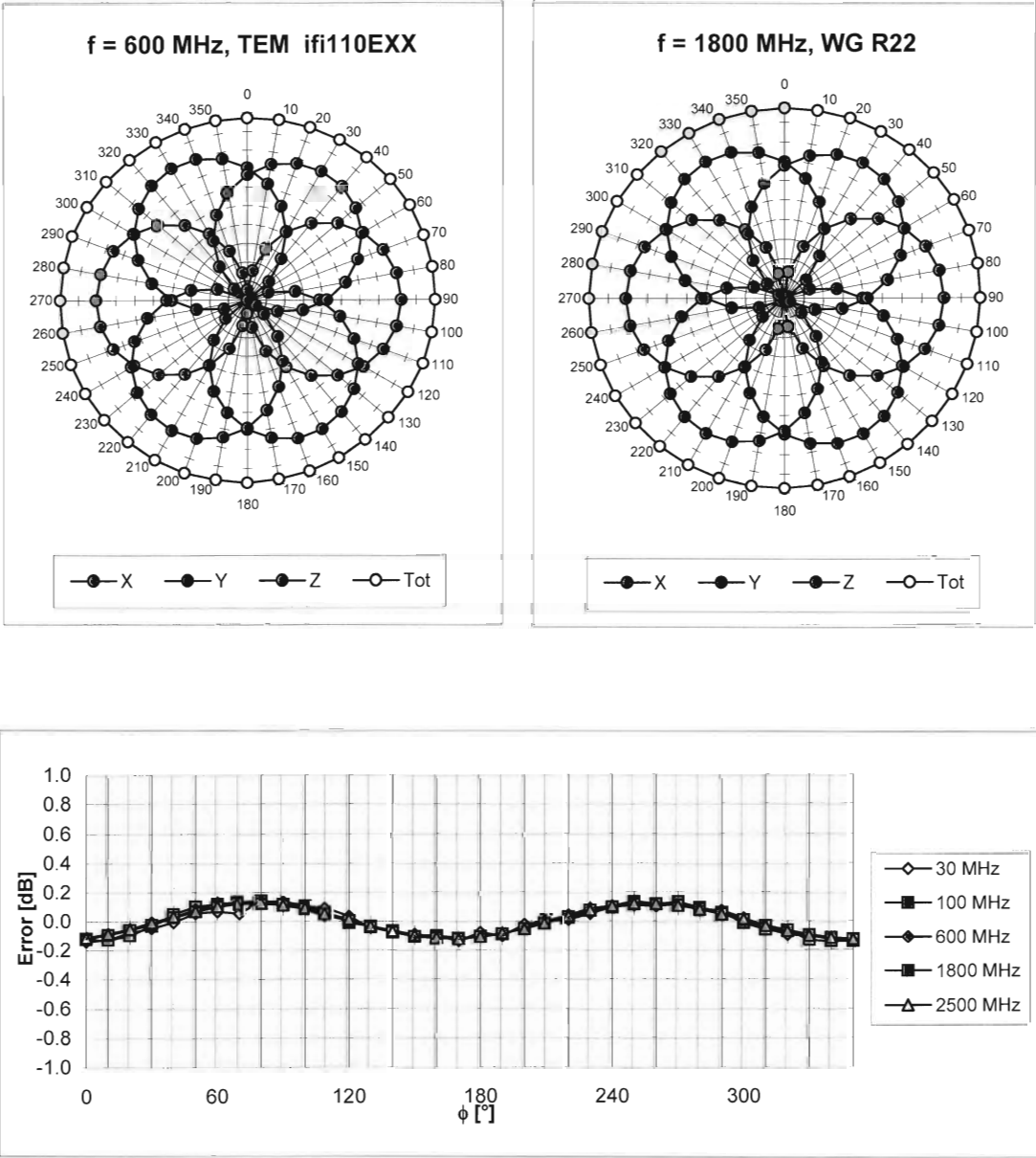
^c The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

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



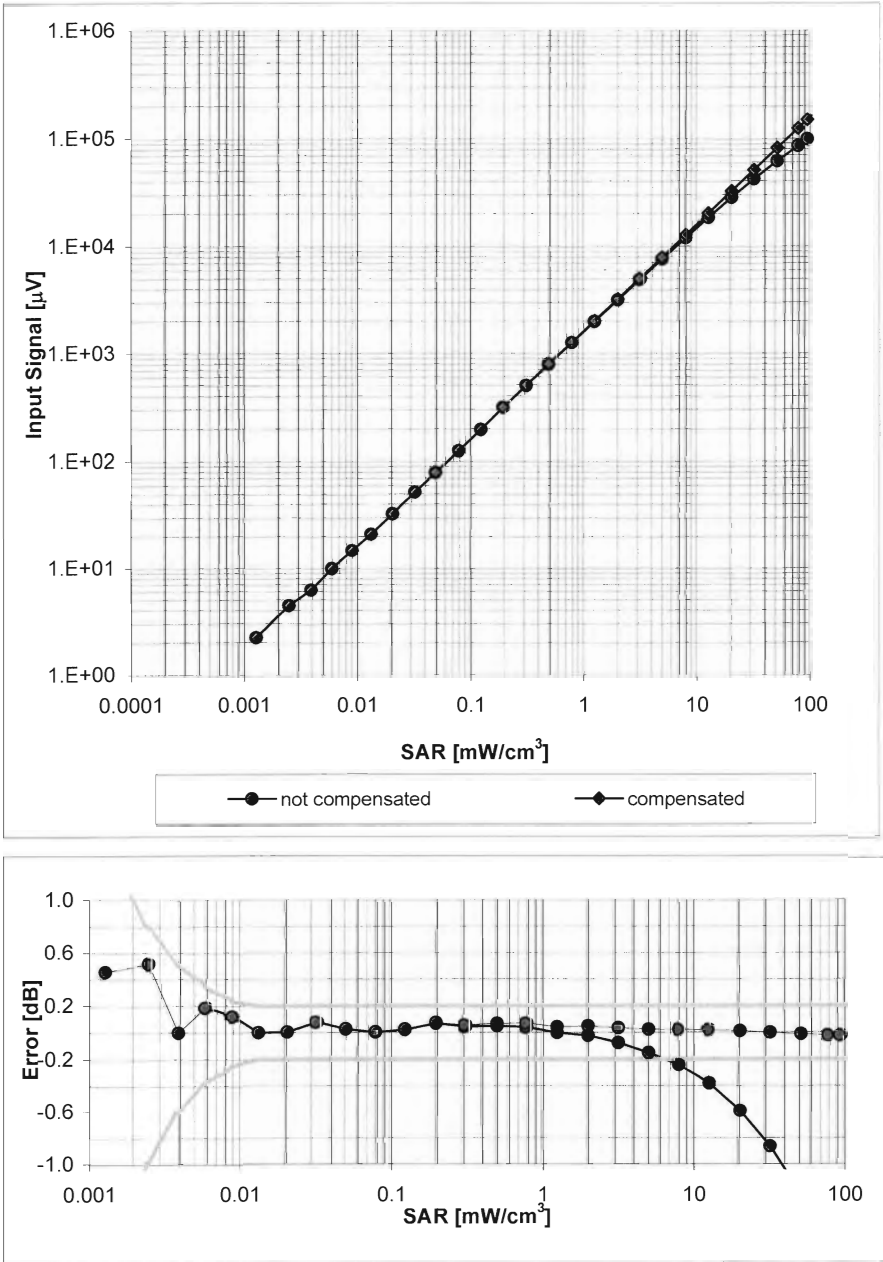
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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



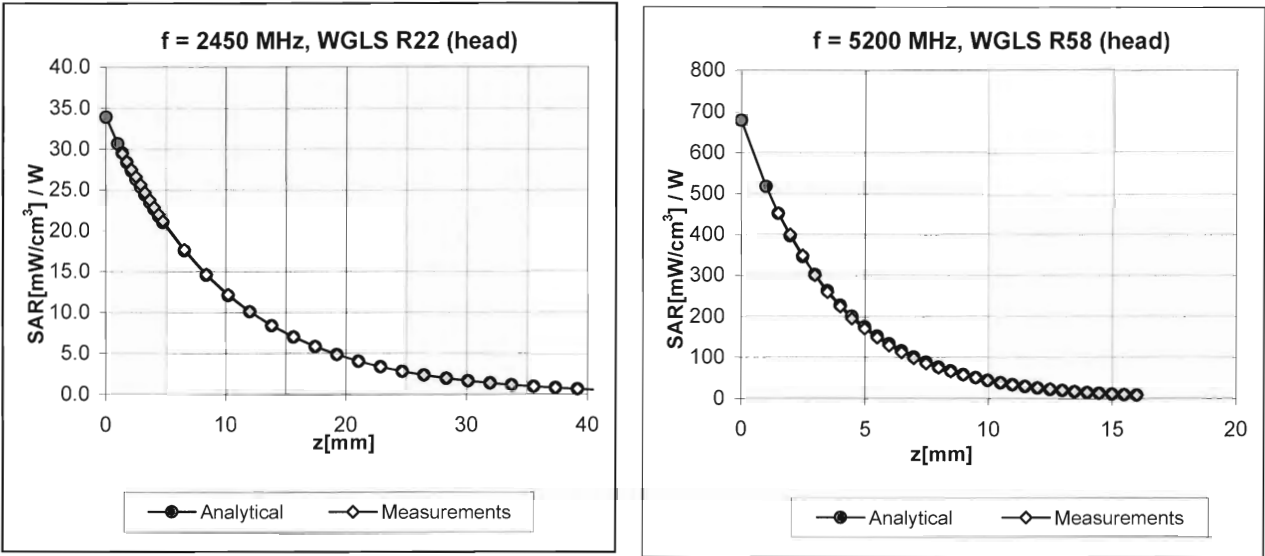
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range f(SAR_{head})
(Waveguide R22, f = 1800 MHz)



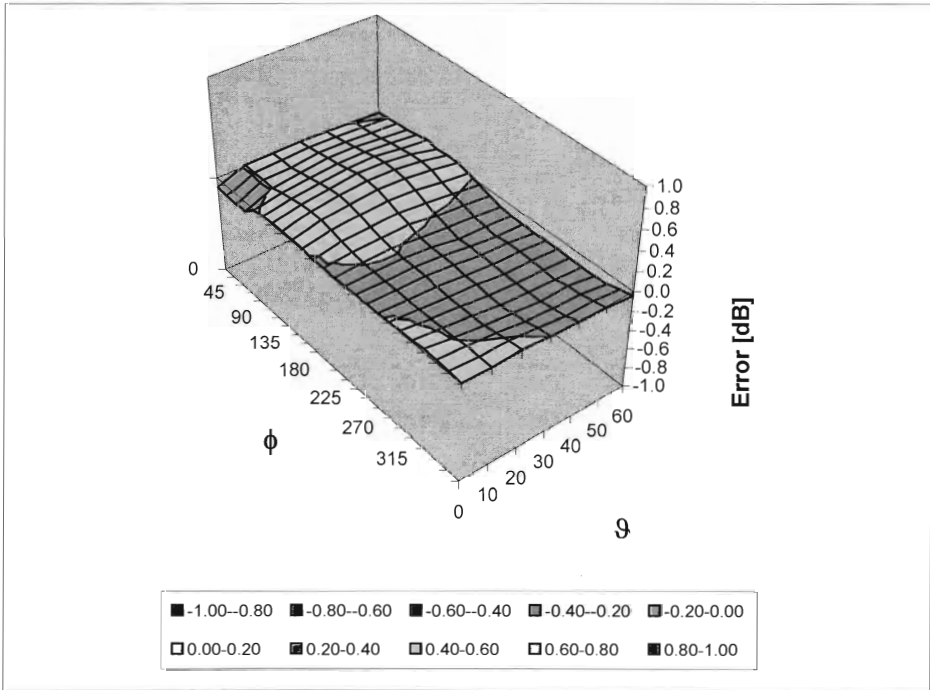
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in HSL

Error (ϕ, θ), f = 900 MHz



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

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

Northwest

EMC

Dipole Calibration

Rev 12/09/2010

Dipole Calibration

Please see attached calibration data

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



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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Accreditation No.: SCS 108

Client Northwest EMC

Certificate No: D2450V2-855_Nov10

CALIBRATION CERTIFICATE

Object D2450V2 - SN: 855

Calibration procedure(s) QA CAL-05.v7
Calibration procedure for dipole validation kits

Calibration date: November 11, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: November 12, 2010

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Measurement Conditions

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

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.8 ± 6 %	1.72 mho/m ± 6 %
Head TSL temperature during test	(22.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.1 mW / g
SAR normalized	normalized to 1W	52.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	53.4 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.13 mW / g
SAR normalized	normalized to 1W	24.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.7 mW /g ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.3 ± 6 %	1.92 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.8 mW / g
SAR normalized	normalized to 1W	51.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	51.5 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.96 mW / g
SAR normalized	normalized to 1W	23.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.9 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.0 Ω + 2.1 j Ω
Return Loss	- 27.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.5 Ω + 5.0 j Ω
Return Loss	- 26.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.158 ns
----------------------------------	----------

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 10, 2009

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL U12 BB

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.72 \text{ mho/m}$; $\epsilon_r = 38.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

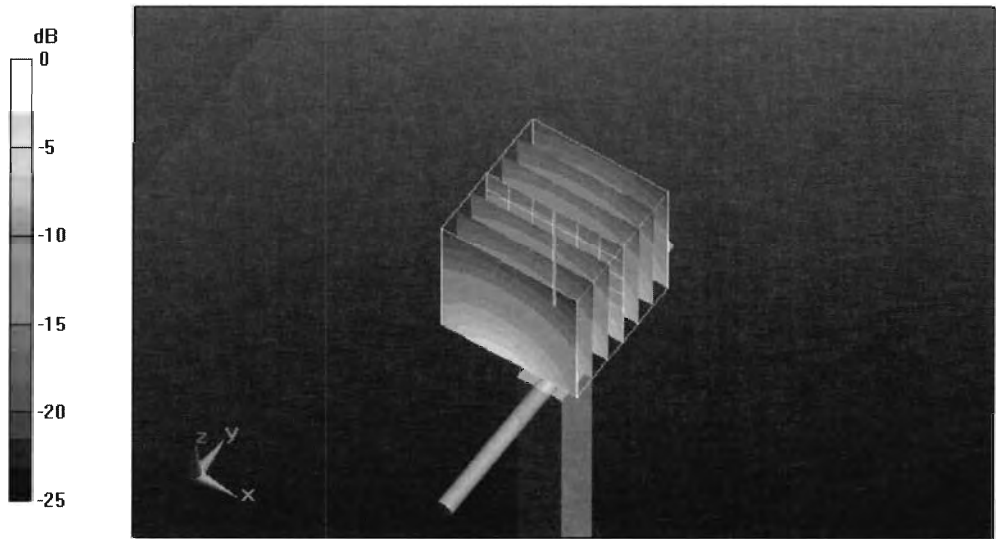
Pin=250 mW/d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 102.4 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 26.8 W/kg

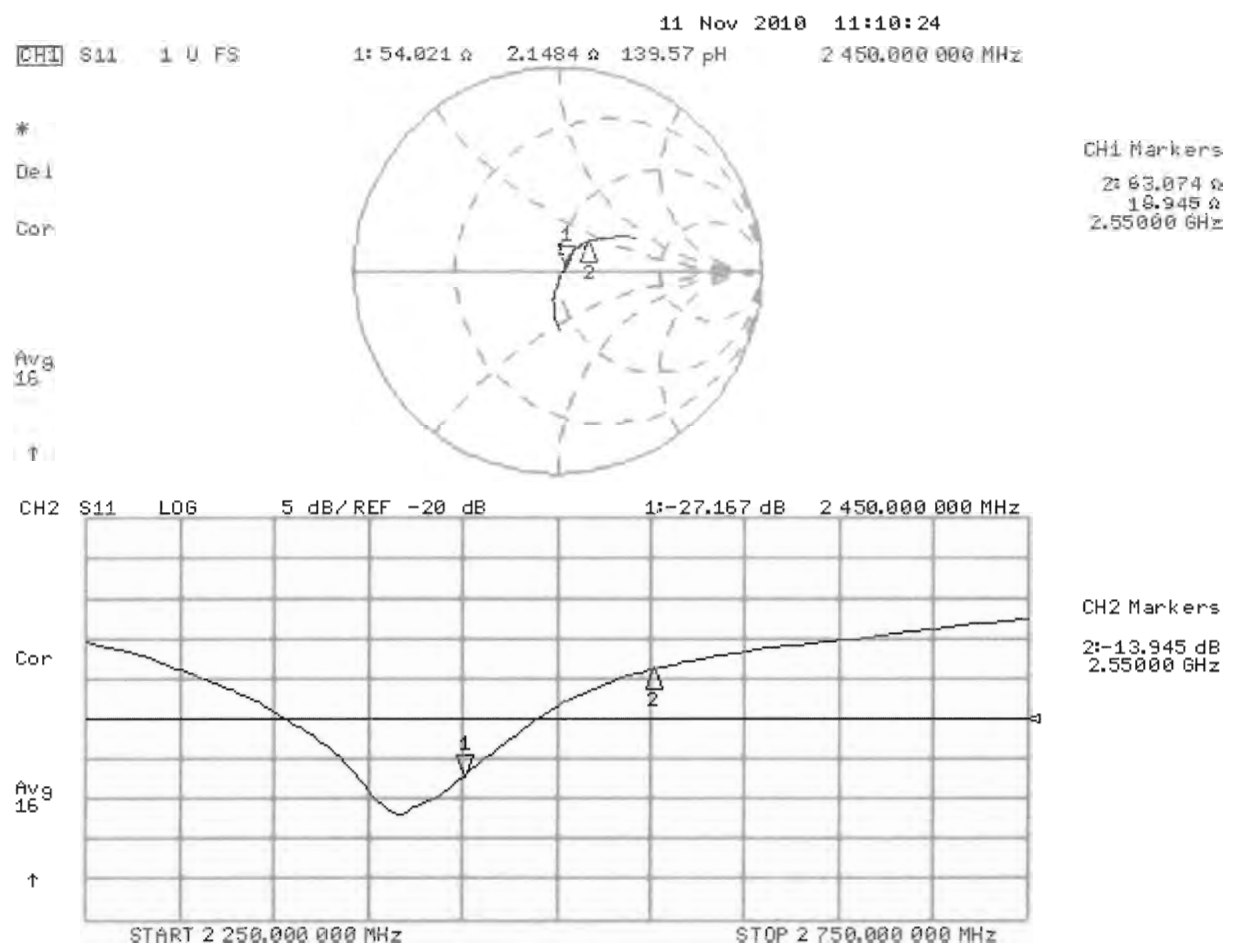
SAR(1 g) = 13.1 mW/g; SAR(10 g) = 6.13 mW/g

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



0 dB = 16.7mW/g

Impedance Measurement Plot for Head TSL



Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: MSL U12 BB

Medium parameters used: $f = 2450 \text{ MHz}$; $\sigma = 1.92 \text{ mho/m}$; $\epsilon_r = 52.3$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

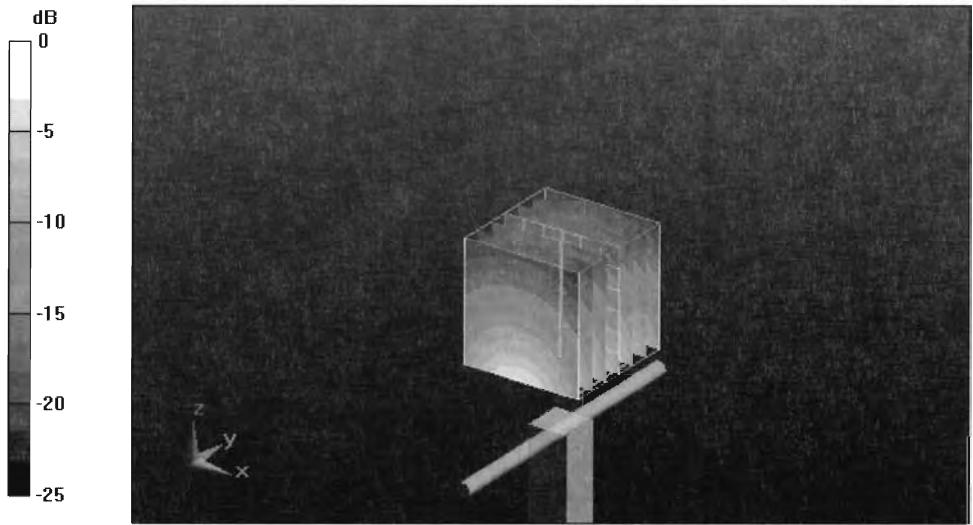
Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.4 V/m; Power Drift = 0.034 dB

Peak SAR (extrapolated) = 26.7 W/kg

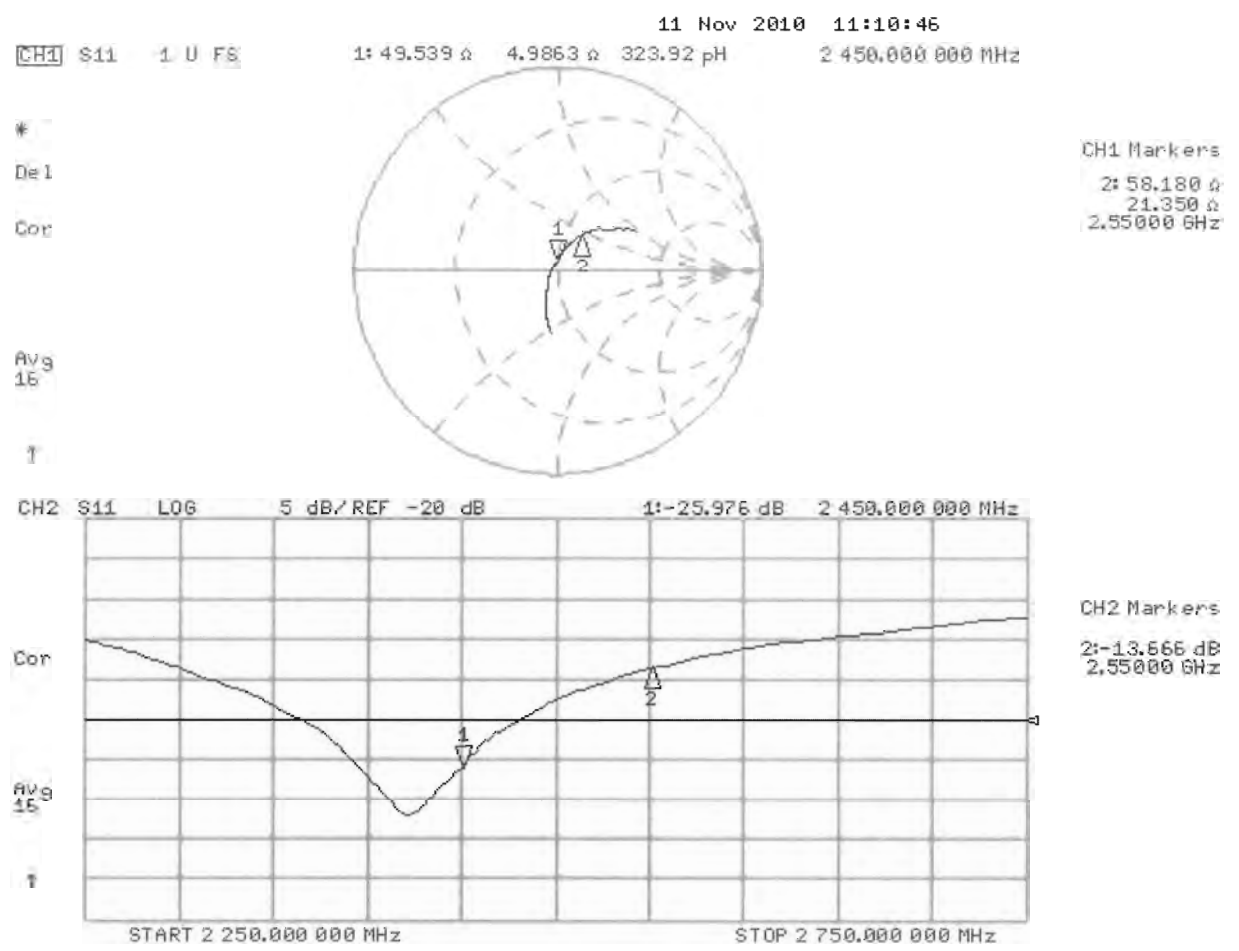
SAR(1 g) = 12.8 mW/g; SAR(10 g) = 5.96 mW/g

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



0 dB = 16.9mW/g

Impedance Measurement Plot for Body TSL



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



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Northwest EMC**

Certificate No: **D5GHzV2-1066_Nov10**

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: **November 16, 2010**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe EX3DV4	SN: 3503	05-Mar-10 (No. EX3-3503_Mar10)	Mar-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct 11

Calibrated by: **Claudio Leubler** **Laboratory Technician** 

Approved by: **Katja Pokovic** **Technical Manager** 

Issued: November 17, 2010

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



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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEC Std 62209 Part 2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", Draft Version 0.9, December 2004
- b) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- c) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Area Scan resolution	dx, dy = 10 mm	
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 2.0 mm	
Frequency	5200 MHz $\pm$ 1 MHz 5500 MHz $\pm$ 1 MHz 5800 MHz $\pm$ 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	37.2 $\pm$ 6 %	4.59 mho/m $\pm$ 6 %
Head TSL temperature during test	(21.7 $\pm$ 0.2) °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	100 mW input power	8.33 mW / g
SAR normalized	normalized to 1W	83.3 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	83.8 mW / g $\pm$ 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.35 mW / g
SAR normalized	normalized to 1W	23.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.6 mW / g $\pm$ 19.5 % (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	36.7 ± 6 %	4.90 mho/m ± 6 %
Head TSL temperature during test	(21.7 ± 0.2) °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	100 mW input power	8.88 mW / g
SAR normalized	normalized to 1W	88.8 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	89.3 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.49 mW / g
SAR normalized	normalized to 1W	24.9 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	25.0 mW / g ± 19.5 % (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	36.3 ± 6 %	5.21 mho/m ± 6 %
Head TSL temperature during test	(21.7 ± 0.2) °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	100 mW input power	8.25 mW / g
SAR normalized	normalized to 1W	82.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	82.9 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 mW / g
SAR normalized	normalized to 1W	23.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.3 mW / g ± 19.5 % (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	47.4 ± 6 %	5.32 mho/m ± 6 %
Body TSL temperature during test	(22.3 ± 0.2) °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	condition	
SAR measured	100 mW input power	7.86 mW / g
SAR normalized	normalized to 1W	78.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	78.1 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.18 mW / g
SAR normalized	normalized to 1W	21.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.6 mW / g ± 19.5 % (k=2)

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.9 ± 6 %	5.70 mho/m ± 6 %
Body TSL temperature during test	(22.3 ± 0.2) °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	condition	
SAR measured	100 mW input power	8.54 mW / g
SAR normalized	normalized to 1W	85.4 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	84.8 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.35 mW / g
SAR normalized	normalized to 1W	23.5 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.3 mW / g ± 19.5 % (k=2)

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.5 ± 6 %	6.10 mho/m ± 6 %
Body TSL temperature during test	(22.3 ± 0.2) °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	condition	
SAR measured	100 mW input power	7.61 mW / g
SAR normalized	normalized to 1W	76.1 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	75.6 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.09 mW / g
SAR normalized	normalized to 1W	20.9 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.7 mW / g ± 19.5 % (k=2)

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	$51.2 \Omega - 7.0 j\Omega$
Return Loss	-23.1 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	$52.6 \Omega - 2.8 j\Omega$
Return Loss	-28.6 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	$56.0 \Omega - 0.4 j\Omega$
Return Loss	-24.9 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	$51.4 \Omega - 5.6 j\Omega$
Return Loss	-24.8 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	$52.9 \Omega - 2.0 j\Omega$
Return Loss	-29.4 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	$56.7 \Omega + 1.2 j\Omega$
Return Loss	-23.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.198 ns
----------------------------------	----------

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	November 27, 2006

DASY5 Validation Report for Head TSL

/Time: 15.11.2010 13:45:25

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; Duty Cycle: 1:1

Medium: HSL 501

Medium parameters used: $f = 5200$ MHz; $\sigma = 4.6$ mho/m; $\epsilon_r = 37.2$; $\rho = 1000$ kg/m³,

Medium parameters used: $f = 5500$ MHz; $\sigma = 4.91$ mho/m; $\epsilon_r = 36.7$; $\rho = 1000$ kg/m³,

Medium parameters used: $f = 5800$ MHz; $\sigma = 5.22$ mho/m; $\epsilon_r = 36.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.36, 5.36, 5.36), ConvF(4.85, 4.85, 4.85), ConvF(4.74, 4.74, 4.74); Calibrated: 05.03.2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Configuration D5GHzV2 Dipole (Head)/d=10mm, Pin=100mW, f=5200 MHz/Zoom Scan (4x4x2mm), dist=2mm (8x8x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 64.7 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 32.1 W/kg

SAR(1 g) = 8.33 mW/g; SAR(10 g) = 2.35 mW/g

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

Configuration D5GHzV2 Dipole (Head)/d=10mm, Pin=100mW, f=5500 MHz/Zoom Scan (4x4x2mm), dist=2mm (8x8x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 65 V/m; Power Drift = 0.077 dB

Peak SAR (extrapolated) = 36.3 W/kg

SAR(1 g) = 8.88 mW/g; SAR(10 g) = 2.49 mW/g

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

Configuration D5GHzV2 Dipole (Head)/d=10mm, Pin=100mW, f=5800 MHz/Zoom Scan (4x4x2mm), dist=2mm (8x8x12)/Cube 0:

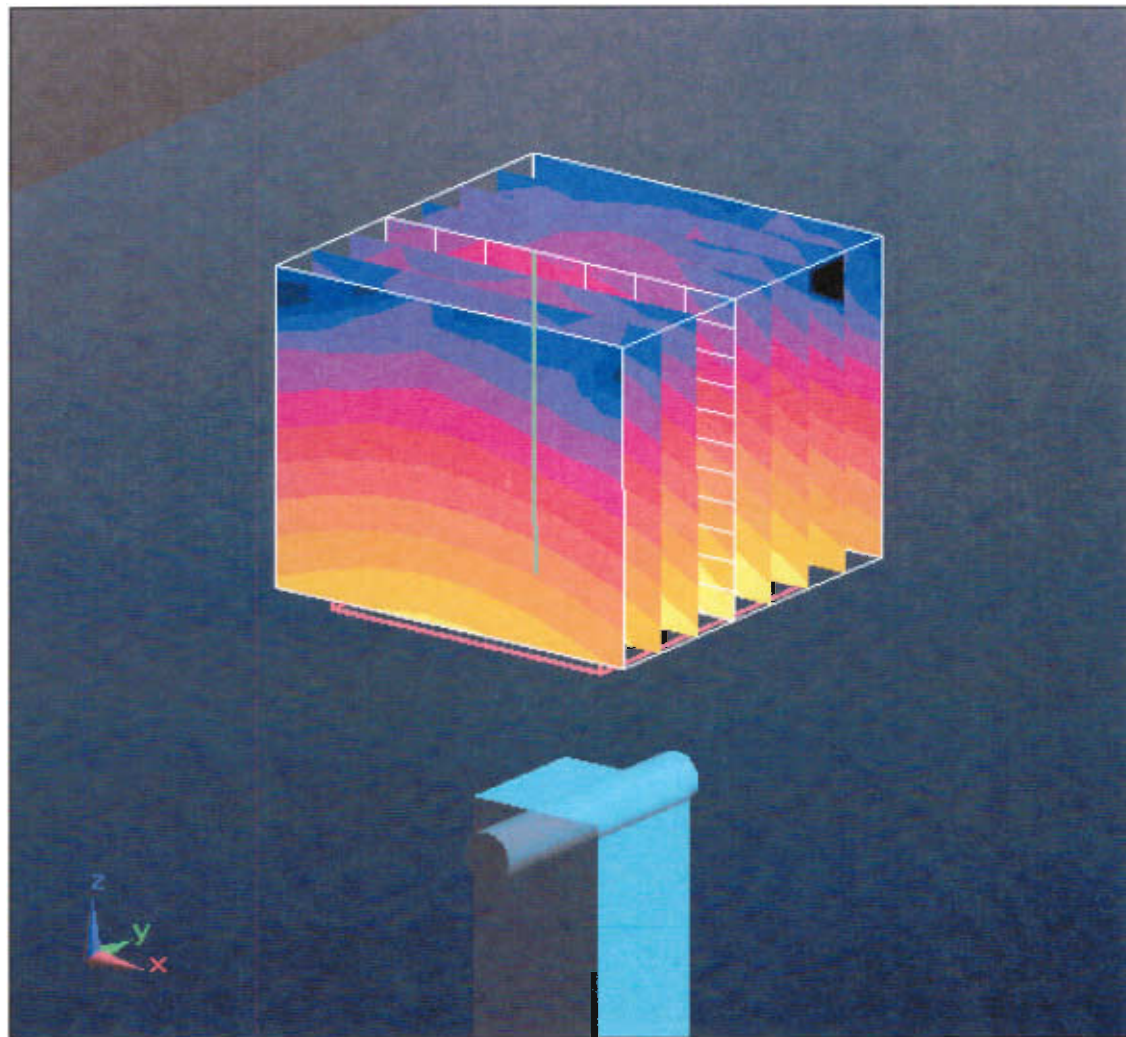
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 61.5 V/m; Power Drift = 0.062 dB

Peak SAR (extrapolated) = 34.8 W/kg

SAR(1 g) = 8.25 mW/g; SAR(10 g) = 2.32 mW/g

Maximum value of SAR (measured) = 16.4 mW/g



0 dB = 16.4mW/g

Impedance Measurement Plot for Head TSL

15 Nov 2010 09:44:56

CH1 S11 1 U FS

31 51.168 Ω -6.9785 Ω 4.3859 pF

5 200.000 000 MHz

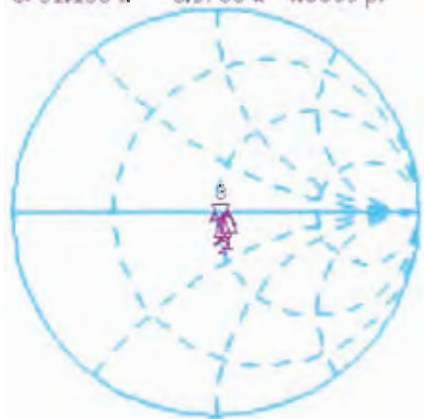
*

Del

Cor

avg

16



CH1 Markers

11 55.984 Ω

-365.23 Ω

5.80000 GHz

21 52.627 Ω

-2.7576 Ω

5.50000 GHz

CH2 S11 LOG

5 dB/REF -20 dB

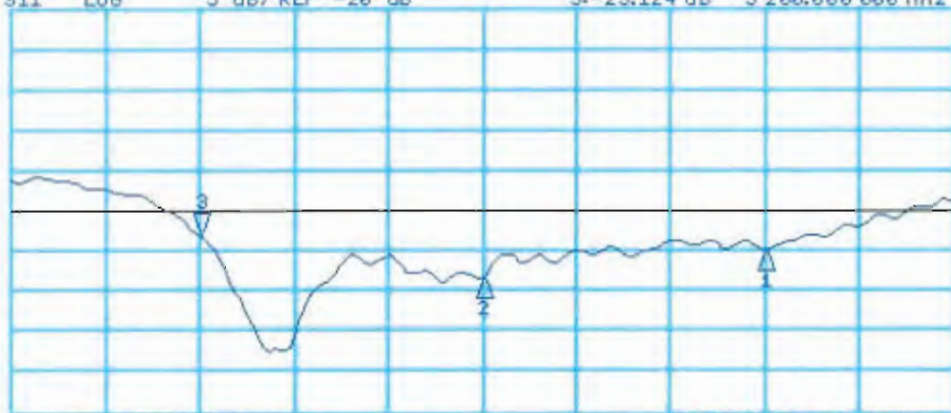
31 -23.124 dB

5 200.000 000 MHz

Cor

avg

16



CH2 Markers

11 -24.942 dB

5.80000 GHz

21 -28.572 dB

5.50000 GHz

START 5 000.000 000 MHz

STOP 6 000.000 000 MHz

DASY5 Validation Report for Body TSL

Date/Time: 16.11.2010 15:06:09

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; Duty Cycle: 1:1

Medium: MSL 5000 MHz

Medium parameters used: $f = 5200$ MHz; $\sigma = 5.3$ mho/m; $\epsilon_r = 47.4$; $\rho = 1000$ kg/m³,

Medium parameters used: $f = 5500$ MHz; $\sigma = 5.68$ mho/m; $\epsilon_r = 46.9$; $\rho = 1000$ kg/m³,

Medium parameters used: $f = 5800$ MHz; $\sigma = 6.08$ mho/m; $\epsilon_r = 46.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.88, 4.88, 4.88), ConvF(4.37, 4.37, 4.37), ConvF(4.57, 4.57, 4.57); Calibrated: 05.03.2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Configuration D5GHzV2 Dipole (Body)/d=10mm, Pin=100mW, f=5200 MHz/Zoom Scan (4x4x2mm), dist=2mm (8x8x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 60.6 V/m; Power Drift = 0.011 dB

Peak SAR (extrapolated) = 32 W/kg

SAR(1 g) = 7.86 mW/g; SAR(10 g) = 2.18 mW/g

Maximum value of SAR (measured) = 15.4 mW/g

Configuration D5GHzV2 Dipole (Body)/d=10mm, Pin=100mW, f=5500 MHz/Zoom Scan (4x4x2mm), dist=2mm (8x8x12)/Cube 0:

Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 61.2 V/m; Power Drift = -0.016 dB

Peak SAR (extrapolated) = 36.6 W/kg

SAR(1 g) = 8.54 mW/g; SAR(10 g) = 2.35 mW/g

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

Configuration D5GHzV2 Dipole (Body)/d=10mm, Pin=100mW, f=5800 MHz/Zoom Scan (4x4x2mm), dist=2mm (8x8x12)/Cube 0:

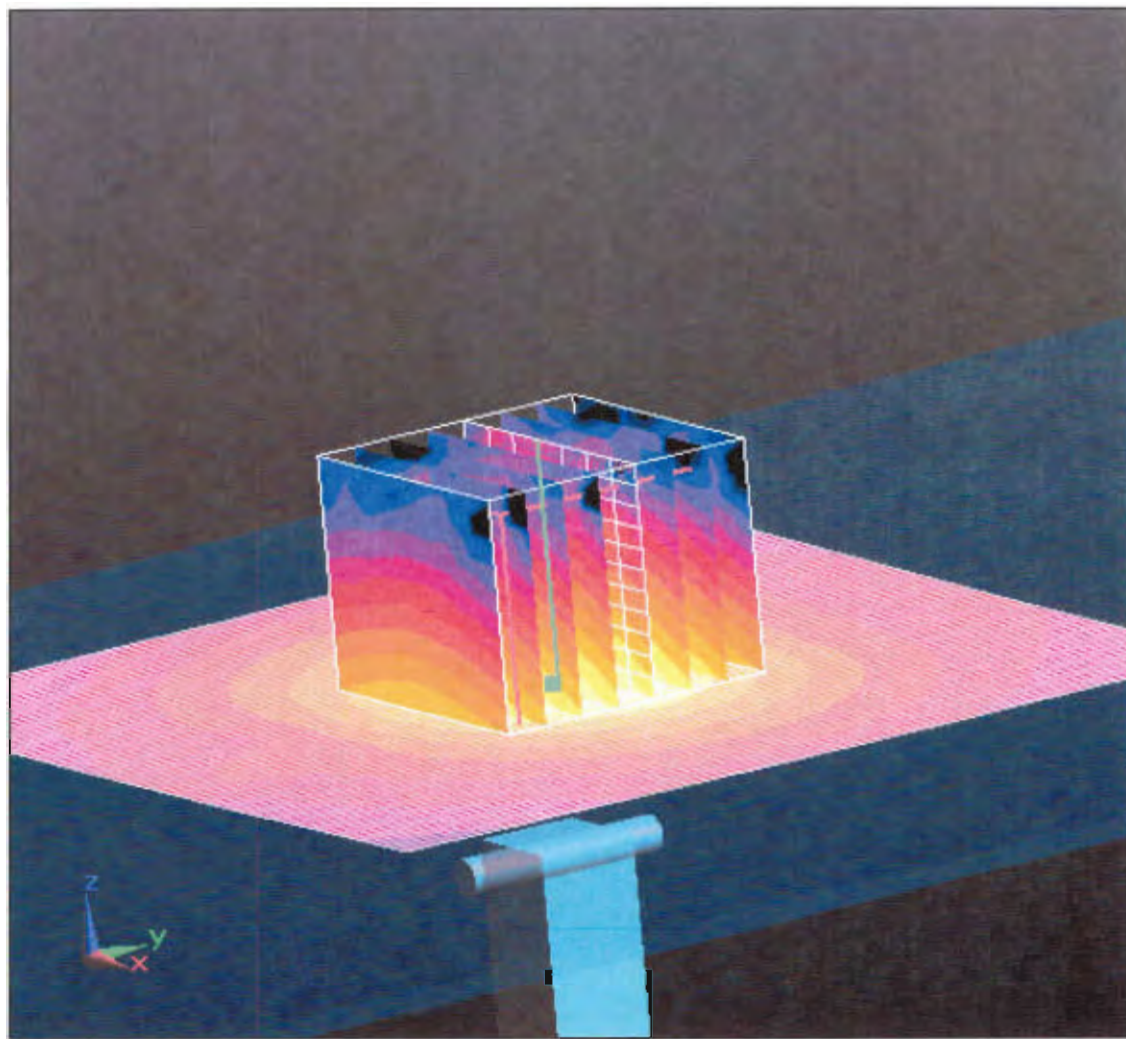
Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 56.3 V/m; Power Drift = 0.033 dB

Peak SAR (extrapolated) = 34.4 W/kg

SAR(1 g) = 7.61 mW/g; SAR(10 g) = 2.09 mW/g

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



0 dB = 15.1mW/g

Impedance Measurement Plot for Body TSL

16 Nov 2010 12:14:24

CH1 S11 1 U FS 3: 51.412 Ω -5.6426 Ω 5.4242 pF 5 200.000 000 MHz

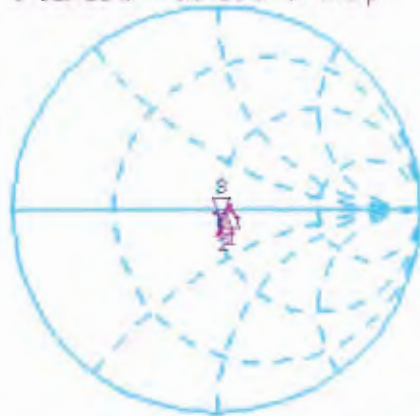
*

Del

Cor

Avg
16

t



CH1 Markers

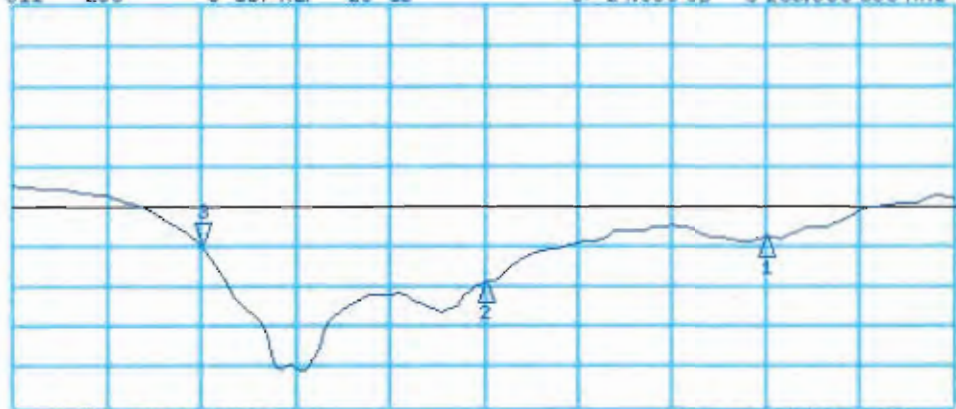
1: 56.717 Ω
1.2324 Ω
5.0000 GHz
2: 52.865 Ω
-1.9766 Ω
5.5000 GHz

CH2 S11 LOG 5 dB/REF -20 dB 3: -24.835 dB 5 200.000 000 MHz

Cor

Avg
16

t



CH2 Markers

1: -23.876 dB
5.0000 GHz
2: -29.399 dB
5.5000 GHz

START 5 000.000 000 MHz

STOP 5 000.000 000 MHz