

# Intermec Technologies Corporation

## Model: 1000CP03C

Evaluated to the following SAR Specifications:

FCC 2.1093: 2011  
Health Safety Code 6:2009

Report No. INMC0737.1 Rev 01

Report Prepared By



[www.nwemc.com](http://www.nwemc.com)  
1-888-EMI-CERT

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SAR Evaluation Report

**Certificate of Evaluation**  
**Last Date of Test: October 6, 2011**  
**Intermec Technologies Corporation**  
**Model: 1000CP03C**

Applicable Standards			
Test Description	Specification	Test Method	Pass/Fail
SAR Evaluation	FCC 2.1093:2011	FCC OET 65C:2001	Pass
		IEEE Std 1528:2003	
		FCC KDB 447498 D01 v04	
		FCC KDB 941225 D01 v02, and D03	
	FCC KDB 648474 D01 v01r05	Pass	
Health Safety Code 6:2009	RSS-102, Issue 4:2010		

Highest SAR Values				
Frequency Band	Head 1g (W/kg)	Body 1g (W/kg)	Limit 1g (W/kg)	Exposure Environment
Cellular	.377	1.12	1.6	General Population Uncontrolled
PCS	.517	1.19 <sup>Note 1</sup>		

Note 1: 12mm spacing required between left side of EUT and body phantom

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

**Test Facility**

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

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

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

**Approved By:**



Don Facticeau, IS Manager



NVLAP Lab Code: 200630-0

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

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

Revision Number	Description	Date	Page Number
01	Corrected model number of unit	10/27/11	30-61

**Barometric Pressure**

The recorded barometric pressure has been normalized to sea level.



# Accreditations and Authorizations

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## 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.

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## 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.

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## 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*)

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## 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.

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## 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).

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# Accreditations and Authorizations

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## 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.*)

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## 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).

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## 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

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## 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*)

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## 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.

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## SCOPE

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

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



# Northwest EMC Locations



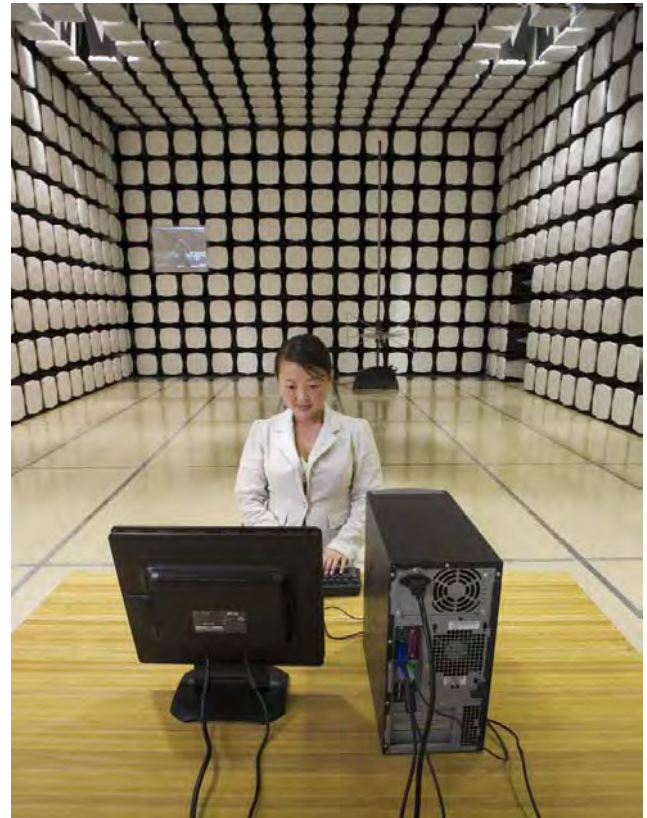
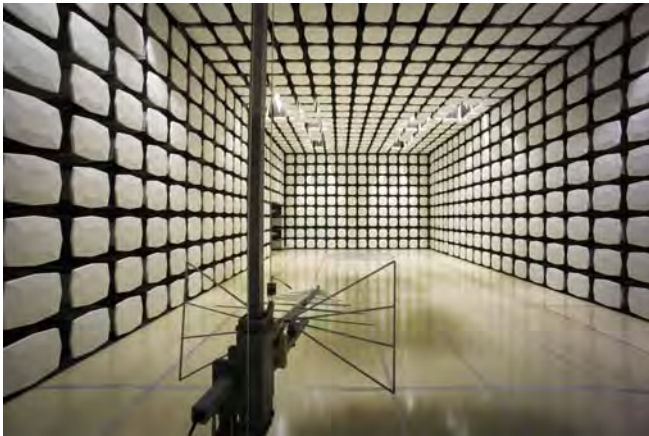
Oregon  
Labs EV01-EV12  
22975 NW Evergreen Pkwy  
Suite 400  
Hillsboro, OR 97124  
(503) 844-4066

California  
Labs OC01-OC13  
41 Tesla  
Irvine, CA 92618  
(949) 861-8918

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

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

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



## Party Requesting the Test

<b>Company Name:</b>	Intermec Technologies Corporation
<b>Address:</b>	550 Second St. SE
<b>City, State, Zip:</b>	Cedar Rapids, IA 52401-2023
<b>Test Requested By:</b>	Stu Adams
<b>Model:</b>	1000CP03C
<b>First Date of Test:</b>	September 19, 2011
<b>Last Date of Test:</b>	October 6, 2011
<b>Receipt Date of Samples:</b>	September 16, 2011
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage

## Information Provided by the Party Requesting the Test

## Functional Description of the EUT (Equipment Under Test)

The EUT is the Model 1000CP03C handheld computer containing two radio modules, the Intermec Model RC12 and the Sierra Wireless MC5728V, 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 MC5728V radio module is a CDMA (EVDO Rev A) radio. Its frequency range:

- 824.7 – 848.31 MHz
- 1851.25 – 1908.8 MHz

The closest spacing between the CDMA 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 CDMA antenna is on the left side.

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

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

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

**Overview of the SAR Evaluation****Objective**

To demonstrate compliance with the SAR requirements of FCC 2.1093 and Canada's Health Safety Code 6. This evaluation will be used to support a Class 2 Permissive Change authorization of FCC ID: EHA-1000CP01CX2. The following changes have been made: the barcode scanner in the previously certified Model 1000CP01C has been slightly repositioned so that it points straight out, instead of tilted downward, resulting in the new Model 1000CP03C (subject of this SAR evaluation). A new holster has been developed for use with Model 1000CP03C that is worn on the wrist / forearm.

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

**Scope**

The 802.11a/b/g/n – Bluetooth radio was evaluated under a separate SAR evaluation report.

Regarding the CDMA (EVDO Rev A) radio:

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

*“Routine SAR evaluation with respect to Section 2.1093 of the rules is required for licensed transmitter to show compliance.”*

The SAR evaluation documented in this report is for the CDMA (EVDO Rev A) portion of the EUT.



**CONFIGURATION 1 INMC0737**

<b>EUT</b>			
<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
Wrist Holster	Taylor Made	TM-CCN70-WS-SW - T5, Revision B	None
Battery	Intermec Technologies Corporation	1000AB01	16961001770
Battery	Intermec Technologies Corporation	1000AB01	24561000347
Handheld Computer	Intermec Technologies Corporation	1000CP03C	14621142016

**CONFIGURATION 2 INMC0737**

<b>EUT</b>			
<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
Battery	Intermec Technologies Corporation	1000AB01	16961001770
Battery	Intermec Technologies Corporation	1000AB01	24561000347
Handheld Computer	Intermec Technologies Corporation	1000CP03C	14621142016

<b>Equipment modifications</b>					
Item	Date	Test	Modification	Note	Disposition of EUT
1	9/19/11	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	9/30/11	SAR Evaluation	Moved left side of EUT 12mm from body phantom	Pat Helton of Intermec said additional padding will be added to the holster to insure a 12mm minimum spacing on the left side.	EUT remained at Northwest EMC following the test.
3	10/6/11	SAR Evaluation	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Per FCC KDB 941225, the conducted output power was measured at the low, middle and high channels in each band. An Agilent 8960 test set, Model E5515C, was used to control the EUT. The following applications were installed on the test set: CDMA 2000 Mobile Test Rev B.18.12, and EVDO Term Test Rev A.13.10. This provided all the necessary tools to operate the EUT in the prescribed manner without any difficulties or equipment limitations.

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

## 1XRTT

Per FCC KDB 941225, measurements for 1XRTT were made according to the procedures in section 4.4.5.2 of 3GPP2C.S0011/TIA-98-E. Results for steps 3, 4, and 10 of the power measurement procedure are tabulated on the following pages. SO55 was measured with power control bits in "All Up" condition; TDSO/SO32 was measured with power control bits in the "Bits Hold" condition.

The Agilent 8960 test set was configured as follows:

- Cell Info > Cell Parameters > System ID (SID) > 16420
  - Network ID (NID) > 65535
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > See attached data sheet
- FCH Service Option (SO) Setup > See attached data sheet
- Traffic Data Rate > Full (9.6kbps)
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps
  - R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Rvs Power Ctrl > Active bits (SO32)
- Rvs Power Ctrl > All Up bits (Maximum TxPout) (SO55)
- Call Params
  - Cell Power > set to -104 dBm/1.23 MHz (SO55)
  - Cell Power > Start at -86 dBm/1.23 MHz , then decrease until max power is reached (SO32)

## EVDO Rev 0

Per FCC KDB 941225, measurements for EVDO Rev 0 were made according to the procedures in section 3.1.2.3.4 of 3GPP2 C.S0033-0/TIA-866. The results are tabulated on the following pages.

The Agilent 8960 test set was configured as follows:

### RTAP Settings

- Call Control:
  - Generator Info > Channel Data Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Params:
  - Cell Power > Set to -105.5 dBm/1.23 MHz
  - Application Config > Enhanced Test Application Protocol > RTAP
  - RTAP Rate > 153.6 kbps
  - Protocol Rel > 0 (1xEV-DO)
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

**FTAP Settings**

Call Control:  
Generator Info > Channel Data Info > Termination Parameters > Max Forward Packet Duration > 16 Slots

Call Params:  
Cell Power > Set to -105.5 dBm/1.23 MHz  
Application Config > Enhanced Test Application Protocol > FTAP  
FTAP Rate > 307.2 kbps (2 slot, QPSK)  
Protocol Rel > 0 (1xEV-DO)  
Rvs Power Ctrl > All Up bits (Maximum TxPout)

**EVDO Rev A**

For EVDO Rev A mode, measurements were made according to the procedures in section 4.3.4 of 3GPP2 C.S0033-A. The results are tabulated on the following pages.

The Agilent 8960 test set was configured as follows:

**RETAP Settings**

Call Params:  
Cell Power > Set to -60 dBm/1.23 MHz  
Protocol Rev > A (1xEV-DO-A)  
Application Config > Enhanced Test Application Protocol > RETAP  
R-Data Pkt Size > 4096  
Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2

Call Control:  
PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0):  
Generator Info > Channel Data Info > Termination Parameters > Max Forward Packet Duration > 16 Slots  
ACK R-Data After > Subpacket 0 (All ACK)  
Rvs Power Ctrl > All Up bits (Maximum TxPout)

**FETAP Settings**

Call Params:  
Cell Power > Set to -60 dBm/1.23 MHz  
Protocol Rev > A (1xEV-DO-A)  
Application Config > Enhanced Test Application Protocol > FETAP  
F-Traffic Format > 4 (1024, 2, 128) Canonical (307.2k, QPSK)  
Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2

Call Control:  
PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0):  
Generator Info > Channel Data Info > Termination Parameters > Max Forward Packet Duration > 16 Slots  
ACK R-Data After > Subpacket 0 (All ACK)  
Rvs Power Ctrl > All Up bits (Maximum TxPout)

NORTHWEST		EMC		Output Power		XMR 2011.01.18	
EUT: 1000CP03C				Work Order: INMC0737			
Serial Number: 14621142016				Date: 09/19/11			
Customer: Intermec Technologies Corporation				Temperature: 24.2			
Attendees: None				Humidity: 45%			
Project:				Barometric Pres.: 1024.3			
Tested by: Rod Peloquin		EUT Power		Battery		Job Site: EV08	
TEST SPECIFICATIONS				Test Method			
FCC 2.1093:2011				FCC OET 65C:2001			
<b>COMMENTS</b>							
Conducted output power							
<b>DEVIATIONS FROM TEST STANDARD</b>							
None							
Configuration #	2	Signature <i>Rod Peloquin</i>					

### CDMA 2000 1x

Band	Channel	Frequency (MHz)	Radio Configuration (RC)	Service Option (SO)	Conducted Power (Average)		
					dBm	W	
Cellular Band	1013	824.7	RC3 (Fwd3, Rvs3)	SO55 (Loopback)	24.58	0.287	
				SO32 (FCH+SCH)	23.39	0.218	
				S032(FCH)	23.94	0.248	
	384	836.52	RC3 (Fwd3, Rvs3)	RC1(Fwd1, Rvs1)	SO55 (Loopback)	24.62	0.290
				SO55 (Loopback)	24.78	0.301	
				SO32 (FCH+SCH)	23.59	0.229	
	777	848.31	RC3 (Fwd3, Rvs3)	SO32(FCH)	24.58	0.287	
				RC1(Fwd1, Rvs1)	SO55 (Loopback)	24.86	0.306
				SO55 (Loopback)	24.58	0.287	
PCS Band	25	1851.25	RC3 (Fwd3, Rvs3)	SO32 (FCH+SCH)	23.34	0.216	
				SO55 (Loopback)	24.58	0.287	
				S032(FCH)	24.53	0.284	
	600	1880	RC3 (Fwd3, Rvs3)	RC1(Fwd1, Rvs1)	SO55 (Loopback)	24.59	0.288
				SO55 (Loopback)	25.17	0.329	
				SO32 (FCH+SCH)	23.67	0.233	
	1175	1908.75	RC3 (Fwd3, Rvs3)	S032(FCH)	24.4	0.275	
				RC1(Fwd1, Rvs1)	SO55 (Loopback)	25.26	0.336
				SO55 (Loopback)	25.25	0.335	
600	1880	RC3 (Fwd3, Rvs3)	SO32 (FCH+SCH)	23.85	0.243		
			SO32(FCH)	24.19	0.262		
			RC1(Fwd1, Rvs1)	SO55 (Loopback)	25.23	0.333	
1175	1908.75	RC3 (Fwd3, Rvs3)	SO55 (Loopback)	24.89	0.308		
			SO32 (FCH+SCH)	23.62	0.230		
			S032(FCH)	22.62	0.183		
1175	1908.75	RC3 (Fwd3, Rvs3)	RC1(Fwd1, Rvs1)	SO55 (Loopback)	24.97	0.314	

### EV-DO Rev 0

Band	Channel	Frequency (MHz)	FTAP Rate (kbps)	RTAP Rate (kbps)	Conducted Power (Average - MAP)	
					dBm	W
Cellular	1013	824.70	307.2 (2 slot, QPSK)	153.6	24.62	0.290
	384	836.52			24.87	0.307
	777	848.31			24.66	0.292
PCS	25	1851.25	307.2 (2 slot, QPSK)	153.6	25.19	0.330
	600	1880.00			25.21	0.332
	1175	1908.75			25.12	0.325

### EV-DO Rev A

Band	Channel	Frequency (MHz)	FETAP-Traffic Format (kbps)	RETAP-Data Payload Size	Conducted Power (Average)	
					dBm	W
Cellular	1013	824.70	307.2 (QPSK/ACK channel is transmitted at all the slots)	4096	24.74	0.298
	384	836.52			25.04	0.319
	777	848.31			24.65	0.292
PCS	25	1851.25	307.2 (QPSK/ACK channel is transmitted at all the slots)	4096	25.23	0.333
	600	1880.00			25.26	0.336
	1175	1908.75			25.04	0.319

### Characterization of tissue-equivalent liquid dielectric properties

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

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

### Target values of dielectric parameters

Per FCC OET 65C, Appendix C:

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

Target Frequency (MHz)	Head		Body	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (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

( $\epsilon_r$  = relative permittivity,  $\sigma$  = 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<sup>+</sup>% Pure Sodium Chloride

Sugar: 98<sup>+</sup>% Pure Sucrose

Water: De-ionized, 16 M $\Omega$ <sup>+</sup> resistivity

HEC: Hydroxyethyl Cellulose

DGBE: 99<sup>+</sup>% 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		<b>EMC</b>		<b>Tissue - Equivalent Liquid</b>		SAR 2011.02.21	
EUT: MSL900				Work Order: INMC0737			
Serial Number: SAT				Date: 09/19/2011			
Customer: Intermec Technologies Corporation				Temperature (°C): 22.8			
Attendees: None				Humidity: 48			
Project: P-INMC018				Barometric Pres. (mb): 1022.30			
Tested by: Ethan Schoonover and Jennifer Herrett				Power: None			
Job Site: Cal Lab							
TEST SPECIFICATIONS				Test Method			
FCC 2.1093:2011				FCC OET 65C:2001			
<b>COMMENTS</b>							
None							
<b>DEVIATIONS FROM TEST STANDARD</b>							
None							
Configuration #	None	Signature <i>Jennifer Herrett</i>					
<b>Tissue: MSL900</b>				<b>Liquid Temperature (°C): 22.9</b>			

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
	54.571	0.996	55.200	0.970	1.14	-2.71
700.0	55.9	0.868				
705.0	55.8	0.873				
710.0	55.8	0.878				
715.0	55.7	0.882				
720.0	55.7	0.887				
725.0	55.6	0.891				
730.0	55.6	0.895				
735.0	55.5	0.900				
740.0	55.5	0.905				
745.0	55.4	0.909				
750.0	55.3	0.914				
755.0	55.3	0.918				
760.0	55.2	0.922				
765.0	55.2	0.927				
770.0	55.2	0.931				
775.0	55.1	0.936				
780.0	55.1	0.941				
785.0	55.1	0.946				
790.0	55.0	0.951				
795.0	55.0	0.957				
800.0	54.9	0.962				
805.0	54.9	0.967				
810.0	54.8	0.972				
815.0	54.8	0.977				
820.0	54.7	0.981				
825.0	54.7	0.987				
830.0	54.6	0.991				
835.0	54.6	0.996				
840.0	54.5	1.002				
845.0	54.5	1.006				
850.0	54.4	1.011				
855.0	54.4	1.016				
860.0	54.3	1.021				
865.0	54.3	1.026				
870.0	54.2	1.031				
875.0	54.2	1.036				
880.0	54.1	1.041				
885.0	54.1	1.045				
890.0	54.0	1.051				
895.0	54.0	1.055				
900.0	53.9	1.060				
905.0	53.9	1.065				
910.0	53.9	1.071				
915.0	53.8	1.076				
920.0	53.8	1.080				
925.0	53.7	1.085				
930.0	53.7	1.090				
935.0	53.6	1.095				
940.0	53.6	1.100				
945.0	53.5	1.105				
950.0	53.5	1.110				
955.0	53.4	1.115				
960.0	53.4	1.119				
965.0	53.4	1.124				
970.0	53.3	1.129				
975.0	53.3	1.134				
980.0	53.2	1.139				
985.0	53.2	1.144				
990.0	53.2	1.149				
995.0	53.1	1.155				
1000.0	53.1	1.160				
1005.0	53.0	1.165				
1010.0	53.0	1.170				
1015.0	52.9	1.175				
1020.0	52.9	1.180				
1025.0	52.9	1.185				
1030.0	52.8	1.191				
1035.0	52.8	1.196				
1040.0	52.7	1.201				
1045.0	52.7	1.207				
1050.0	52.7	1.212				
1055.0	52.6	1.217				
1060.0	52.6	1.223				
1065.0	52.5	1.228				
1070.0	52.5	1.234				
1075.0	52.5	1.239				
1080.0	52.4	1.244				
1085.0	52.4	1.250				
1090.0	52.3	1.255				
1095.0	52.3	1.260				
1100.0	52.2	1.265				
1105.0	52.2	1.270				
1110.0	52.2	1.275				
1115.0	52.1	1.280				
1120.0	52.1	1.285				
1125.0	52.0	1.291				
1130.0	52.0	1.296				
1135.0	51.9	1.301				
1140.0	51.9	1.306				
1145.0	51.9	1.311				
1150.0	51.8	1.316				
1155.0	51.8	1.322				
1160.0	51.7	1.327				
1165.0	51.7	1.332				
1170.0	51.7	1.337				
1175.0	51.6	1.342				
1180.0	51.6	1.347				
1185.0	51.5	1.352				
1190.0	51.5	1.357				
1195.0	51.5	1.362				
1200.0	51.4	1.368				



NORTHWEST EMC		Tissue - Equivalent Liquid		SAR 2011.02.21	
EUT: HSL900			Work Order: INMC0737		
Serial Number: SAS			Date: 09/20/2011		
Customer: Intermec Technologies Corporation			Temperature (°C): 22.6		
Attendees: none			Humidity: 45.1		
Project: PINMC018			Barometric Pres. (mb): 1019		
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: HSL900			Liquid Temperature (°C): 22.1		

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
835	41.366	0.861	41.500	0.900	0.32	4.28
700.0	42.9	0.742				
705.0	42.9	0.747				
710.0	42.8	0.751				
715.0	42.7	0.756				
720.0	42.7	0.760				
725.0	42.6	0.765				
730.0	42.5	0.770				
735.0	42.5	0.774				
740.0	42.4	0.779				
745.0	42.4	0.783				
750.0	42.3	0.788				
755.0	42.3	0.793				
760.0	42.2	0.797				
765.0	42.1	0.802				
770.0	42.1	0.806				
775.0	42.0	0.811				
780.0	42.0	0.815				
785.0	41.9	0.819				
790.0	41.9	0.824				
795.0	41.8	0.828				
800.0	41.8	0.832				
805.0	41.7	0.836				
810.0	41.7	0.841				
815.0	41.6	0.845				
820.0	41.5	0.849				
825.0	41.5	0.853				
830.0	41.4	0.857				
835.0	41.4	0.861				
840.0	41.3	0.866				
845.0	41.2	0.870				
850.0	41.2	0.875				
855.0	41.1	0.879				
860.0	41.0	0.884				
865.0	41.0	0.888				
870.0	40.9	0.893				
875.0	40.8	0.897				
880.0	40.8	0.901				
885.0	40.7	0.905				
890.0	40.7	0.910				
895.0	40.6	0.915				
900.0	40.6	0.919				
905.0	40.5	0.923				
910.0	40.4	0.928				
915.0	40.4	0.932				
920.0	40.3	0.936				
925.0	40.3	0.940				
930.0	40.2	0.945				
935.0	40.2	0.948				
940.0	40.1	0.953				
945.0	40.0	0.956				
950.0	40.0	0.960				
955.0	39.9	0.964				
960.0	39.9	0.968				
965.0	39.8	0.972				
970.0	39.8	0.976				
975.0	39.7	0.979				
980.0	39.7	0.984				
985.0	39.7	0.988				
990.0	39.6	0.992				
995.0	39.6	0.997				
1000.0	39.5	1.002				
1005.0	39.5	1.006				
1010.0	39.4	1.011				
1015.0	39.4	1.016				
1020.0	39.3	1.021				
1025.0	39.3	1.026				
1030.0	39.2	1.030				
1035.0	39.2	1.035				
1040.0	39.2	1.040				
1045.0	39.1	1.044				
1050.0	39.1	1.049				
1055.0	39.0	1.053				
1060.0	39.0	1.058				
1065.0	38.9	1.063				
1070.0	38.9	1.067				
1075.0	38.8	1.072				
1080.0	38.8	1.076				
1085.0	38.8	1.081				
1090.0	38.7	1.085				
1095.0	38.7	1.089				
1100.0	38.6	1.094				
1105.0	38.6	1.098				
1110.0	38.5	1.101				
1115.0	38.5	1.106				
1120.0	38.4	1.110				
1125.0	38.4	1.114				
1130.0	38.4	1.118				
1135.0	38.3	1.122				
1140.0	38.3	1.127				
1145.0	38.2	1.131				
1150.0	38.2	1.135				
1155.0	38.1	1.139				
1160.0	38.1	1.143				
1165.0	38.0	1.148				
1170.0	38.0	1.152				
1175.0	37.9	1.156				
1180.0	37.9	1.160				
1185.0	37.9	1.165				
1190.0	37.8	1.169				
1195.0	37.8	1.173				
1200.0	37.7	1.178				

**EMC****Tissue - Equivalent Liquid**

EUT: MSL 1900	Work Order: INMC0737
Serial Number: SAO	Date: 9-20-2011
Customer: Intermec Technologies Corporation	Temperature (°C): 23.5
Attendees: None	Humidity: 44.6
Project: P-INMC018	Barometric Pres. (mb): 1018.1
Tested by: Ethan Schoonover	Power: N/A
Job Site: Cal Lab	
<b>TEST SPECIFICATIONS</b>	
FCC 2.1093:2011	Test Method FCC OET 65C:2001
<b>COMMENTS</b>	
None	
<b>DEVIATIONS FROM TEST STANDARD</b>	
None	
Configuration #	None
Signature <i>Jennifer Herritt</i>	
<b>Tissue: MSL 1900                      Liquid Temperature (°C): 22.3</b>	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
1900	52.104	1.490	53.300	1.520	2.24	1.99

1600.0	53.2	1.161
1612.5	53.2	1.176
1625.0	53.1	1.190
1637.5	53.1	1.204
1650.0	53.0	1.218
1662.5	53.0	1.233
1675.0	52.9	1.246
1687.5	52.9	1.259
1700.0	52.8	1.272
1712.5	52.8	1.284
1725.0	52.7	1.297
1737.5	52.7	1.309
1750.0	52.7	1.322
1762.5	52.6	1.335
1775.0	52.6	1.349
1787.5	52.5	1.363
1800.0	52.5	1.377
1812.5	52.5	1.392
1825.0	52.4	1.407
1837.5	52.4	1.421
1850.0	52.3	1.435
1862.5	52.3	1.449
1875.0	52.2	1.463
1887.5	52.1	1.476
1900.0	52.1	1.490
1912.5	52.1	1.503
1925.0	52.0	1.516
1937.5	52.0	1.530
1950.0	51.9	1.544
1962.5	51.9	1.559
1975.0	51.9	1.574
1987.5	51.8	1.588
2000.0	51.8	1.603

**EMC****Tissue - Equivalent Liquid**

EUT: HSL1900		Work Order: INMC0737	
Serial Number: SAN		Date: 09/21/2011	
Customer: Intermec Technologies Corporation		Temperature (°C): 23.3	
Attendees: None		Humidity: 44.7	
Project: P-INMC018		Barometric Pres. (mb): 1016.50	
Tested by: Jennifer Herrett		Power: None	
Job Site: Cal Lab			
<b>TEST SPECIFICATIONS</b>		<b>Test Method</b>	
FCC 2.1093:2011		FCC OET 65C:2001	
<b>COMMENTS</b>			
None			
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			
Configuration #	None	Signature <i>Jennifer Herrett</i>	
<b>Tissue: HSL1900</b>		<b>Liquid Temperature (°C): 21.6</b>	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
1900	38.844	1.372	40.000	1.400	2.89	2.02

1600.0	40.2	1.074
1612.5	40.1	1.087
1625.0	40.1	1.100
1637.5	40.0	1.113
1650.0	40.0	1.126
1662.5	39.9	1.139
1675.0	39.8	1.152
1687.5	39.8	1.163
1700.0	39.7	1.174
1712.5	39.7	1.185
1725.0	39.6	1.197
1737.5	39.5	1.209
1750.0	39.5	1.220
1762.5	39.4	1.233
1775.0	39.4	1.245
1787.5	39.4	1.258
1800.0	39.3	1.271
1812.5	39.2	1.284
1825.0	39.2	1.297
1837.5	39.1	1.310
1850.0	39.1	1.323
1862.5	39.0	1.335
1875.0	39.0	1.348
1887.5	38.9	1.359
1900.0	38.8	1.372
1912.5	38.8	1.384
1925.0	38.7	1.396
1937.5	38.7	1.408
1950.0	38.7	1.421
1962.5	38.6	1.433
1975.0	38.6	1.446
1987.5	38.5	1.459
2000.0	38.5	1.472

**EMC****Tissue - Equivalent Liquid**

EUT: MSL1900		Work Order: INMC0737	
Serial Number: SAO		Date: 10/05/2011	
Customer: Intermec Technologies Corporation		Temperature (°C): 22.4	
Attendees: none		Humidity: 45.6	
Project: P-INMC018		Barometric Pres. (mb): 1000.60	
Tested by: Jennifer Herrett		Power: None	
Job Site: Cal Lab			
<b>TEST SPECIFICATIONS</b>		<b>Test Method</b>	
FCC 2.1093:2011		FCC OET 65C:2001	
<b>COMMENTS</b>			
None			
<b>DEVIATIONS FROM TEST STANDARD</b>			
None			
Configuration #	None	Signature <i>Jennifer Herrett</i>	
<b>Tissue: MSL1900</b>		<b>Liquid Temperature (°C): 22.4</b>	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
1900	51.920	1.570	53.300	1.520	2.59	-3.31

1600.0	53.1	1.234
1612.5	53.0	1.247
1625.0	53.0	1.260
1637.5	52.9	1.273
1650.0	52.9	1.287
1662.5	52.8	1.300
1675.0	52.8	1.314
1687.5	52.7	1.326
1700.0	52.7	1.340
1712.5	52.7	1.353
1725.0	52.6	1.366
1737.5	52.6	1.381
1750.0	52.5	1.395
1762.5	52.5	1.410
1775.0	52.4	1.425
1787.5	52.4	1.439
1800.0	52.3	1.454
1812.5	52.3	1.468
1825.0	52.2	1.483
1837.5	52.2	1.497
1850.0	52.1	1.512
1862.5	52.1	1.526
1875.0	52.0	1.541
1887.5	52.0	1.556
1900.0	51.9	1.570
1912.5	51.9	1.585
1925.0	51.8	1.599
1937.5	51.8	1.613
1950.0	51.7	1.626
1962.5	51.7	1.640
1975.0	51.6	1.654
1987.5	51.6	1.670
2000.0	51.5	1.684

**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**

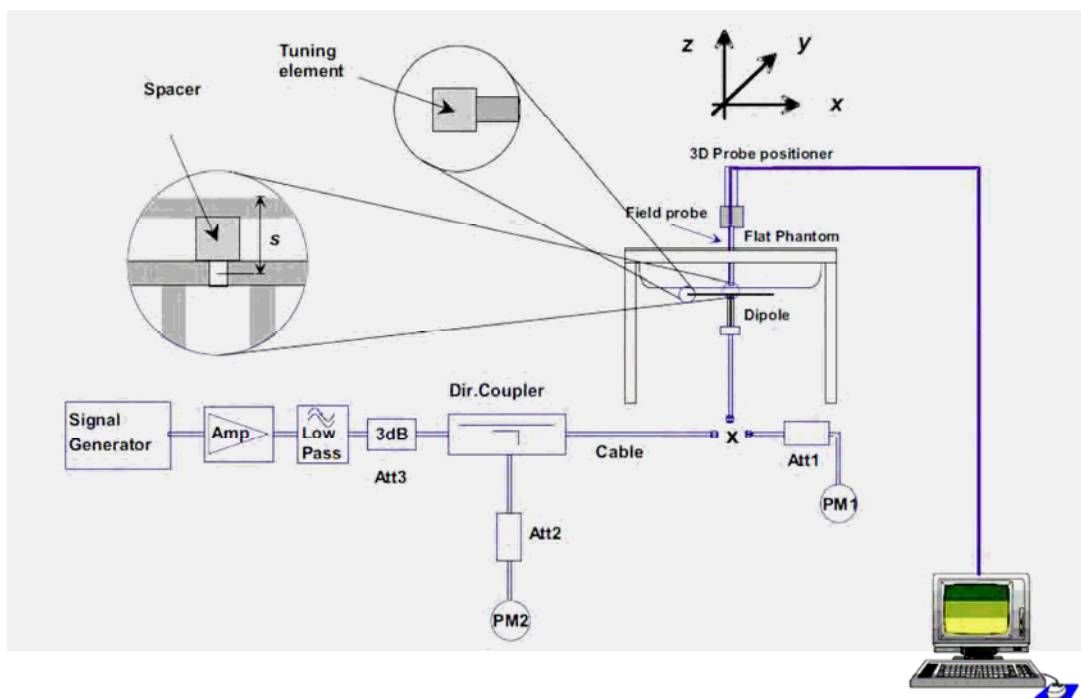
Within 24 hours of a measurement, Northwest EMC used the system validation kit (calibrated reference dipole) to test whether the system was operating within its specifications. The validation was performed in the indicated bands by making SAR measurements of the reference dipole with the phantom filled 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 <b>EMC</b>		<b>System Verification</b>		SAR 2011.02.07
<b>EUT:</b>	System Verifications			<b>Work Order:</b> INMC0737
<b>Serial Number:</b>	Various			<b>Date:</b> See Data Sheets
<b>Customer:</b>	Intermec Technologies Corporation			<b>Temperature:</b> See Data Sheets
<b>Attendees:</b>	None			<b>Humidity:</b> See Data Sheets
<b>Project:</b>				<b>Barometric Pres.:</b> See Data Sheets
<b>Tested by:</b>	Jennifer Herrett			<b>Job Site:</b> EV08
<b>TEST SPECIFICATIONS</b>		<b>Test Method</b>		
FCC 2.1093:2011		FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 941225 D01 v02, and D03 FCC KDB 648474 D01 V01r05		
Health Safety Code 6:2009		RSS-102, Issue 4:2010		
<b>COMMENTS</b>				
None				
<b>DEVIATIONS FROM TEST STANDARD</b>				
No Deviations				
<b>Configuration:</b>	N/A	Signature <i>Jennifer Herrett</i>		

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
9/19/2011	MSL900 835MHz	20.00	10.00	0.98	0.65	9.83	6.47	9.93	6.51	-1.01	-0.61	
9/20/2011	HSL900 835MHz	20.00	10.00	0.97	0.64	9.66	6.36	9.64	6.29	0.21	1.11	
9/21/2011	HSL1900 1900MHz	20.00	10.00	3.90	2.00	39.00	20.00	40.20	20.90	-2.99	-4.31	
9/21/2011	MSL1900 1900MHz	20.00	10.00	4.05	2.10	40.50	21.00	39.90	21.00	1.50	0.00	
10/5/2011	MSL1900 1900MHz	20.00	10.00	4.32	2.29	43.20	22.90	39.90	21.00	8.27	9.05	
10/6/2011	MSL900 835MHz	20.51	8.89	1.14	0.75	10.14	6.66	9.93	6.51	2.08	2.31	

## EMC

## SAR TEST DATA

Room Temperature (°C):	23.8	Humidity (%):	48.8	Test Date:	09/19/11
Liquid Temperature (°C):	22.5	Barometric Pressure (mb):	1022.3	Tested by:	Ethan Schoonover

## MSL900 System Check\_835MHz 09-19-11

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4D108

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 0.996264$  mho/m,  $\epsilon = 54.571$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.996$  mho/m;  $\epsilon = 54.571$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASYS Configuration:

Probe: ES3DV3 - SN3173; ConvF(5.97, 5.97, 5.97); Calibrated: 2/23/2011  
 Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 5mm (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)

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

Maximum value of Total (measured) = 32.142 V/m

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

Reference Value = 31.282 V/m; Power Drift = 0.04 dB

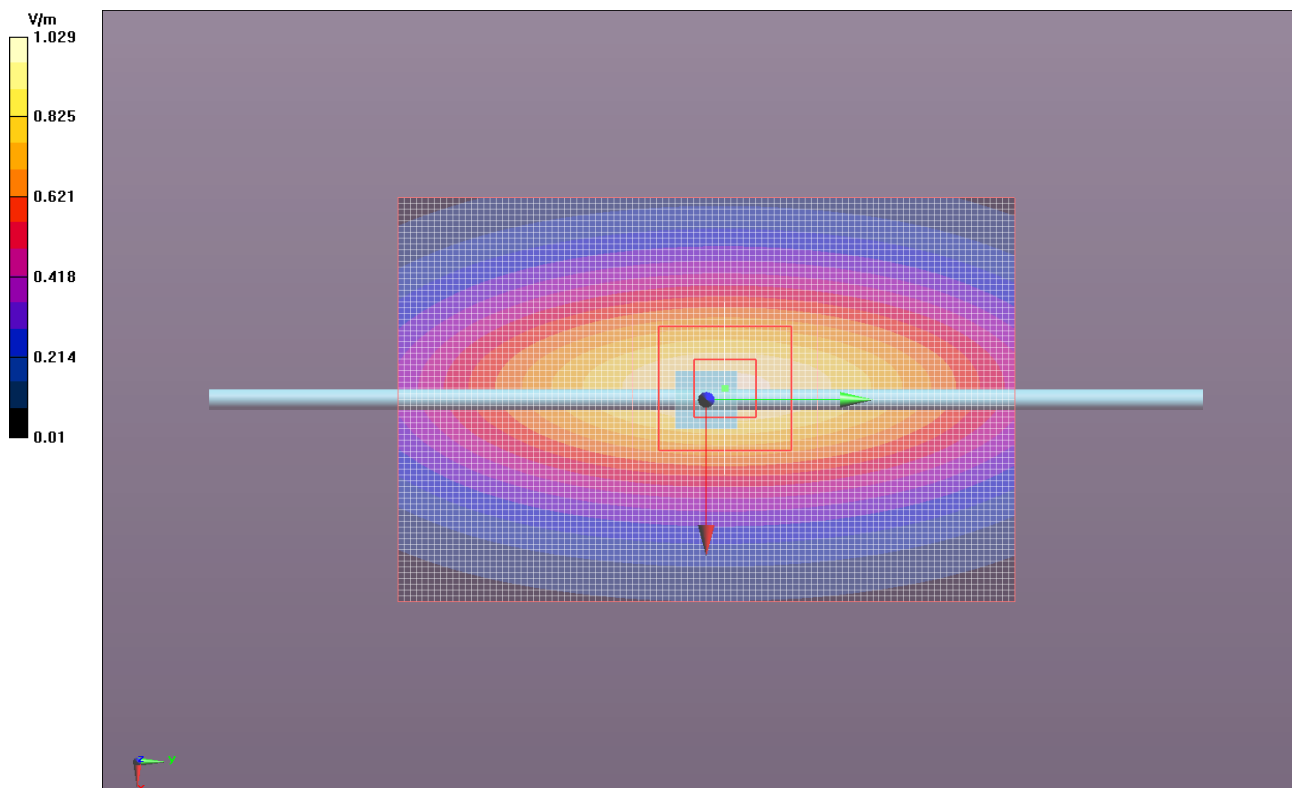
Peak SAR (extrapolated) = 1.446 W/kg

**SAR(1 g) = 0.982 mW/g; SAR(10 g) = 0.646 mW/g**

Maximum value of SAR (measured) = 0.982 mW/g

**System Check/System Check/Area Scan (71x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.978 mW/g



Room Temperature (°C):	22.1	Humidity (%):	45	Test Date:	09/20/11
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1019	Tested by:	Jennifer Herrett

### HSL900 System Check\_835MHz 9-20-11

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4D108

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.861$  mho/m;  $\epsilon = 41.366$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 0.861427$  mho/m,  $\epsilon = 41.3662$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASYS5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(6.01, 6.01, 6.01); Calibrated: 2/23/2011  
 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 (71x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 0.961 mW/g

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

Reference Value = 33.329 V/m; Power Drift = 0.01 dB

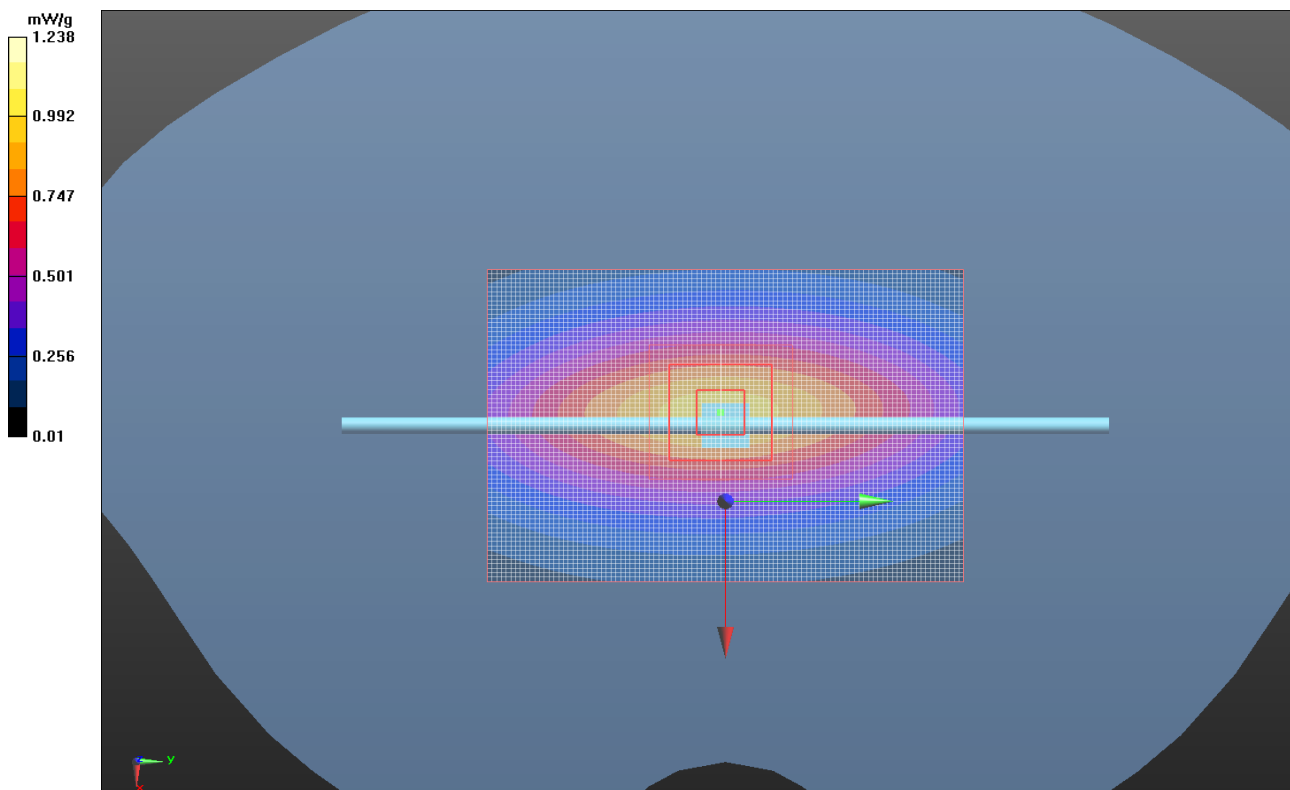
Peak SAR (extrapolated) = 1.432 W/kg

**SAR(1 g) = 0.966 mW/g; SAR(10 g) = 0.636 mW/g**

Maximum value of SAR (measured) = 0.964 mW/g

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

Maximum value of Total (measured) = 37.906 V/m





Room Temperature (°C):	24.5	Humidity (%):	50	Test Date:	09/21/11
Liquid Temperature (°C):	21.3	Barometric Pressure (mb):	1013.7	Tested by:	Ethan Schoonover

### MSL1900 System Check\_1900MHz 9-21-11

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:xxx

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.49$  mho/m;  $\epsilon_r = 52.104$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.48974$  mho/m,  $\epsilon_r = 52.1043$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3246; ConvF(4.63, 4.63, 4.63); 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/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.165 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 7.650 W/kg

**SAR(1 g) = 4.05 mW/g; SAR(10 g) = 2.1 mW/g**

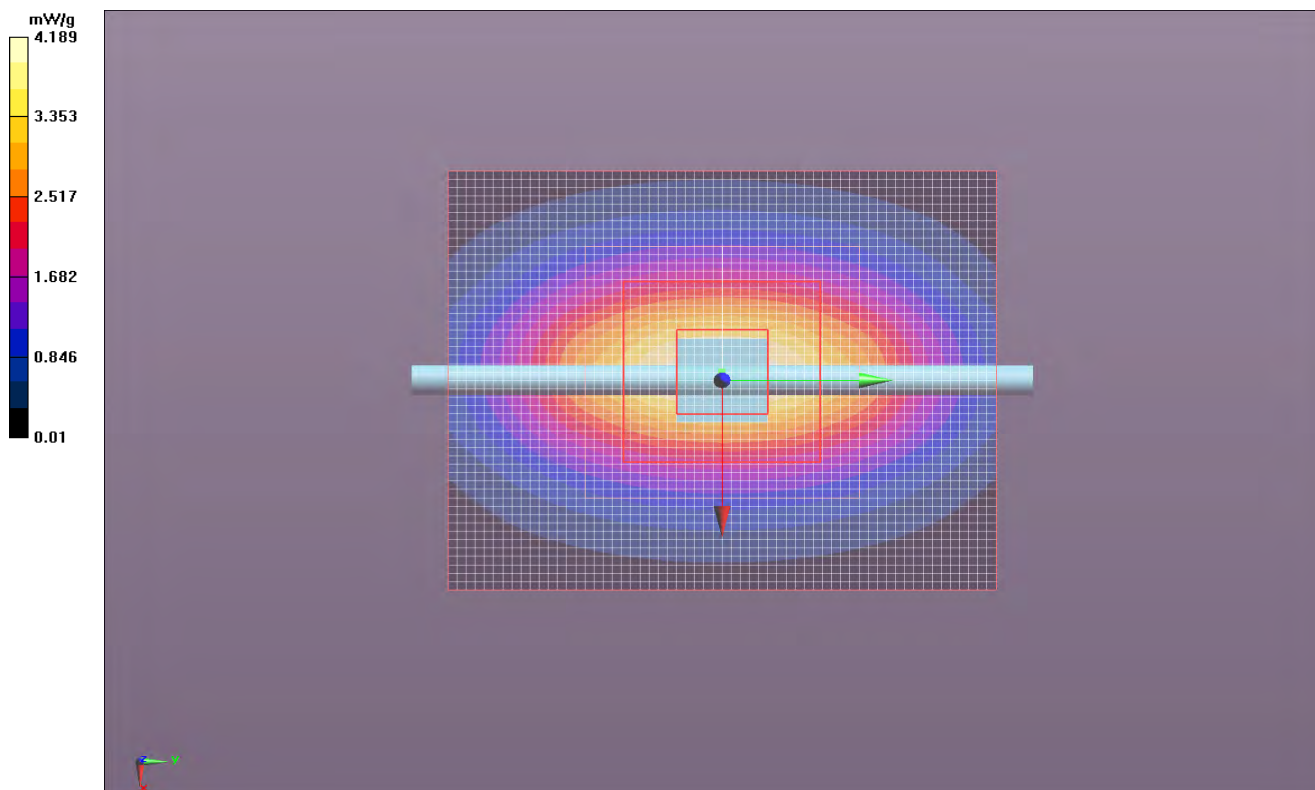
Maximum value of SAR (measured) = 4.030 mW/g

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

Maximum value of SAR (interpolated) = 4.107 mW/g

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

Maximum value of Total (measured) = 53.024 V/m



Room Temperature (°C):	24.5	Humidity (%):	50	Test Date:	09/21/11
Liquid Temperature (°C):	21.3	Barometric Pressure (mb):	1013.7	Tested by:	Ethan Schoonover

### HSL1900 System Check\_1900MHz 9-21-11

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:xxx

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.372$  mho/m;  $\epsilon_r = 38.844$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.37175$  mho/m,  $\epsilon_r = 38.844$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASy5 (IEEE/IEC/ANSI C63.19-2007)

DASy5 Configuration:

Probe: ES3DV3 - SN3246; ConvF(5.02, 5.02, 5.02); 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: DASy52, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

Reference Value = 52.358 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 7.605 W/kg

**SAR(1 g) = 3.9 mW/g; SAR(10 g) = 2 mW/g**

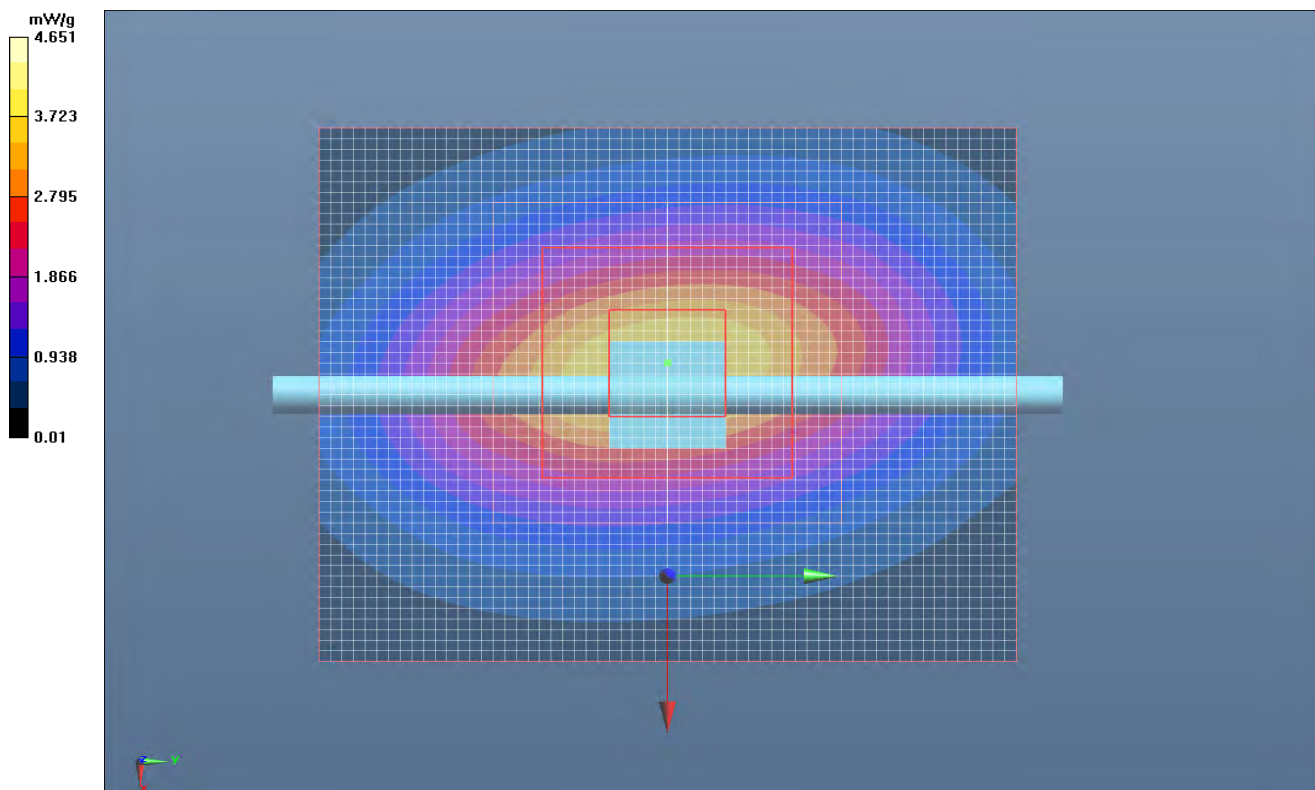
Maximum value of SAR (measured) = 3.841 mW/g

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

Maximum value of SAR (interpolated) = 3.853 mW/g

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

Maximum value of Total (measured) = 58.229 V/m



Room Temperature (°C):	22.4	Humidity (%):	42.1	Test Date:	10/05/11
Liquid Temperature (°C):	22.3	Barometric Pressure (mb):	1006	Tested by:	Jennifer Herrett

### MSL1900 System Check\_1900MHz 10-5-11c

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d131

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.57$  mho/m;  $\epsilon_r = 51.92$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.57027$  mho/m,  $\epsilon_r = 51.9196$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(4.55, 4.55, 4.55); Calibrated: 2/23/2011  
 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) = 4.382 mW/g

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

Reference Value = 51.053 V/m; Power Drift = 0.06 dB

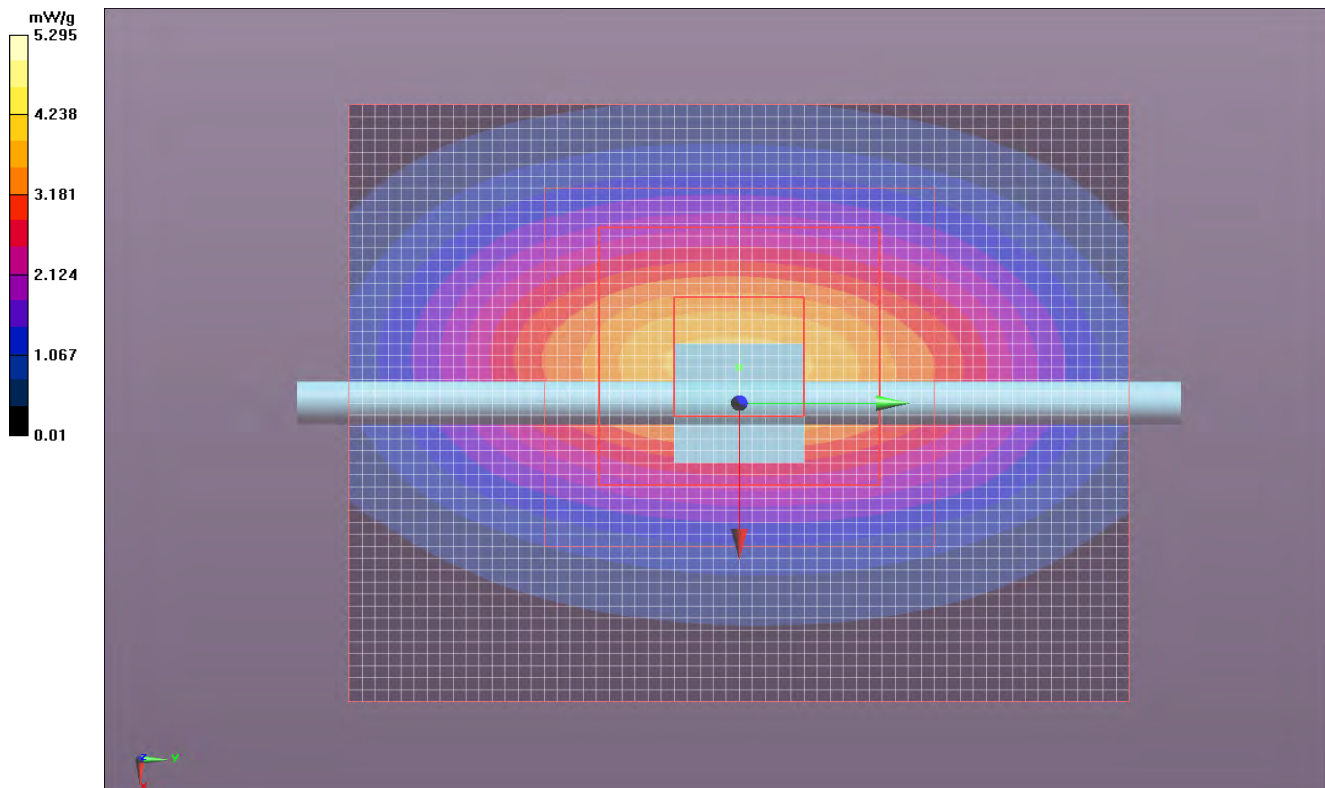
Peak SAR (extrapolated) = 7.858 W/kg

**SAR(1 g) = 4.32 mW/g; SAR(10 g) = 2.29 mW/g**

Maximum value of SAR (measured) = 4.344 mW/g

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

Maximum value of Total (measured) = 58.070 V/m



Room Temperature (°C):	23.8	Humidity (%):	43.4	Test Date:	10/07/11
Liquid Temperature (°C):	22.9	Barometric Pressure (mb):	1022.3	Tested by:	Ethan Schoonover

### MSL900 System Check\_835MHz 10-6b-11

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4D108

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 1.0111$  mho/m,  $\epsilon_r = 56.5118$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $f = 835$  MHz;  $\sigma = 1.011$  mho/m;  $\epsilon_r = 56.512$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(5.97, 5.97, 5.97); Calibrated: 2/23/2011  
 Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 5mm (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)

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

Maximum value of Total (measured) = 34.991 V/m

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

Reference Value = 34.105 V/m; Power Drift = -0.12 dB

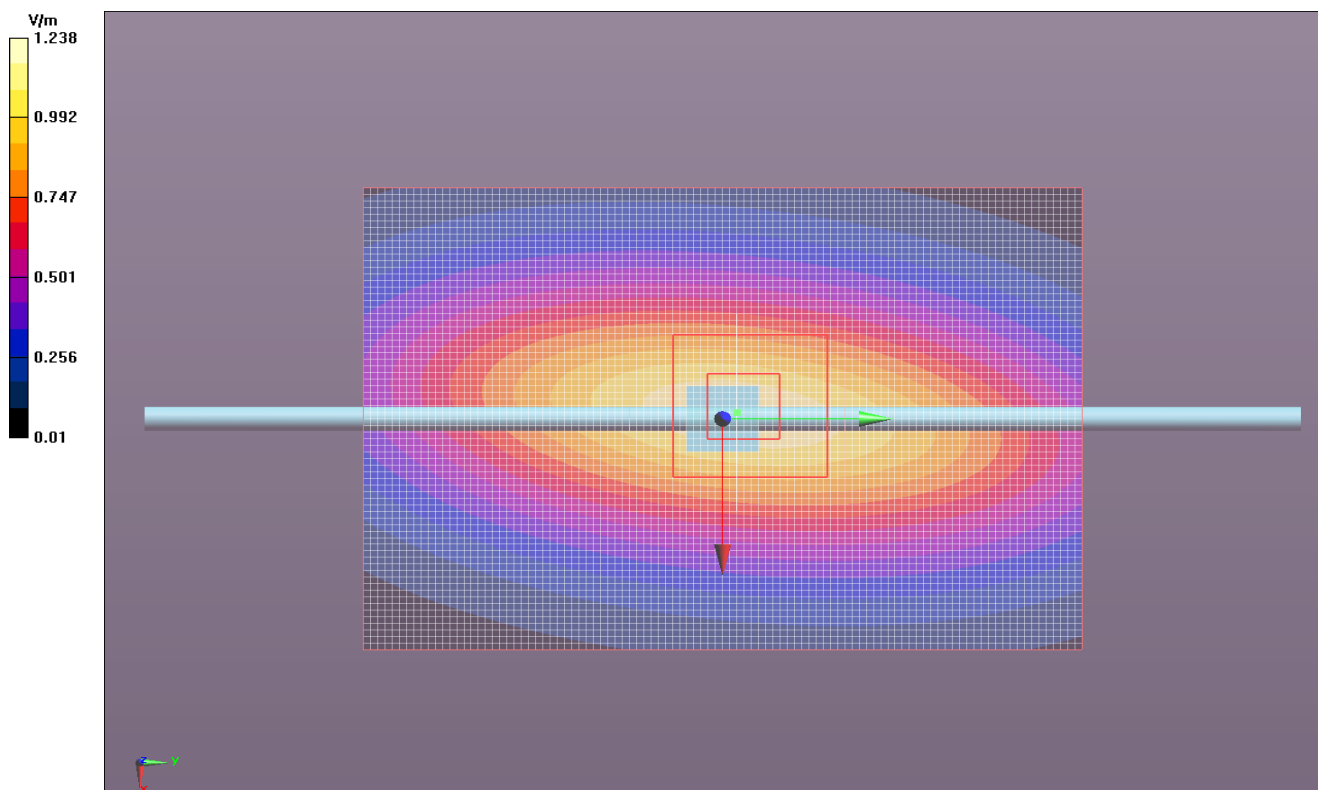
Peak SAR (extrapolated) = 1.674 W/kg

**SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.749 mW/g**

Maximum value of SAR (measured) = 1.136 mW/g

**System Check/System Check/Area Scan (71x101x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (interpolated) = 1.144 mW/g



## Test Configurations

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

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

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

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

Per KDB 648474, among the channels required for normal testing, SAR must be measured on the highest conducted output power channel in each band (see highlighted values in the Output Power section of this report). When the SAR measured on the highest output channel is  $< 0.8$  W/kg, SAR evaluation for the other required channels is unnecessary.

All testing was performed with the EUT configured in a worst-case configuration and operating mode to produce the highest SAR levels. An Agilent 8960 test set, Model E5515C, was used to control the EUT. The following applications were installed on the test set: CDMA 2000 Mobile Test Rev B.18.12, and EVDO Term Test Rev A.13.10. This provided all the necessary tools to operate the EUT in the prescribed manner without any difficulties or equipment limitations.

## Summary

The following tables summarize the measured SAR values.

## SAR TEST DATA

EMC

EUT:	1000CP03C	Work Order:	INMC0737
Serial Number:	14621142016	Date:	See Data Sheets
Customer:	Intermec Technologies Corporation	Temperature:	See Data Sheets
Attendees:	None	Humidity:	See Data Sheets
Project:	P-INMC018	Barometric Pres.:	See Data Sheets
Tested by:	Jennifer Herrett	Job Site:	EV08
<b>TEST SPECIFICATIONS</b>		<b>Test Method</b>	
FCC 2.1093:2011		FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 941225 D01 v02, and D03 FCC KDB 648474 D01 V01r05	
Health Safety Code 6:2009		RSS-102, Issue 4:2010	
<b>COMMENTS</b>			
Worst case configuration from original SAR evaluation conducted in Feb 2011			
<b>DEVIATIONS FROM TEST STANDARD</b>			
No Deviations			
Configuration #	1	Signature <i>Jennifer Herrett</i>	

Test Configuration	Frequency Band	Transmit Frequency	Transmit Channel	Transmit Mode	Data Rate (Mbps)	Side	EUT Position	Start Power (Conducted)	SAR Drift During Test (dB)	1g SAR Level	Test #
Head	Cellular	836.52	384	EVDO-Rev. A	FETAP: 307.2 RETAP: 4096 Payload	Right	Cheek	25.04	0.03	0.377	1
							Tilt	25.04	-0.02	0.363	2
						Left	Cheek	25.04	0.03	0.268	3
							Tilt	25.04	0.02	0.238	4

## EMC

## SAR TEST DATA

Room Temperature (°C):	22.3	Humidity (%):	45.2	Test Date:	09/20/11
Liquid Temperature (°C):	22.1	Barometric Pressure (mb):	1019	Tested by:	Jennifer Herrett

## Head Test 1 9-20-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 836.52 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 0.861427$  mho/m,  $\epsilon = 41.3662$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.863$  mho/m;  $\epsilon = 41.348$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Right Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASYS5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(6.01, 6.01, 6.01); Calibrated: 2/23/2011  
 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: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

**Head - Right/Cheek - Mid/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 18.516 V/m

**Head - Right/Cheek - Mid/Reference scan (51x81x1):** Measurement grid: dx=30mm, dy=30mm

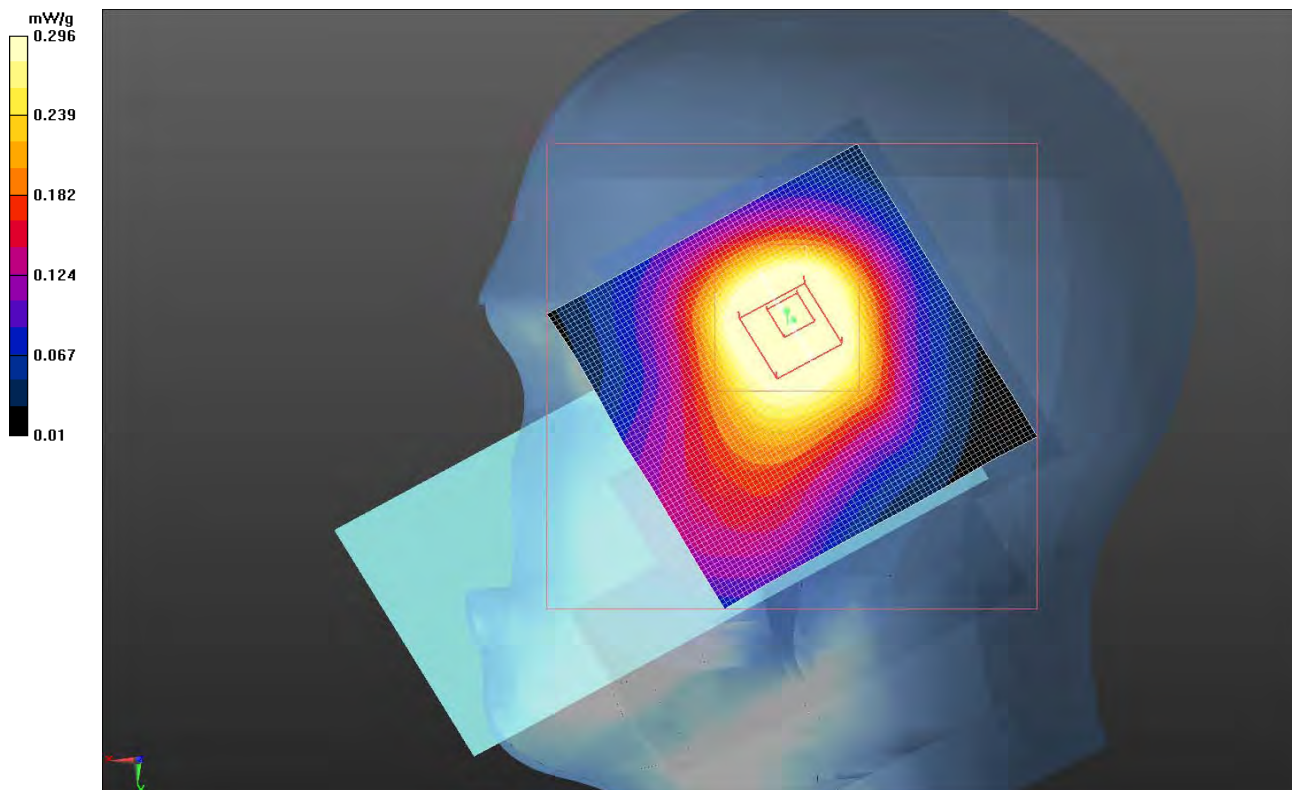
[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (interpolated) = 0.374 mW/g

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

[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (interpolated) = 0.449 mW/g

**Head - Right/Cheek - Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 22.992 V/m; Power Drift = 0.03 dB  
 Peak SAR (extrapolated) = 0.568 W/kg  
**SAR(1 g) = 0.377 mW/g; SAR(10 g) = 0.249 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (measured) = 0.441 mW/g



## EMC

## SAR TEST DATA

Room Temperature (°C):	22.3	Humidity (%):	45.2	Test Date:	09/20/11
Liquid Temperature (°C):	22.1	Barometric Pressure (mb):	1019	Tested by:	Jennifer Herrett

## Head Test 2 9-20-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 836.52 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.863$  mho/m;  $\epsilon = 41.348$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 0.861427$  mho/m,  $\epsilon = 41.3662$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Right Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASYS Configuration:

Probe: ES3DV3 - SN3173; ConvF(6.01, 6.01, 6.01); Calibrated: 2/23/2011  
 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: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.411 mW/g

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

Reference Value = 22.346 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.522 W/kg

SAR(1 g) = 0.363 mW/g; SAR(10 g) = 0.244 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

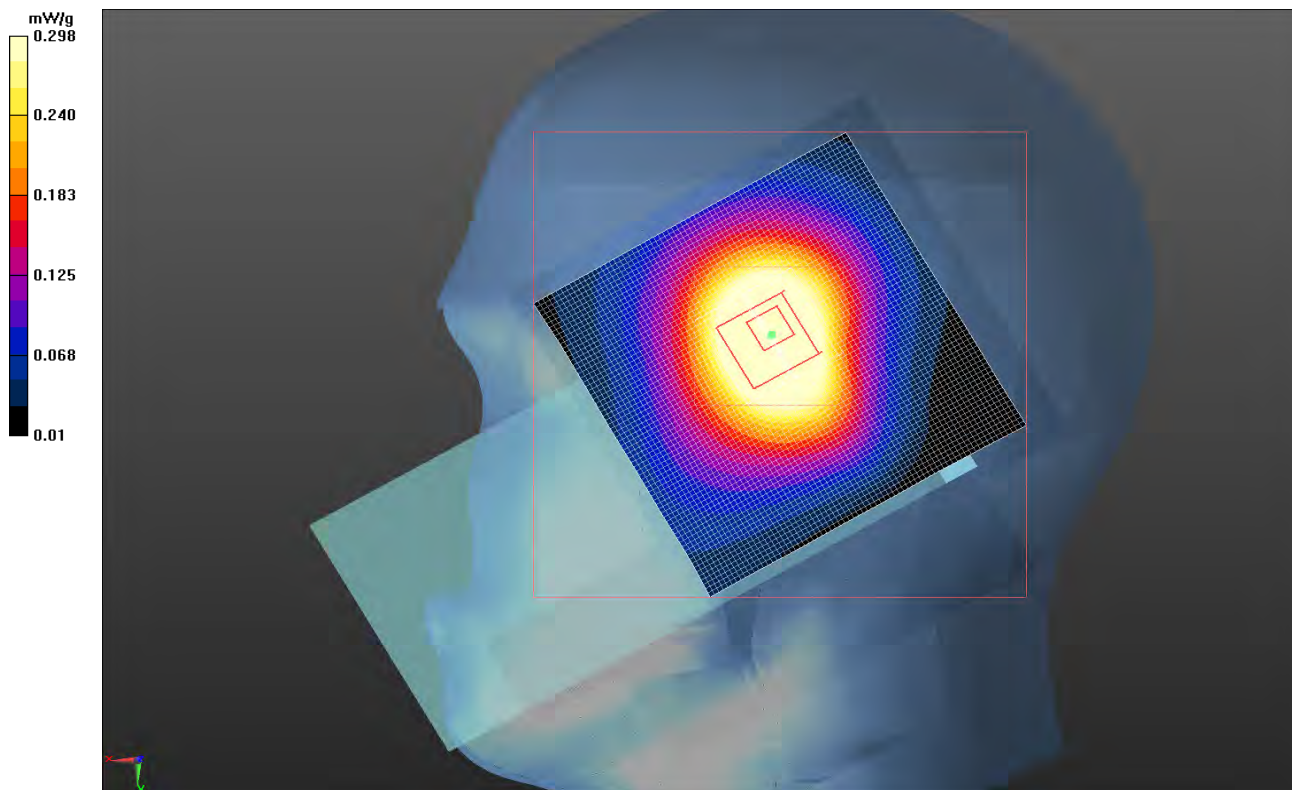
Maximum value of SAR (measured) = 0.418 mW/g

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

Maximum value of Total (measured) = 18.590 V/m

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

Info: Interpolated medium parameters used for SAR evaluation.





## EMC

Room Temperature (°C):	21.9	Humidity (%):	44.9	Test Date:	09/20/11
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1019	Tested by:	Jennifer Herrett

## Head Test 3 9-20-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 836.52 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 0.861427$  mho/m,  $\epsilon = 41.3662$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.863$  mho/m;  $\epsilon = 41.348$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Left Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASYS5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(6.01, 6.01, 6.01); Calibrated: 2/23/2011  
 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: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

**Head - Left/Cheek - Mid/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 15.968 V/m

**Head - Left/Cheek - Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 19.234 V/m; Power Drift = 0.03 dB  
 Peak SAR (extrapolated) = 0.369 W/kg  
**SAR(1 g) = 0.268 mW/g; SAR(10 g) = 0.186 mW/g**

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.306 mW/g

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

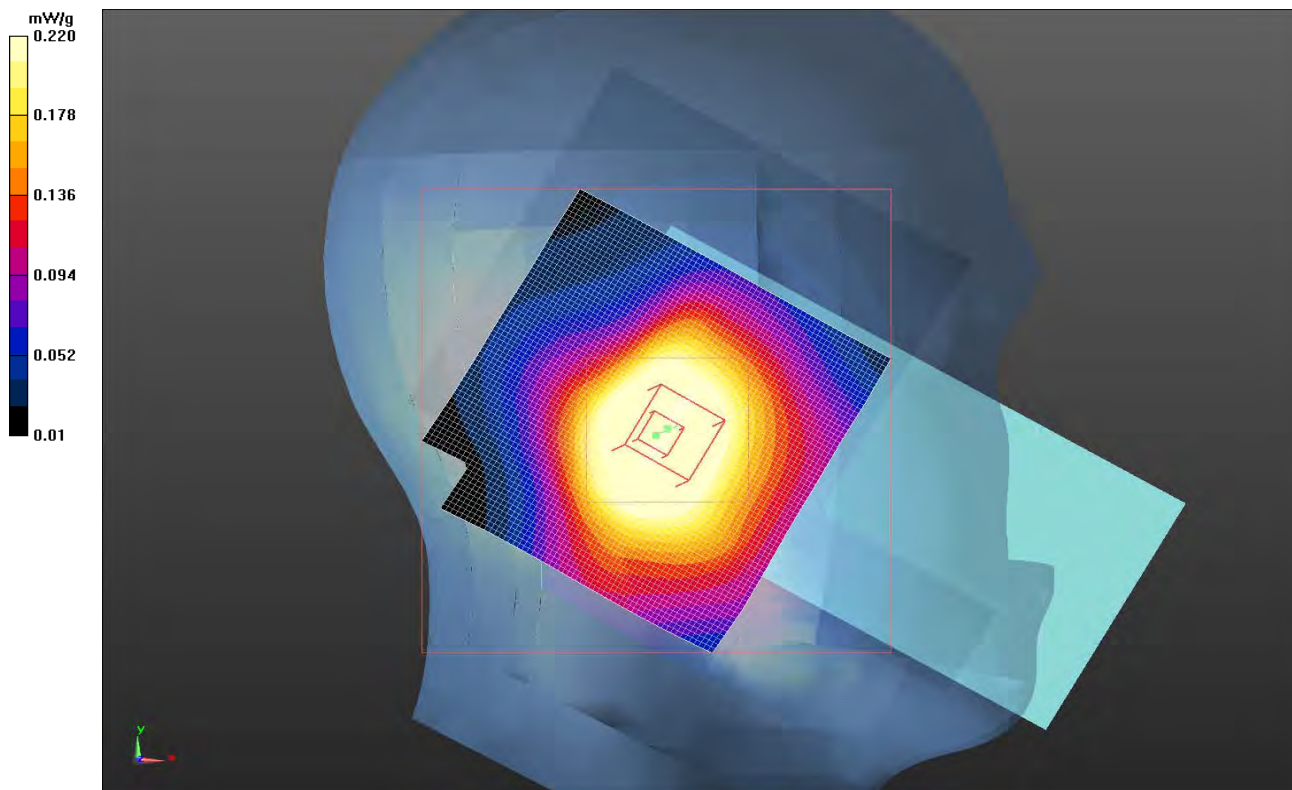
Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.320 mW/g

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

Info: Interpolated medium parameters used for SAR evaluation.

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



## EMC

## SAR TEST DATA

Room Temperature (°C):	21.9	Humidity (%):	44.9	Test Date:	09/20/11
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1019	Tested by:	Jennifer Herrett

## Head Test 4 9-20-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 836.52 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 0.861427$  mho/m,  $\epsilon = 41.3662$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.863$  mho/m;  $\epsilon = 41.348$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Left Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASYS5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(6.01, 6.01, 6.01); Calibrated: 2/23/2011  
 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: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

**Head - Left/Tilt - Mid/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 14.936 V/m

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

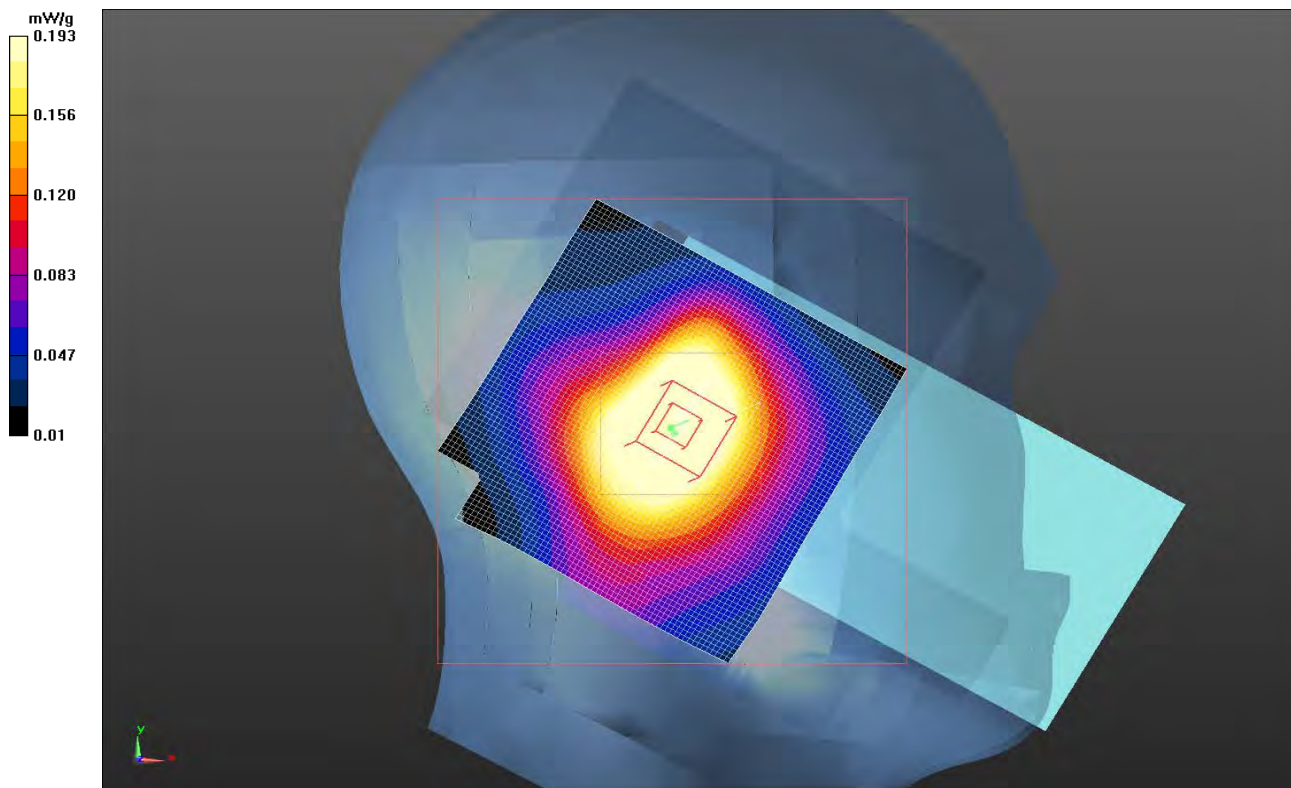
[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (interpolated) = 0.279 mW/g

**Head - Left/Tilt - Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 17.871 V/m; Power Drift = 0.02 dB  
 Peak SAR (extrapolated) = 0.343 W/kg  
**SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.161 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (measured) = 0.275 mW/g

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

[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (interpolated) = 0.273 mW/g

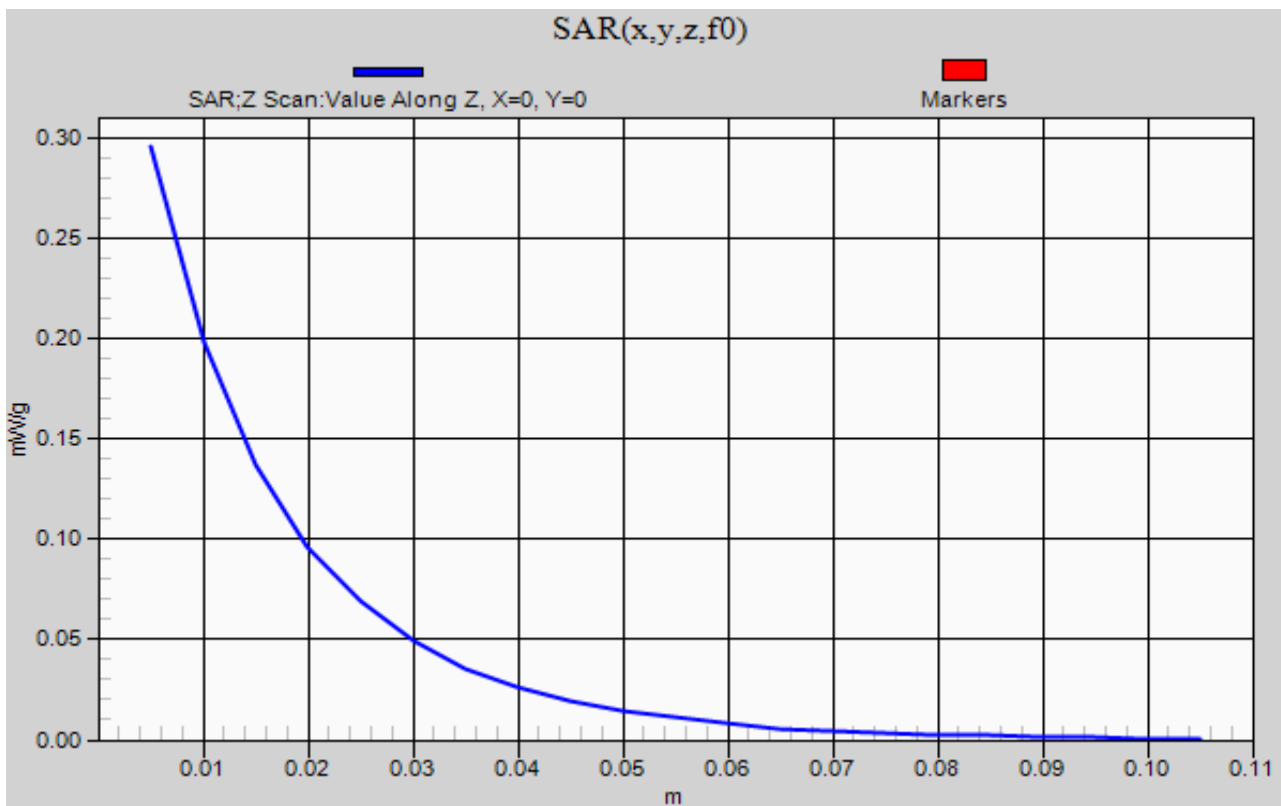


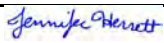
# EMC SAR TEST DATA

Room Temperature (°C):	22.3	Humidity (%):	45.2	Test Date:	09/20/11
Liquid Temperature (°C):	22.1	Barometric Pressure (mb):	1019	Tested by:	Jennifer Herrett

## Head Test 1 9-20-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016



NORTHWEST <b>EMC</b>		<b>SAR TEST DATA</b>		SAR 2011.02.07
EUT:	1000CP03C	Work Order:	INMC0737	
Serial Number:	14621142016	Date:	See Data Sheets	
Customer:	Intermec Technologies Corporation	Temperature:	See Data Sheets	
Attendees:	None	Humidity:	See Data Sheets	
Project:	P-INMC018	Barometric Pres.:	See Data Sheets	
Tested by:	Jennifer Herrett and Ethan Schoonover	Job Site:	EV08	
<b>TEST SPECIFICATIONS</b>		<b>Test Method</b>		
FCC 2.1093:2011		FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 941225 D01 v02, and D03 FCC KDB 648474 D01 V01r05		
Health Safety Code 6:2009		RSS-102, Issue 4:2010		
<b>COMMENTS</b>				
None				
<b>DEVIATIONS FROM TEST STANDARD</b>				
No Deviations				
Configuration #	1	 Signature		

Test Configuration	Frequency Band	Transmit Frequency	Transmit Channel	Transmit Mode	Data Rate (kbps)	Body-Worn Accessory	EUT Position	Start Power (Conducted)	Drift	Measured SAR Level	Test #	
<b>Body</b>	Cellular	824.7	1013	EV-DO Rev. 0	FTAP: 307.2 RTAP: 153.6	Wrist Holster	Left	24.62	-0.0037	1.12	1b	
		836.52	384				Left	24.87	0.02	0.489	1d	
		848.31	777				Left	24.66	-0.05	0.951	1c	
		836.52	384				Right	24.87	0.1	0.202	2	
		836.52	384				Back	24.87	0.02	0.314	3	
		848.31	777				Left	24.65	2.26	0.015	4d	
			824.7	1013	EV-DO Rev. A	FETAP: 307.2 RETAP: 4096 Payload		Left	24.74	0.43	0.008	4e
			836.52	384				Left	25.04	-3.34	0.066	4f

## EMC

## SAR TEST DATA

Room Temperature (°C):	24.2	Humidity (%):	45.5	Test Date:	09/19/11
Liquid Temperature (°C):	22.5	Barometric Pressure (mb):	1022.3	Tested by:	Ethan Schoonover

## Body Test 1b 9-19-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 824.7 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 0.986494$  mho/m,  $\epsilon = 54.6655$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.986$  mho/m;  $\epsilon = 54.666$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

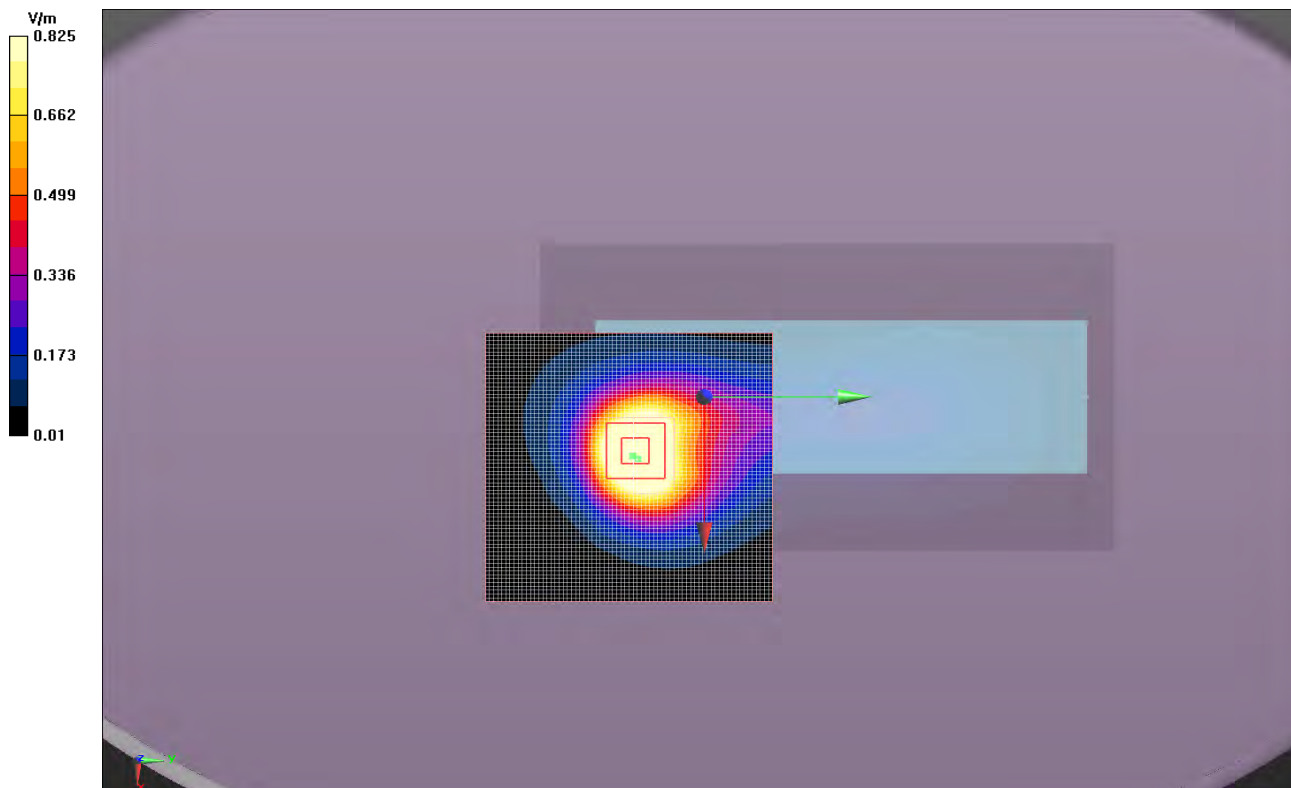
Probe: ES3DV3 - SN3173; ConvF(5.97, 5.97, 5.97); Calibrated: 2/23/2011  
 Sensor-Surface: 0mm (Fix Surface), Sensor-Surface: 3mm (Mechanical Surface Detection)  
 Electronics: DAE4 Sn1237; Calibrated: 11/10/2010  
 Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096  
 Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

**Body/Body - Low/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 28.918 V/m

**Body/Body - Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 36.235 V/m; Power Drift = -0.0037 dB  
 Peak SAR (extrapolated) = 1.940 W/kg  
**SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.637 mW/g**  
 Maximum value of SAR (measured) = 1.381 mW/g

**Body/Body - Low/Reference scan (41x71x1):** Measurement grid: dx=30mm, dy=30mm  
 Maximum value of SAR (interpolated) = 1.345 mW/g

**Body/Body - Low/Area scan (71x71x1):** Measurement grid: dx=15mm, dy=15mm  
 Maximum value of SAR (interpolated) = 1.288 mW/g



## EMC

## SAR TEST DATA

Room Temperature (°C):	24.2	Humidity (%):	45.5	Test Date:	09/19/11
Liquid Temperature (°C):	22.5	Barometric Pressure (mb):	1022.3	Tested by:	Ethan Schoonover

## Body Test 1c 9-19-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 848.31 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 1.0111$  mho/m,  $\epsilon = 54.4228$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used (interpolated):  $f = 848.31$  MHz;  $\sigma = 1.01$  mho/m;  $\epsilon = 54.437$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASYS Configuration:

Probe: ES3DV3 - SN3173; ConvF(5.97, 5.97, 5.97); Calibrated: 2/23/2011  
 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 - Low/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 25.982 V/m

**Body/Body - Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 32.649 V/m; Power Drift = -0.05 dB  
 Peak SAR (extrapolated) = 1.671 W/kg  
**SAR(1 g) = 0.951 mW/g; SAR(10 g) = 0.527 mW/g**

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.160 mW/g

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

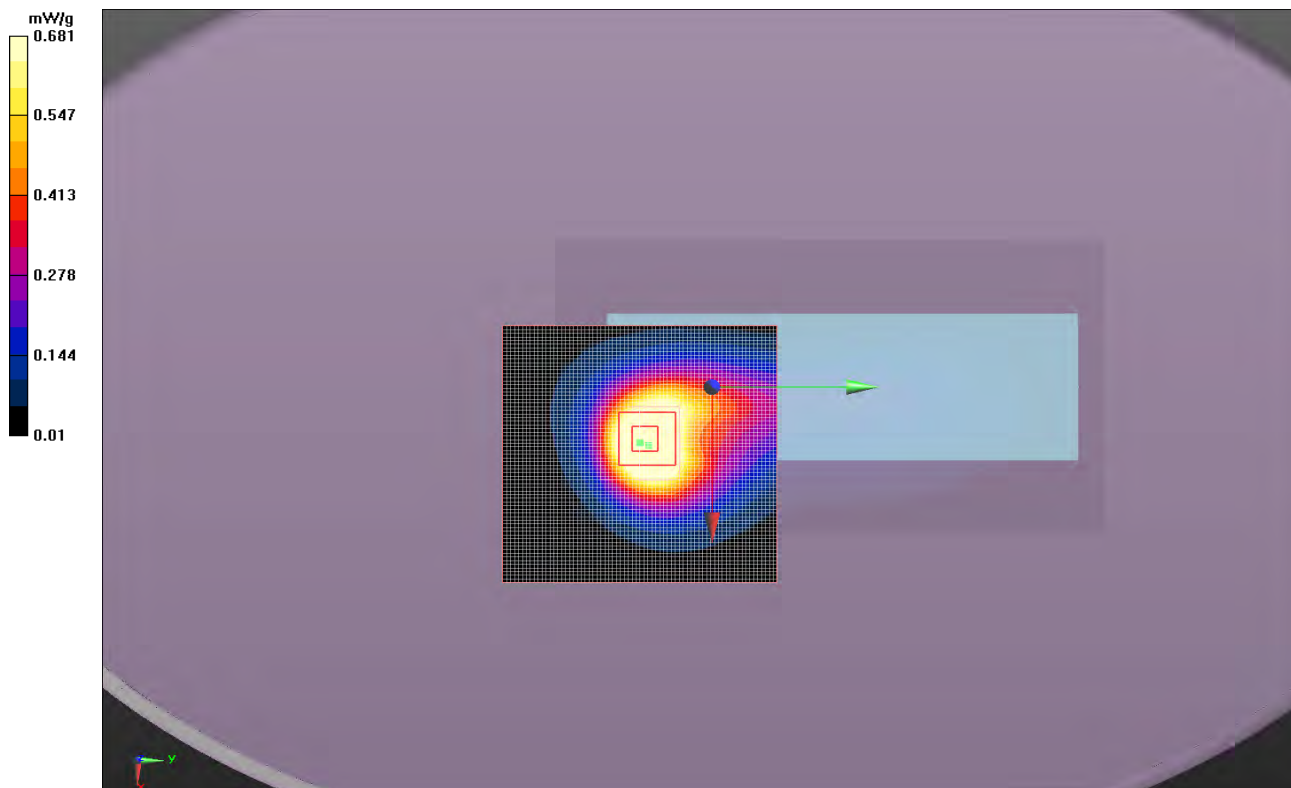
Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 1.179 mW/g

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 1.089 mW/g



## EMC

## SAR TEST DATA

Room Temperature (°C):	24.4	Humidity (%):	44.8	Test Date:	10/06/11
Liquid Temperature (°C):	22.5	Barometric Pressure (mb):	1016	Tested by:	Ethan Schoonover

## Body Test 1d 10-6-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 836.52 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 0.996264$  mho/m,  $\epsilon = 54.571$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.998$  mho/m;  $\epsilon = 54.558$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASYS5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(5.97, 5.97, 5.97); Calibrated: 2/23/2011  
 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 - Mid/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 19.357 V/m

**Body/Body - Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 24.145 V/m; Power Drift = 0.02 dB  
 Peak SAR (extrapolated) = 0.754 W/kg  
**SAR(1 g) = 0.489 mW/g; SAR(10 g) = 0.300 mW/g**

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

Maximum value of SAR (measured) = 0.580 mW/g

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

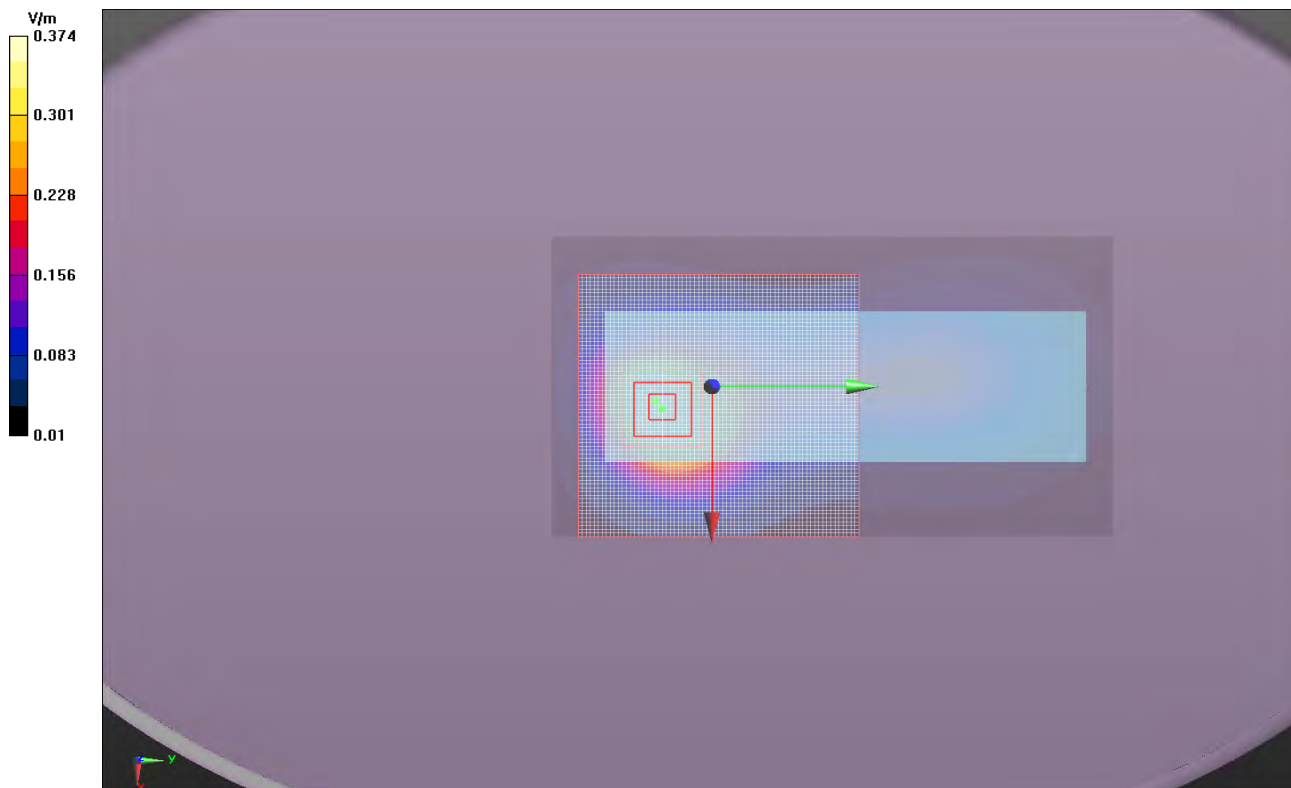
[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.457 mW/g

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

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

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



## EMC

## SAR TEST DATA

Room Temperature (°C):	24.1	Humidity (%):	45.7	Test Date:	09/19/11
Liquid Temperature (°C):	22.8	Barometric Pressure (mb):	1022.3	Tested by:	Ethan Schoonover

## Body Test 2 9-19-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 836.52 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 0.996264$  mho/m,  $\epsilon = 54.571$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.998$  mho/m;  $\epsilon = 54.558$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASYS5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(5.97, 5.97, 5.97); Calibrated: 2/23/2011  
 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 - Mid/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 12.710 V/m

**Body/Body - Mid/Zoom Scan (7x8x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 15.441 V/m; Power Drift = 0.10 dB  
 Peak SAR (extrapolated) = 0.280 W/kg  
**SAR(1 g) = 0.202 mW/g; SAR(10 g) = 0.141 mW/g**

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.230 mW/g

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

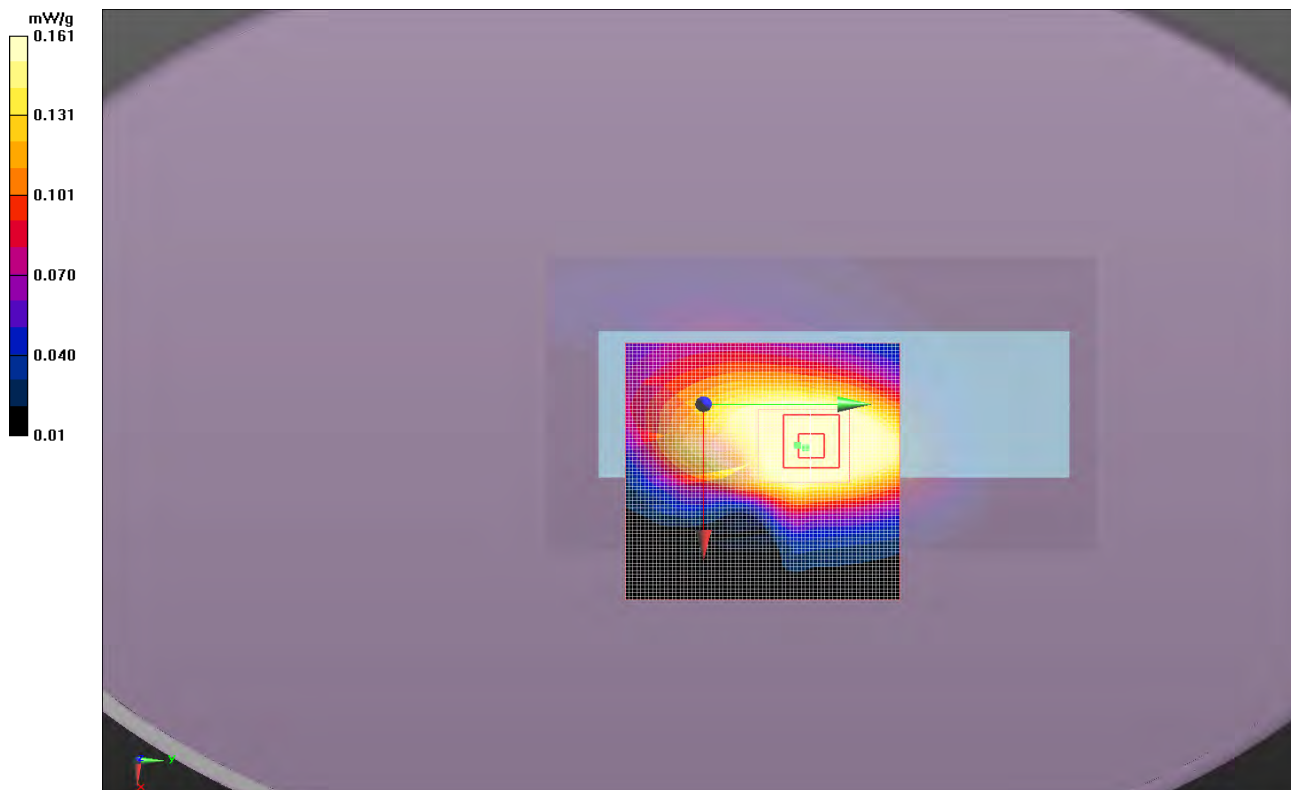
Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.208 mW/g

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.228 mW/g





## EMC

## SAR TEST DATA

Room Temperature (°C):	24.1	Humidity (%):	48	Test Date:	09/19/11
Liquid Temperature (°C):	22.8	Barometric Pressure (mb):	1022.3	Tested by:	Ethan Schoonover

## Body Test 3 9-19-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 836.52 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 0.996264$  mho/m,  $\epsilon = 54.571$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.998$  mho/m;  $\epsilon = 54.558$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASYS5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(5.97, 5.97, 5.97); Calibrated: 2/23/2011  
 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 - Mid/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 15.821 V/m

**Body/Body - Mid/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 19.608 V/m; Power Drift = 0.02 dB  
 Peak SAR (extrapolated) = 0.424 W/kg  
**SAR(1 g) = 0.314 mW/g; SAR(10 g) = 0.223 mW/g**

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

Maximum value of SAR (measured) = 0.355 mW/g

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

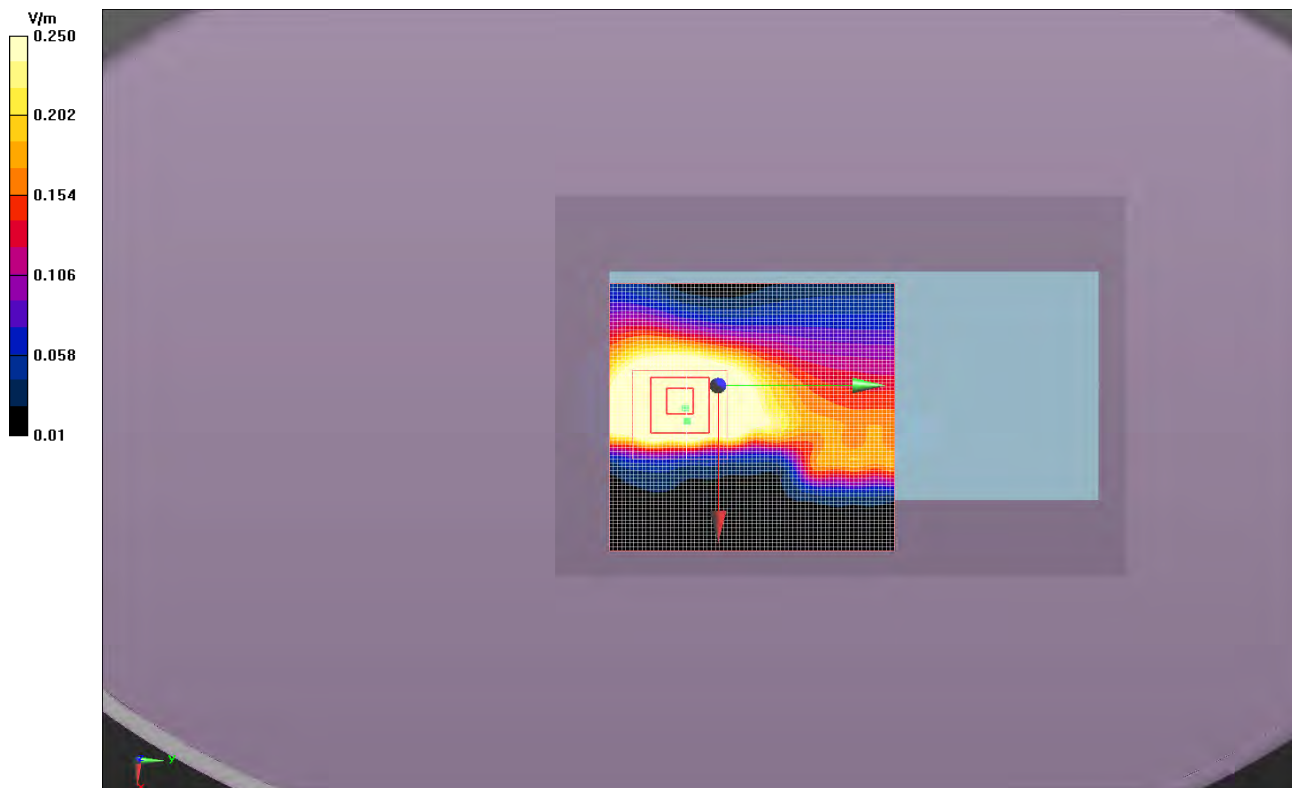
[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.060 mW/g

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

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

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



Room Temperature (°C):	23.8	Humidity (%):	47.4	Test Date:	09/19/11
Liquid Temperature (°C):	23.1	Barometric Pressure (mb):	1020.4	Tested by:	Ethan Schoonover

### Test 4d 9-19-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 848.31 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.998$  mho/m;  $\epsilon_r = 54.558$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 0.996264$  mho/m,  $\epsilon_r = 54.571$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3246; ConvF(6.16, 6.16, 6.16); Calibrated: 9/20/2011  
 Sensor-Surface: 3mm (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)

**Body/Body - Mid/Reference scan (51x81x1):** 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 - Mid/Area scan (71x81x1):** Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.012 mW/g

**Body/Body - Mid/Zoom Scan (9x8x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.402 V/m; Power Drift = 2.26 dB

Peak SAR (extrapolated) = 0.025 W/kg

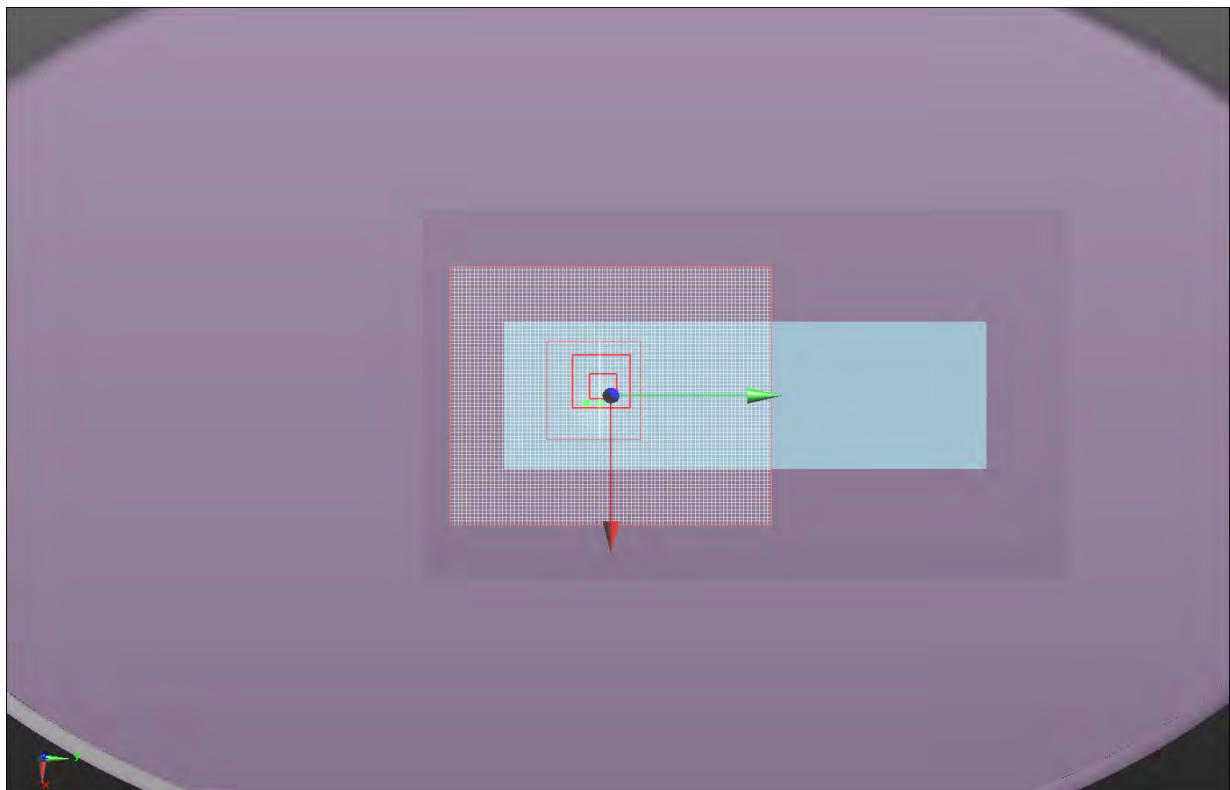
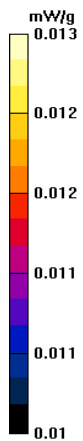
**SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00785 mW/g**

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

Maximum value of SAR (measured) = 0.025 mW/g

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

Maximum value of Total (measured) = 3.639 V/m



Room Temperature (°C):	24.1	Humidity (%):	43.1	Test Date:	09/19/11
Liquid Temperature (°C):	22.9	Barometric Pressure (mb):	1018.3	Tested by:	Ethan Schoonover

### Body Test 4e 9-19-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 824.7 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $f = 825$  MHz;  $\sigma = 0.986$  mho/m;  $\epsilon_r = 54.666$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 0.986494$  mho/m,  $\epsilon_r = 54.6655$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

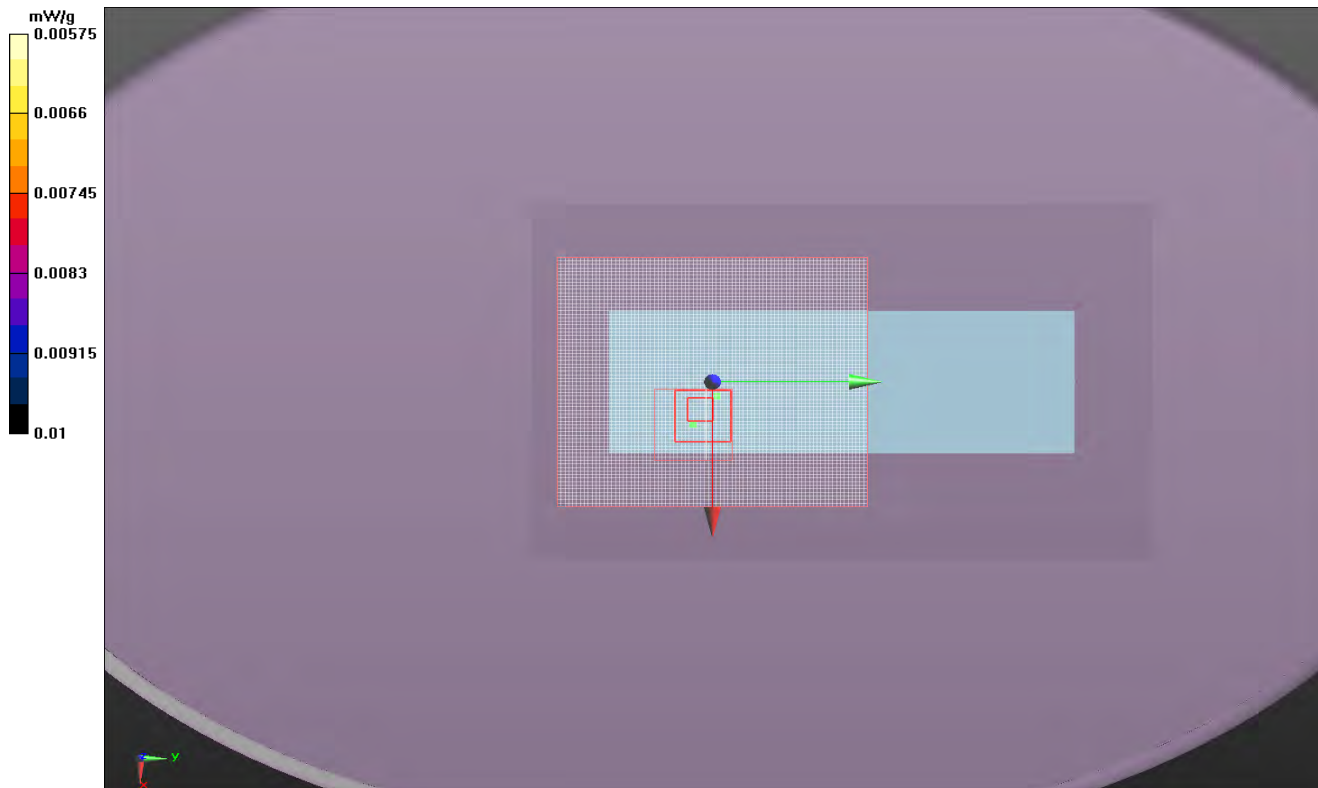
Probe: ES3DV3 - SN3246; ConvF(6.16, 6.16, 6.16); Calibrated: 9/20/2011  
 Sensor-Surface: 3mm (Mechanical Surface Detection), Sensor-Surface: 0mm (Fix Surface)  
 Electronics: DAE4 Sn1237; Calibrated: 11/10/2010  
 Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1096  
 Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

**Body/Body - Mid/Reference scan (51x81x1):** Measurement grid: dx=30mm, dy=30mm  
 Maximum value of SAR (interpolated) = 0.014 mW/g

**Body/Body - Mid/Area scan (71x81x1):** Measurement grid: dx=15mm, dy=15mm  
 Maximum value of SAR (interpolated) = 0.00825 mW/g

**Body/Body - Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 2.968 V/m; Power Drift = 0.43 dB  
 Peak SAR (extrapolated) = 0.011 W/kg  
**SAR(1 g) = 0.00777 mW/g; SAR(10 g) = 0.00507 mW/g**  
 Maximum value of SAR (measured) = 0.00898 mW/g

**Body/Body - Mid/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 2.413 V/m



Room Temperature (°C):	23	Humidity (%):	44.8	Test Date:	09/19/11
Liquid Temperature (°C):	23.3	Barometric Pressure (mb):	1018.7	Tested by:	Ethan Schoonover

### Body Test 4f 9-19-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 836.52 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 836.52$  MHz;  $\sigma = 0.998$  mho/m;  $\epsilon_r = 54.558$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 0.996264$  mho/m,  $\epsilon_r = 54.571$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3246; ConvF(6.16, 6.16, 6.16); Calibrated: 9/20/2011  
 Sensor-Surface: 3mm (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)

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

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

Maximum value of SAR (interpolated) = 0.047 mW/g

**Body/Body - Mid/Area scan (71x81x1):** Measurement grid: dx=15mm, dy=15mm

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

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

**Body/Body - Mid/Zoom Scan (7x8x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.957 V/m; Power Drift = -3.34 dB

Peak SAR (extrapolated) = 0.124 W/kg

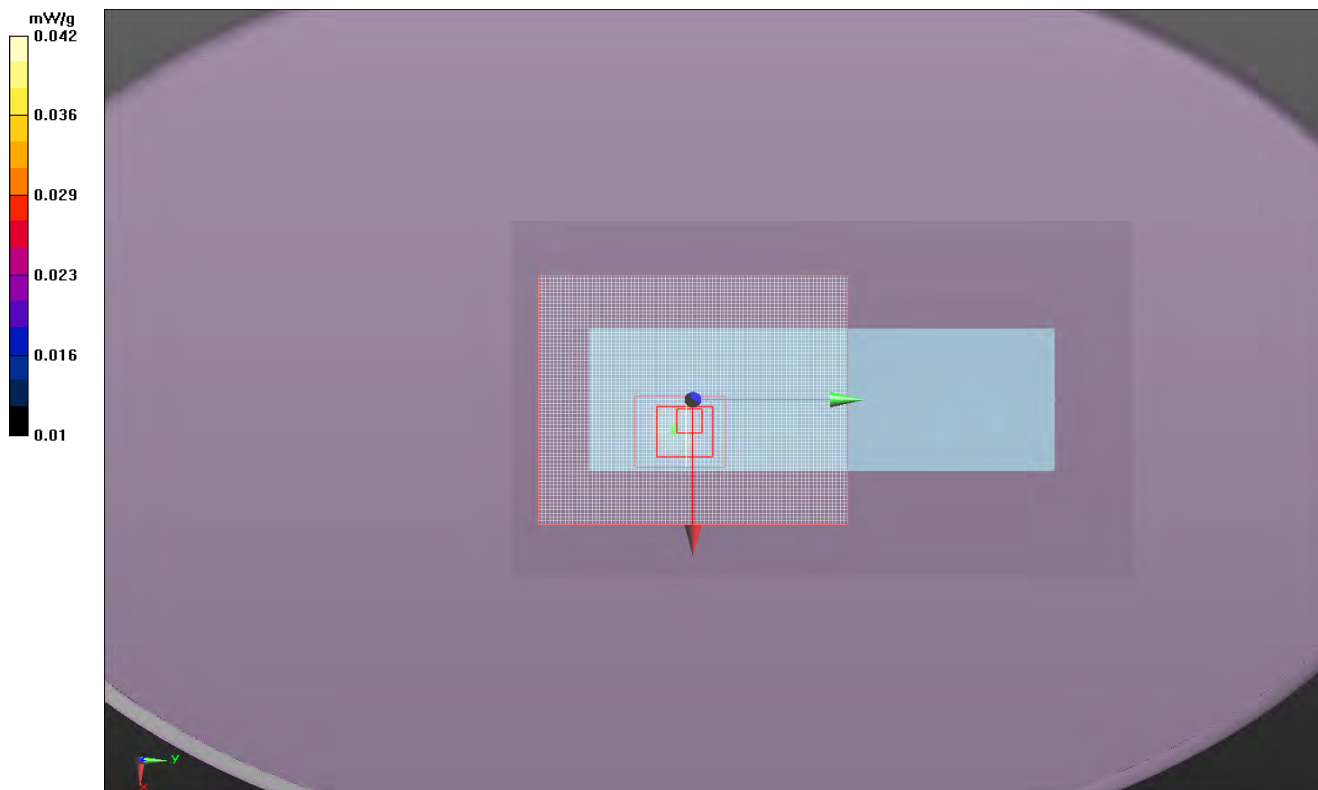
**SAR(1 g) = 0.066 mW/g; SAR(10 g) = 0.042 mW/g**

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

Maximum value of SAR (measured) = 0.075 mW/g

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

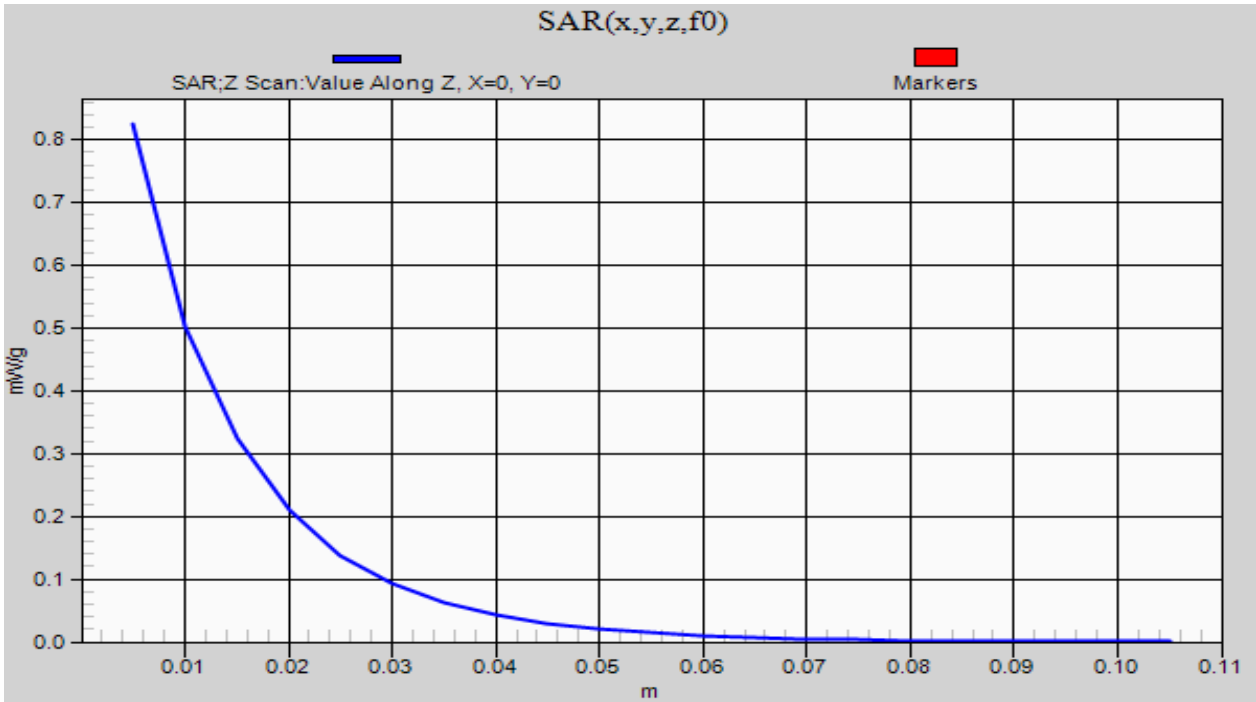
Maximum value of Total (measured) = 6.516 V/m



Room Temperature (°C):	24.2	Humidity (%):	45.5	Test Date:	09/19/11
Liquid Temperature (°C):	22.5	Barometric Pressure (mb):	1022.3	Tested by:	Ethan Schoonover

Body Test 1b 9-19-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016



## SAR TEST DATA

EUT: 1000CP03C	Work Order: INMC0737
Serial Number: 14621142016	Date: See Data Sheets
Customer: Intermec Technologies Corporation	Temperature: See Data Sheets
Attendees: None	Humidity: See Data Sheets
Project: P-INMC018	Barometric Pres.: See Data Sheets
Tested by: Jennifer Herrett and Ethan Schoonover	Job Site: EV08
<b>TEST SPECIFICATIONS</b>	
FCC 2.1093:2011	Test Method FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 941225 D01 v02, and D03 FCC KDB 648474 D01 V01r05
Health Safety Code 6:2009	RSS-102, Issue 4:2010
<b>COMMENTS</b>	
Worst case configuration from original SAR evaluation conducted in Feb 2011	
<b>DEVIATIONS FROM TEST STANDARD</b>	
No Deviations	
Configuration #	1
	Signature <i>Jennifer Herrett</i>

Test Configuration	Frequency Band	Transmit Frequency	Transmit Channel	Transmit Mode	Data Rate (Mbps)	Side	EUT Position	Start Power (Conducted)	SAR Drift During Test (dB)	1g SAR Level	Test #
Head	PCS	1880	600	RC3 (Fwd 3, Rvs 3) SO55 (Loopback)	9.6	Right	Cheek	25.25	0.04	0.517	5
							Tilt	25.25	0.13	0.381	6
						Left	Cheek	25.25	0.28	0.376	7
							Tilt	25.25	0.01	0.279	8

Room Temperature (°C):	21.8	Humidity (%):	44.3	Test Date:	09/21/11
Liquid Temperature (°C):	20.6	Barometric Pressure (mb):	1013.7	Tested by:	Ethan Schoonover

### Head Test 5 9-21-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 1.34749$  mho/m,  $\epsilon_r = 38.9532$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used (interpolated):  $f = 1880$  MHz;  $\sigma = 1.352$  mho/m;  $\epsilon_r = 38.929$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Right Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3246; ConvF(5.02, 5.02, 5.02); 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: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

**Head - Right/Cheek - Mid/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 16.368 V/m

**Head - Right/Cheek - Mid/Reference scan (51x81x1):** Measurement grid: dx=30mm, dy=30mm

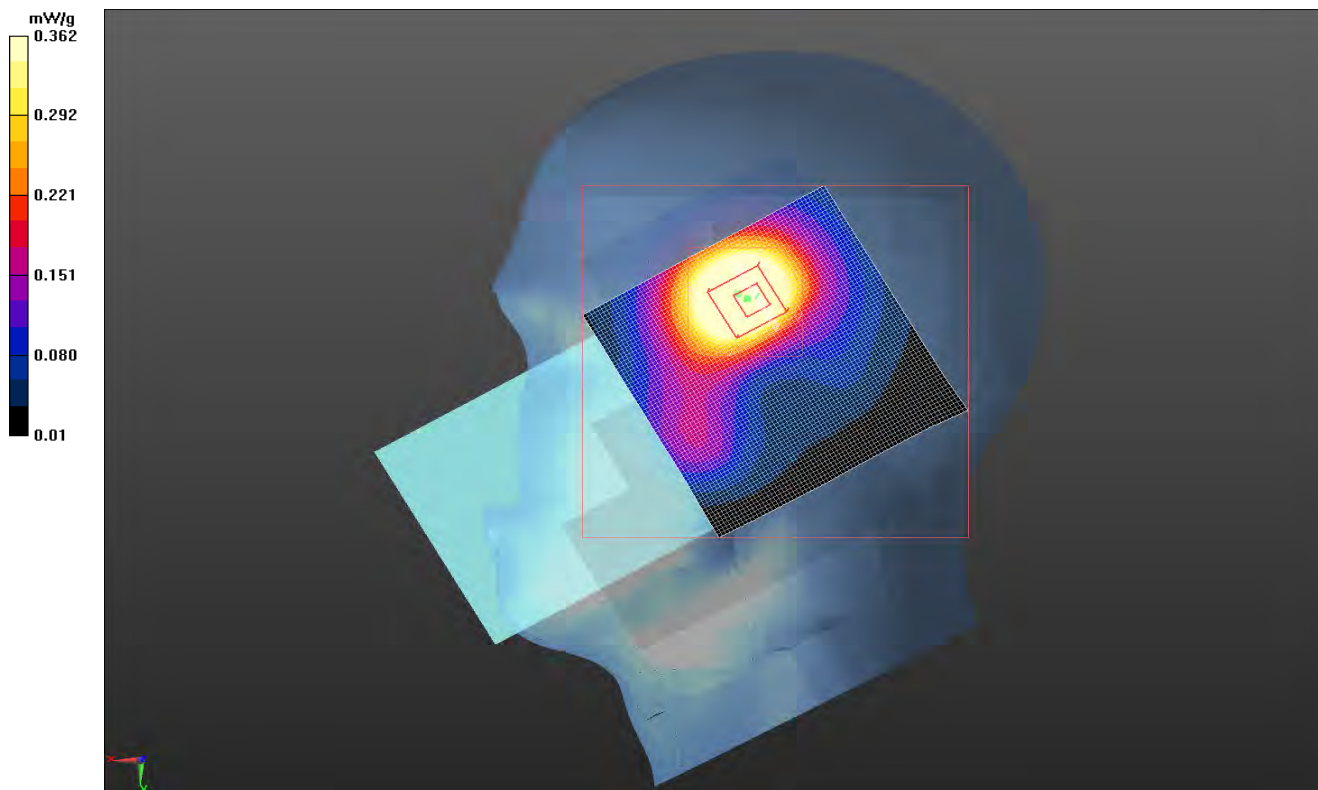
[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (interpolated) = 0.405 mW/g

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

[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (interpolated) = 0.654 mW/g

**Head - Right/Cheek - Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 21.723 V/m; Power Drift = 0.04 dB  
 Peak SAR (extrapolated) = 0.938 W/kg  
**SAR(1 g) = 0.517 mW/g; SAR(10 g) = 0.289 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (measured) = 0.634 mW/g



Room Temperature (°C):	24.4	Humidity (%):	50.8	Test Date:	09/21/11
Liquid Temperature (°C):	21.1	Barometric Pressure (mb):	1013.7	Tested by:	Ethan Schoonover

### Head Test 6 9-21-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 1880$  MHz;  $\sigma = 1.352$  mho/m;  $\epsilon_r = 38.929$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.34749$  mho/m,  $\epsilon_r = 38.9532$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Right Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3246; ConvF(5.02, 5.02, 5.02); 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: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

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

Maximum value of SAR (interpolated) = 0.312 mW/g

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

Reference Value = 16.770 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.696 W/kg

**SAR(1 g) = 0.381 mW/g; SAR(10 g) = 0.212 mW/g**

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

Maximum value of SAR (measured) = 0.475 mW/g

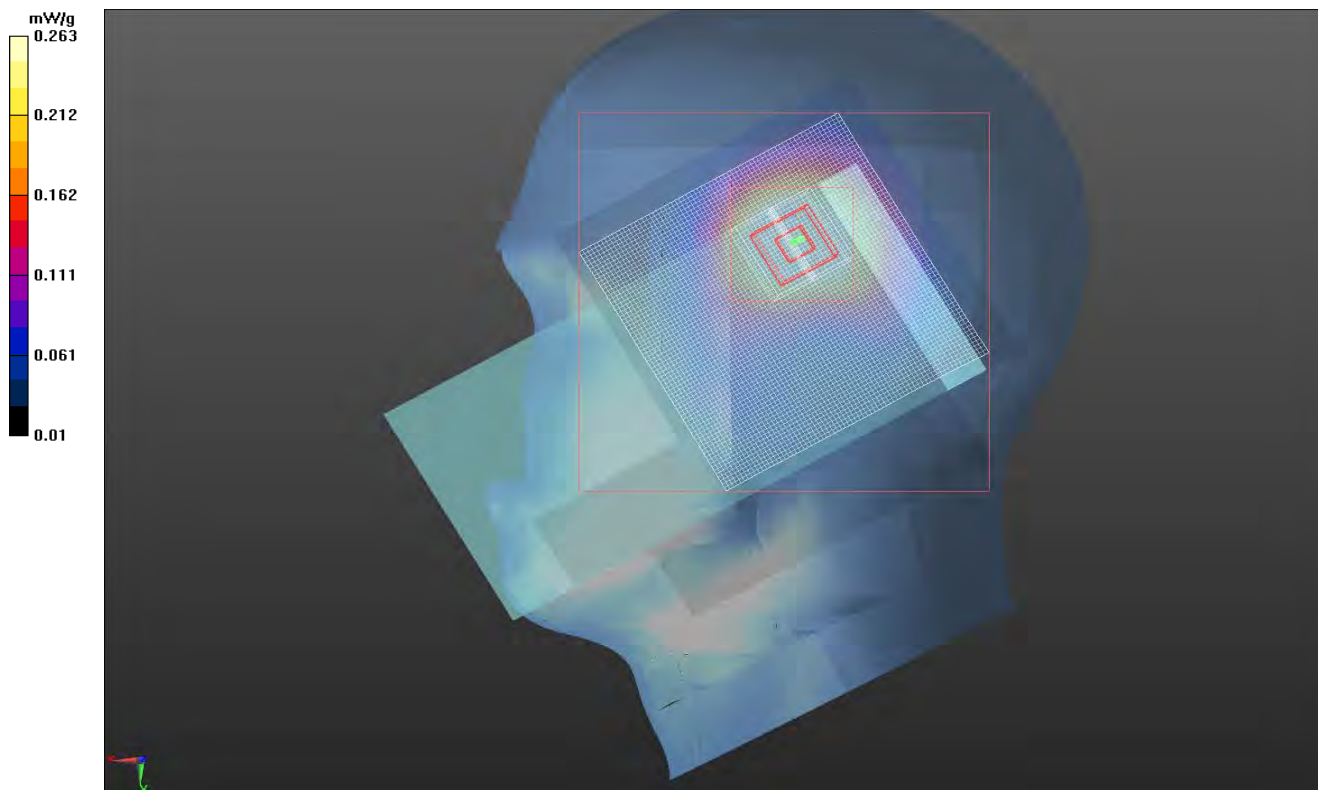
**Head - Right/Tilt - Mid/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 13.940 V/m

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

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

Maximum value of SAR (interpolated) = 0.435 mW/g





Room Temperature (°C):	22.2	Humidity (%):	44	Test Date:	09/21/11
Liquid Temperature (°C):	21.1	Barometric Pressure (mb):	1013.7	Tested by:	Ethan Schoonover

### Head Test 7 9-21-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB  
 Medium parameters used:  $\sigma = 1.34749$  mho/m,  $\epsilon_r = 38.9532$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used (interpolated):  $f = 1880$  MHz;  $\sigma = 1.352$  mho/m;  $\epsilon_r = 38.929$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Left Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3246; ConvF(5.02, 5.02, 5.02); 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 - Mid/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
 Maximum value of Total (measured) = 14.177 V/m

**Head - Left/Cheek - Mid/Reference scan (51x81x1):** Measurement grid: dx=30mm, dy=30mm

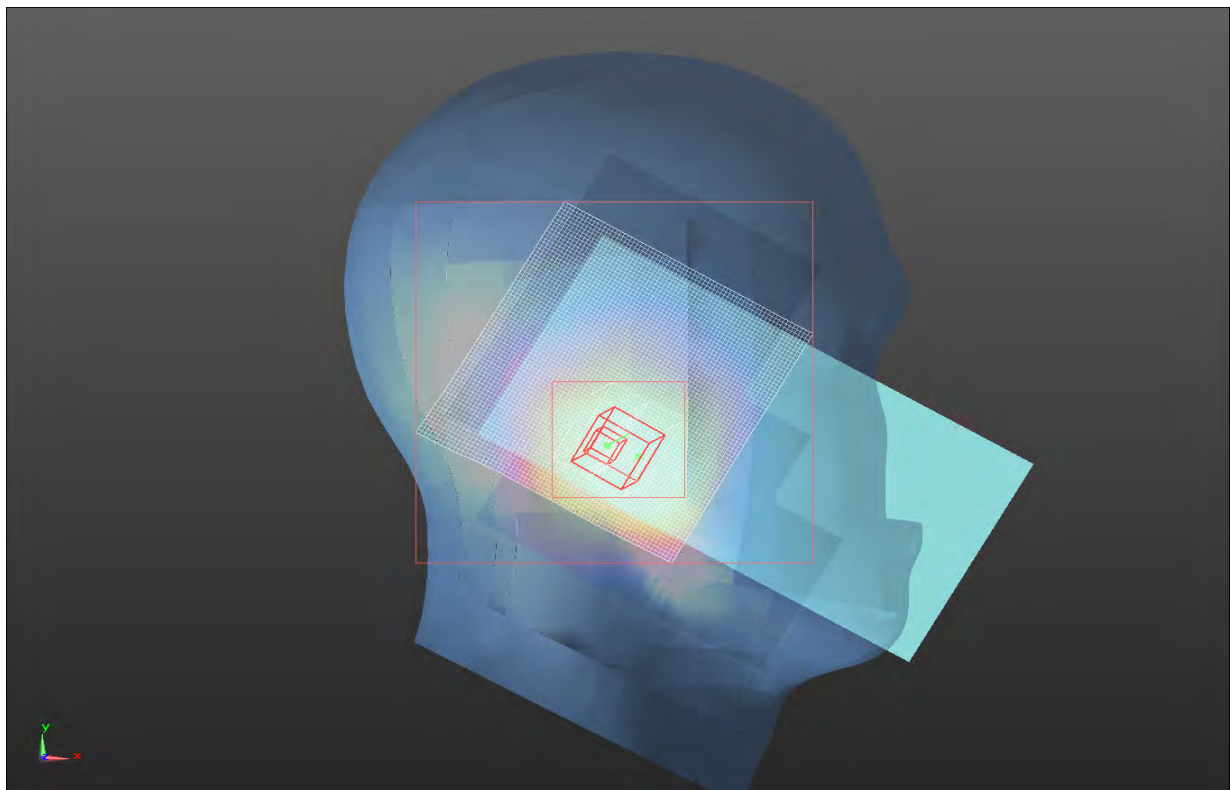
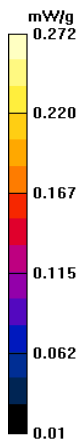
[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (interpolated) = 0.330 mW/g

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

[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (interpolated) = 0.419 mW/g

**Head - Left/Cheek - Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 17.886 V/m; Power Drift = 0.28 dB  
 Peak SAR (extrapolated) = 0.627 W/kg  
**SAR(1 g) = 0.376 mW/g; SAR(10 g) = 0.222 mW/g**

[Info: Interpolated medium parameters used for SAR evaluation.](#)  
 Maximum value of SAR (measured) = 0.451 mW/g



Room Temperature (°C):	22.1	Humidity (%):	44.3	Test Date:	09/21/11
Liquid Temperature (°C):	21	Barometric Pressure (mb):	1013.7	Tested by:	Ethan Schoonover

### Head Test 8 9-21-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 1880$  MHz;  $\sigma = 1.352$  mho/m;  $\epsilon_r = 38.929$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.34749$  mho/m,  $\epsilon_r = 38.9532$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Left Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3246; ConvF(5.02, 5.02, 5.02); 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: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

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

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

Maximum value of SAR (interpolated) = 0.226 mW/g

**Head - Left/Tilt - Mid/Zoom Scan 2 (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.671 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.283 W/kg

**SAR(1 g) = 0.166 mW/g; SAR(10 g) = 0.105 mW/g**

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

Maximum value of SAR (measured) = 0.202 mW/g

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

Reference Value = 14.671 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.467 W/kg

**SAR(1 g) = 0.279 mW/g; SAR(10 g) = 0.161 mW/g**

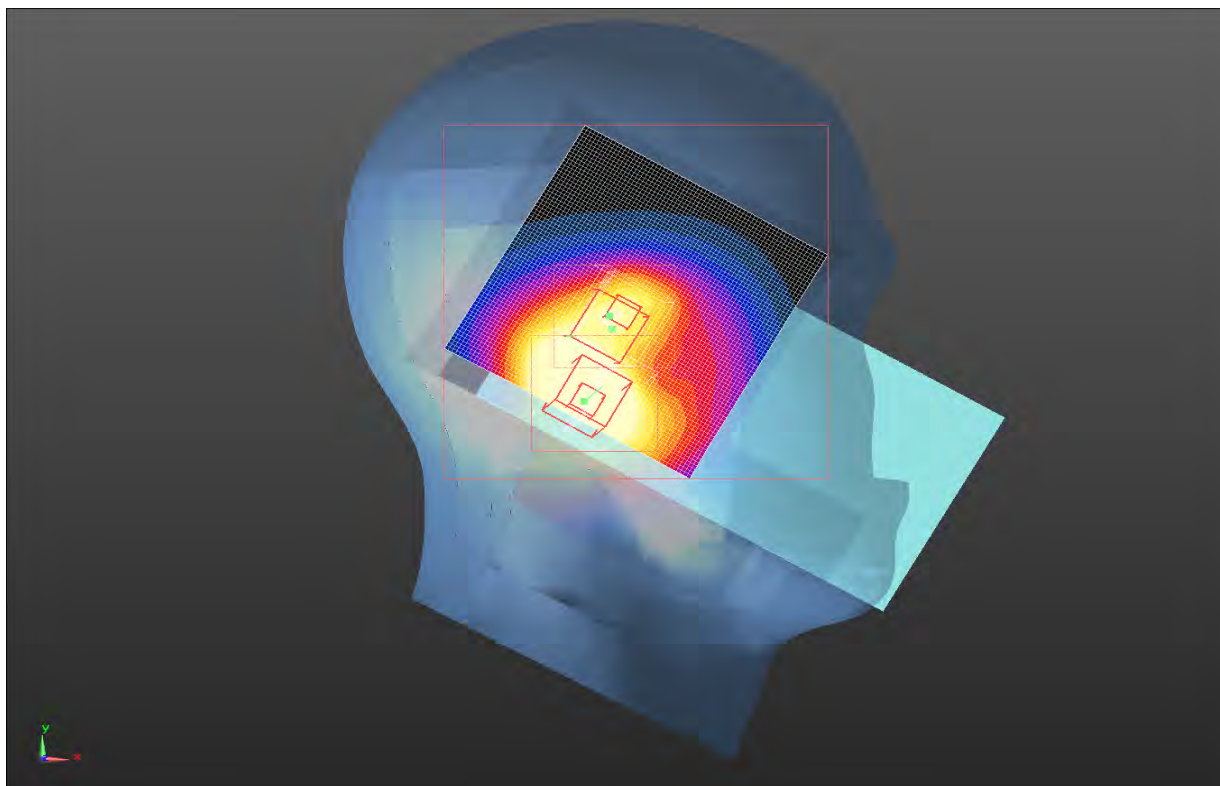
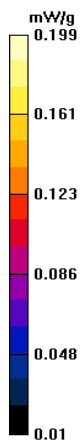
[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.342 mW/g

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

Maximum value of Total (measured) = 12.129 V/m

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



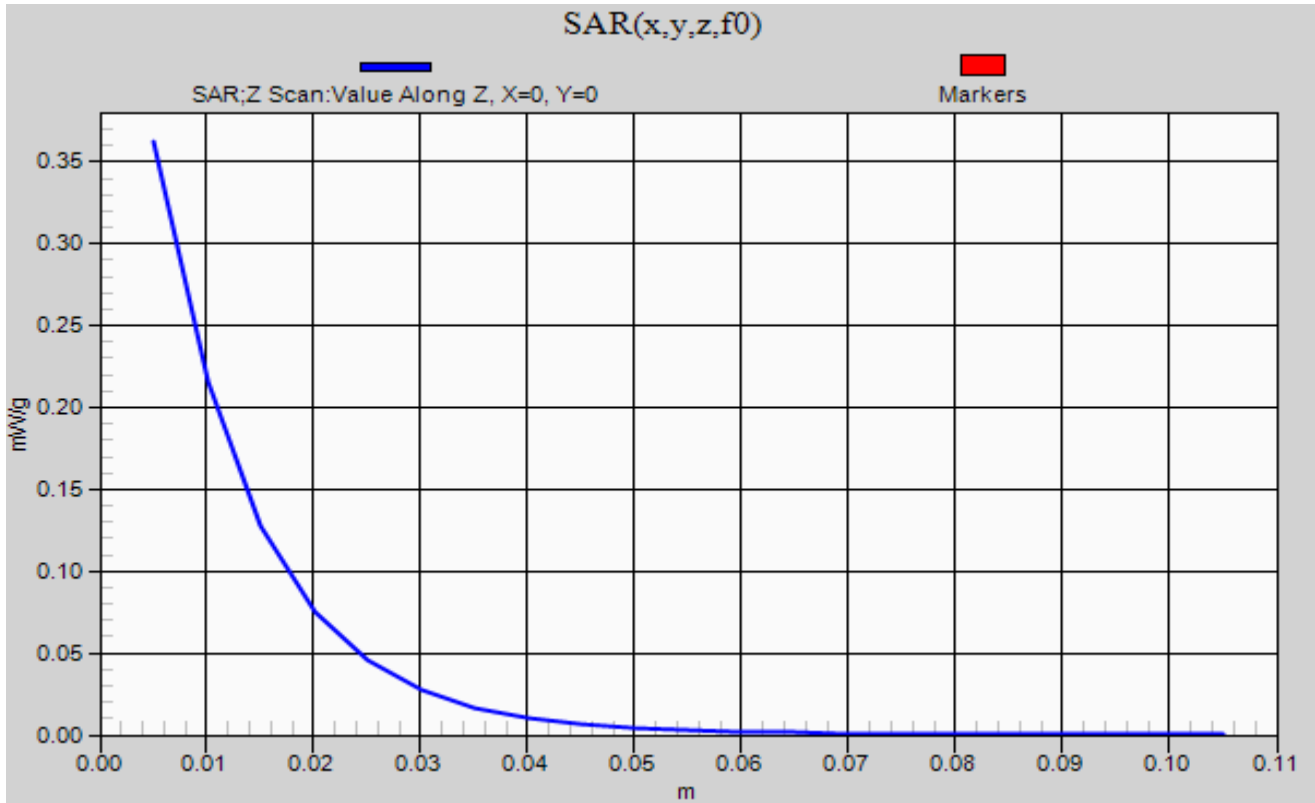
# EMC

# SAR TEST DATA

Room Temperature (°C):	21.8	Humidity (%):	44.3	Test Date:	09/21/11
Liquid Temperature (°C):	20.6	Barometric Pressure (mb):	1013.7	Tested by:	Ethan Schoonover


## Head Test 5 9-21-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016



## SAR TEST DATA

EMC

EUT:	1000CP03C	Work Order:	INMC0737
Serial Number:	14621142016	Date:	See Data Sheets
Customer:	Intermec Technologies Corporation	Temperature:	See Data Sheets
Attendees:	None	Humidity:	See Data Sheets
Project:	P-INMC018	Barometric Pres.:	See Data Sheets
Tested by:	Jennifer Herrett	Job Site:	EV08
<b>TEST SPECIFICATIONS</b>		<b>Test Method</b>	
FCC 2.1093:2011		FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 941225 D01 v02, and D03 FCC KDB 648474 D01 V01r05	
Health Safety Code 6:2009		RSS-102, Issue 4:2010	
<b>COMMENTS</b>			
None			
<b>DEVIATIONS FROM TEST STANDARD</b>			
No Deviations			
Configuration #	1	Signature 	

Test Configuration	Frequency Band	Transmit Frequency	Transmit Channel	Transmit Mode	Data Rate (Mbps)	Body-Worn Accessory	EUT Position	Start Power (Conducted)	SAR Drift During Test (dB)	1g SAR Level	Test #
Body	PCS	1880	600	EV-DO Rev. 0	FTAP: 307.2 RTAP: 153.6	Wrist Holster	Left	25.21	-0.05	0.854	5d
		1851.25	25				Left	25.21	0.46	1.060	5e
		1908.75	1175				Left	25.21	-0.07	0.802	5f
		1880	600	Right			25.21	-0.39	0.062	6	
				Back			25.21	-0.12	0.499	7	
				Left			25.23	0.02	1.19	8e	
			EV-DO Rev. A	FETAP: 307.2 RETAP: 4096 Payload	Left	25.26	0.008	0.971	8d		
			1880	600	Left	25.04	-0.1	0.91	8f		
			1908.75	1175							

Room Temperature (°C):	23.2	Humidity (%):	45.7	Test Date:	10/05/11
Liquid Temperature (°C):	22.4	Barometric Pressure (mb):	1015.2	Tested by:	Ethan Schoonover

### Body Test 5d 10-5-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 1880$  MHz;  $\sigma = 1.547$  mho/m;  $\epsilon_r = 52.004$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.54078$  mho/m,  $\epsilon_r = 52.0257$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(4.55, 4.55, 4.55); Calibrated: 2/23/2011  
 Sensor-Surface: 3mm (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)

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.890 mW/g

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 1.005 mW/g

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

Reference Value = 25.304 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.280 W/kg

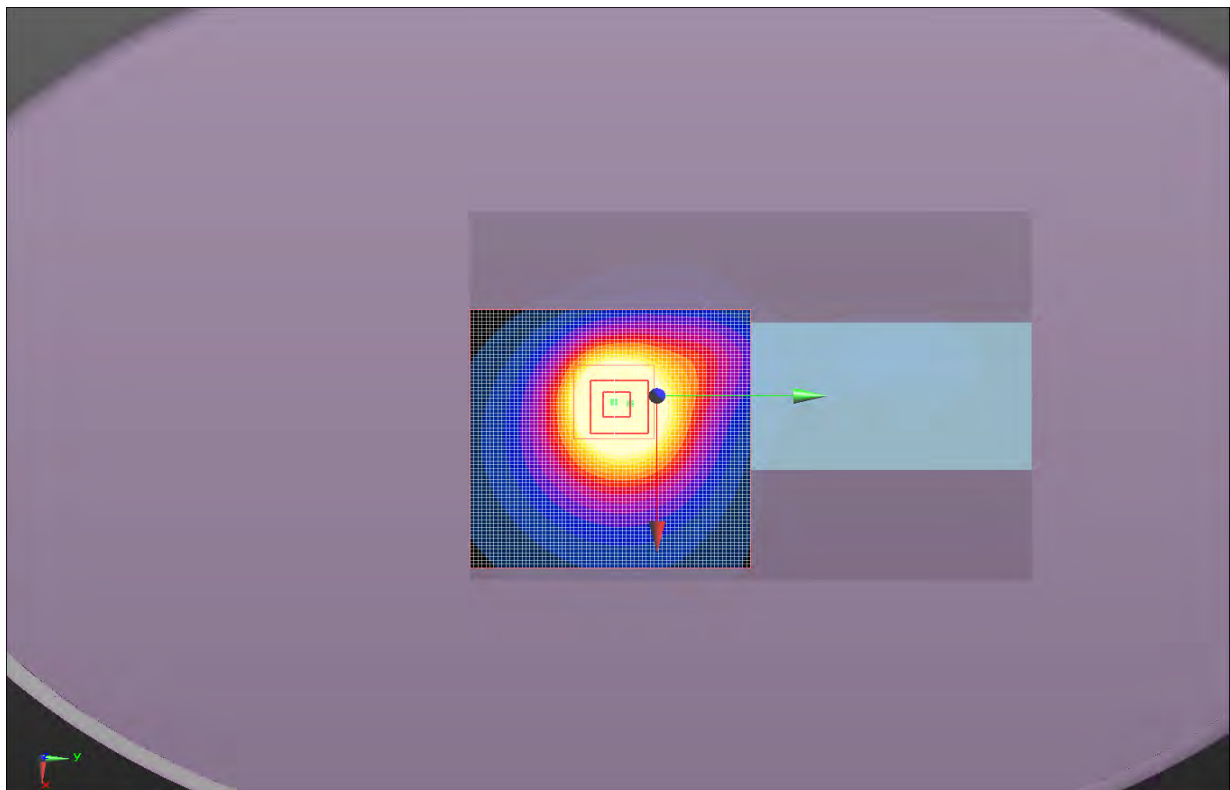
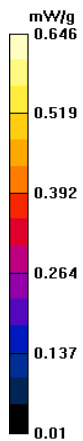
**SAR(1 g) = 0.854 mW/g; SAR(10 g) = 0.532 mW/g**

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.002 mW/g

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

Maximum value of Total (measured) = 20.443 V/m



Room Temperature (°C):	23.3	Humidity (%):	42.8	Test Date:	10/05/11
Liquid Temperature (°C):	22.2	Barometric Pressure (mb):	1015.2	Tested by:	Ethan Schoonover

### Body Test 5e 10-5-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1851.25 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 1851.25$  MHz;  $\sigma = 1.513$  mho/m;  $\epsilon_r = 52.125$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.51163$  mho/m,  $\epsilon_r = 52.1297$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(4.55, 4.55, 4.55); Calibrated: 2/23/2011  
 Sensor-Surface: 3mm (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)

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

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

Maximum value of SAR (interpolated) = 1.143 mW/g

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

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

Maximum value of SAR (interpolated) = 1.241 mW/g

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

Reference Value = 26.896 V/m; Power Drift = 0.46 dB

Peak SAR (extrapolated) = 1.579 W/kg

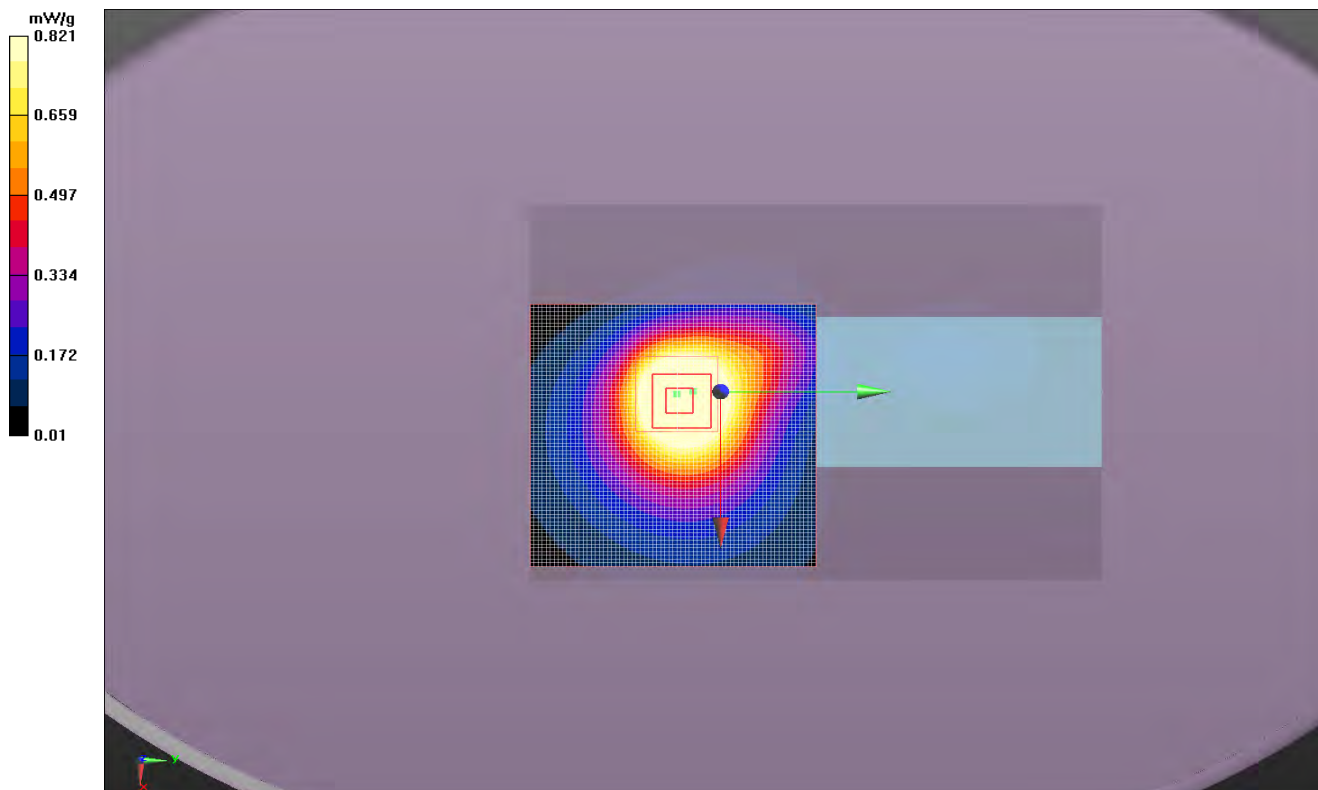
**SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.668 mW/g**

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

Maximum value of SAR (measured) = 1.238 mW/g

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

Maximum value of Total (measured) = 23.300 V/m



Room Temperature (°C):	23.3	Humidity (%):	42.8	Test Date:	10/05/11
Liquid Temperature (°C):	22.2	Barometric Pressure (mb):	1015.2	Tested by:	Ethan Schoonover

### Body Test 5f 10-5-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1908.75 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 1908.75$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.881$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.58477$  mho/m,  $\epsilon_r = 51.8651$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(4.55, 4.55, 4.55); Calibrated: 2/23/2011  
 Sensor-Surface: 3mm (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)

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

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

Maximum value of SAR (interpolated) = 0.858 mW/g

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

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

Maximum value of SAR (interpolated) = 0.938 mW/g

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

Reference Value = 24.546 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 1.222 W/kg

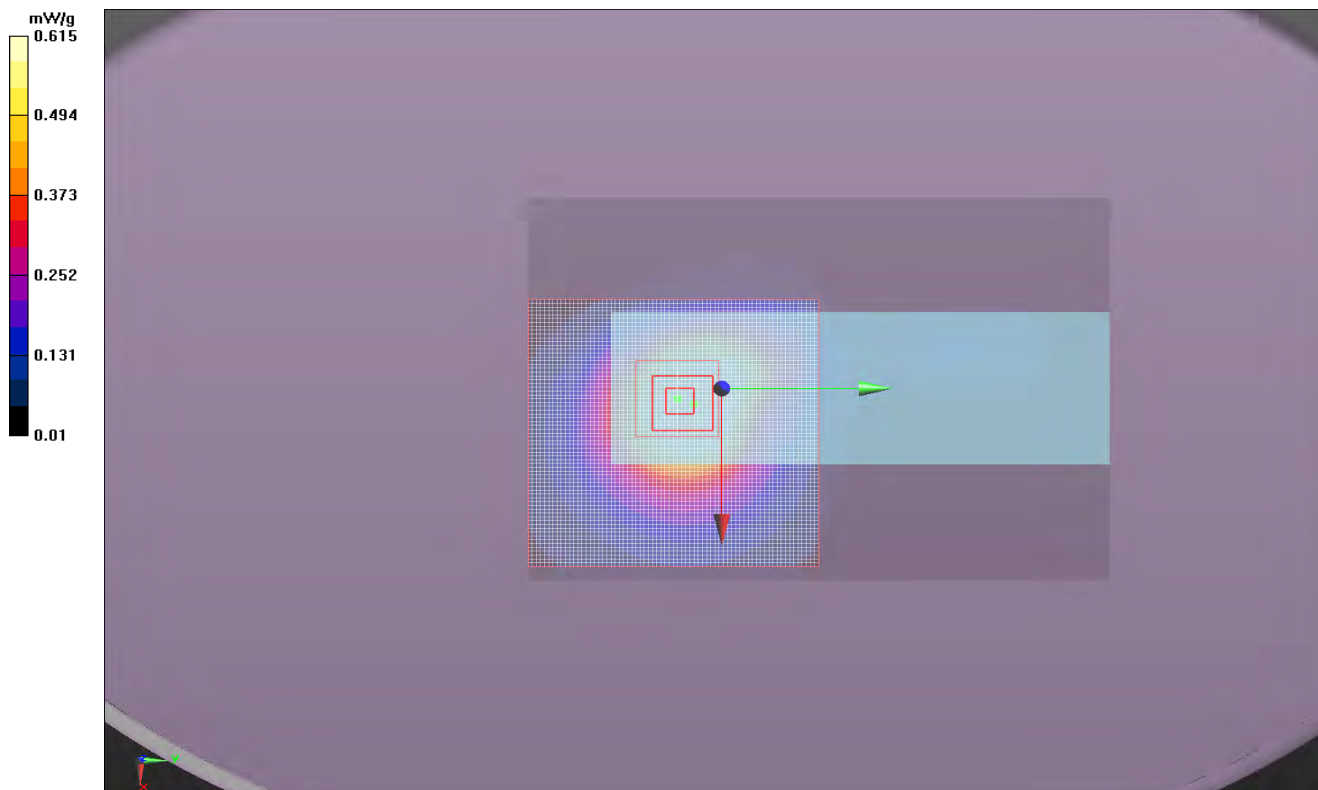
**SAR(1 g) = 0.802 mW/g; SAR(10 g) = 0.496 mW/g**

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

Maximum value of SAR (measured) = 0.949 mW/g

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

Maximum value of Total (measured) = 19.730 V/m



Room Temperature (°C):	21.7	Humidity (%):	46.7	Test Date:	09/20/11
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1016.9	Tested by:	Ethan Schoonover

### Body Test 6 9-20-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 1880$  MHz;  $\sigma = 1.468$  mho/m;  $\epsilon_r = 52.178$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.46276$  mho/m,  $\epsilon_r = 52.1977$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(4.55, 4.55, 4.55); Calibrated: 2/23/2011  
 Sensor-Surface: 3mm (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)

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.060 mW/g

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.076 mW/g

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

Reference Value = 7.133 V/m; Power Drift = -0.39 dB

Peak SAR (extrapolated) = 0.094 W/kg

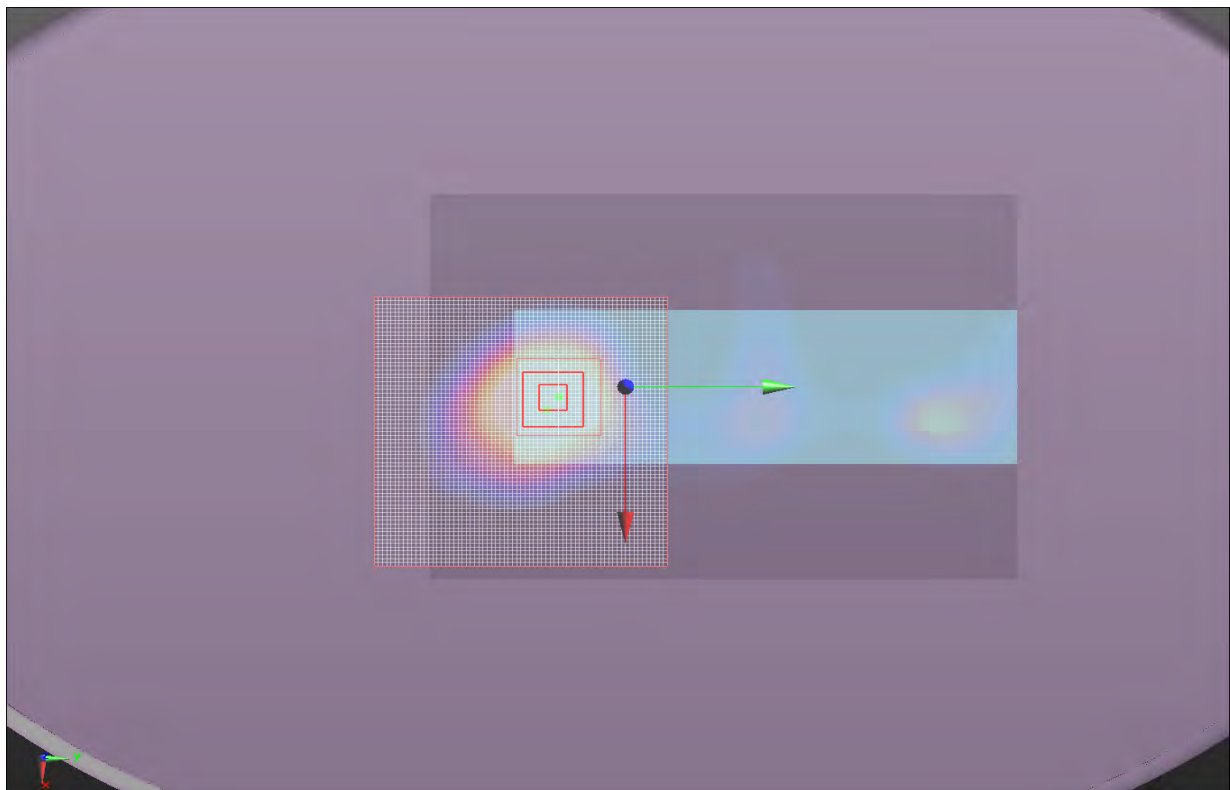
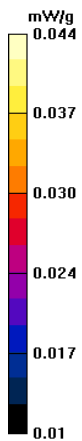
**SAR(1 g) = 0.062 mW/g; SAR(10 g) = 0.038 mW/g**

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.072 mW/g

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

Maximum value of Total (measured) = 5.486 V/m





## EMC

## SAR TEST DATA

Room Temperature (°C):	22.3	Humidity (%):	46.4	Test Date:	09/21/11
Liquid Temperature (°C):	21.3	Barometric Pressure (mb):	1016.5	Tested by:	Jennifer Herrett

## Body Test 7 9-21-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 1880$  MHz;  $\sigma = 1.468$  mho/m;  $\epsilon = 52.178$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.46276$  mho/m,  $\epsilon = 52.1977$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASYS5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(4.55, 4.55, 4.55); Calibrated: 2/23/2011  
 Sensor-Surface: 3mm (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)

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.561 mW/g

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.597 mW/g

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

Reference Value = 19.571 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.753 W/kg

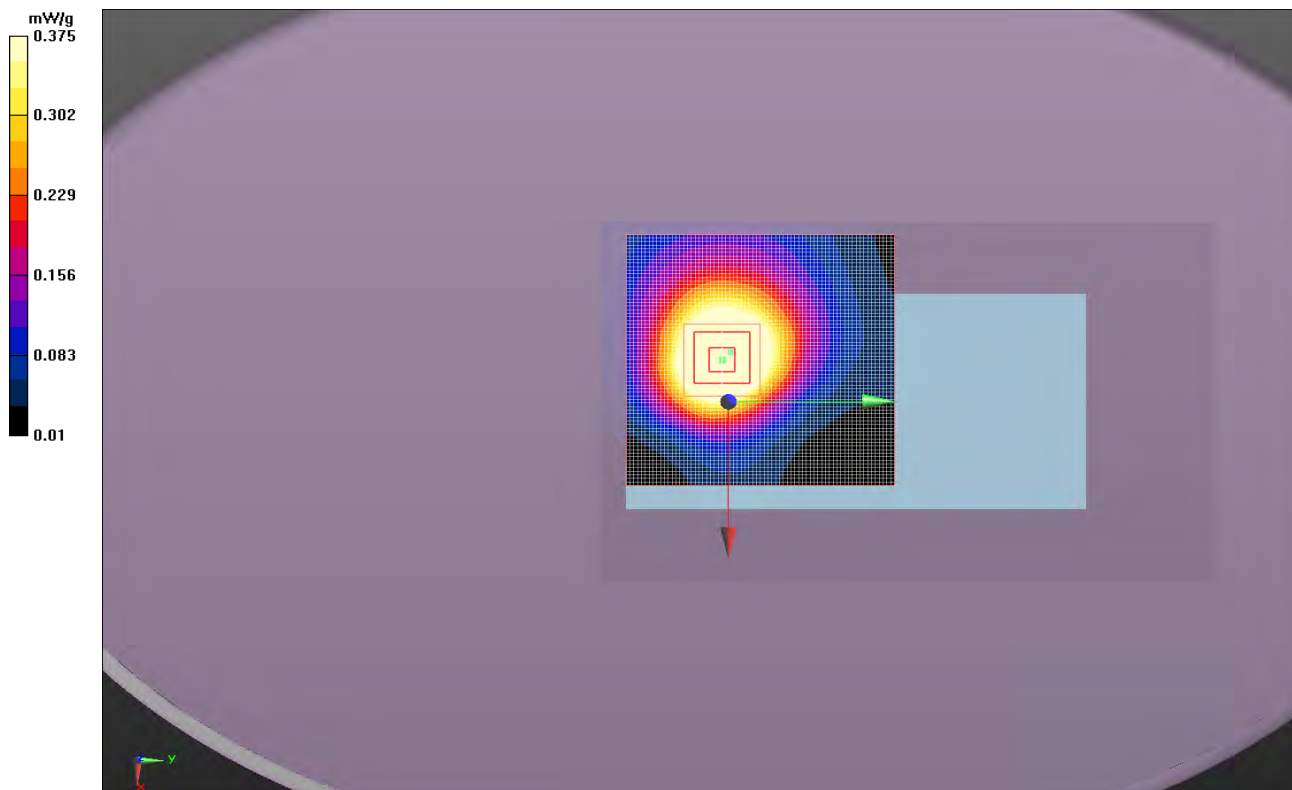
**SAR(1 g) = 0.499 mW/g; SAR(10 g) = 0.313 mW/g**

Info: Interpolated medium parameters used for SAR evaluation.

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

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

Maximum value of Total (measured) = 15.979 V/m



Room Temperature (°C):	22.8	Humidity (%):	42.9	Test Date:	10/05/11
Liquid Temperature (°C):	21.2	Barometric Pressure (mb):	1015.2	Tested by:	Ethan Schoonover

### Body Test 8d 10-5-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 1880$  MHz;  $\sigma = 1.547$  mho/m;  $\epsilon_r = 52.004$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.54078$  mho/m,  $\epsilon_r = 52.0257$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(4.55, 4.55, 4.55); Calibrated: 2/23/2011  
 Sensor-Surface: 3mm (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)

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 1.009 mW/g

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 1.056 mW/g

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

Reference Value = 26.173 V/m; Power Drift = 0.0078 dB

Peak SAR (extrapolated) = 1.505 W/kg

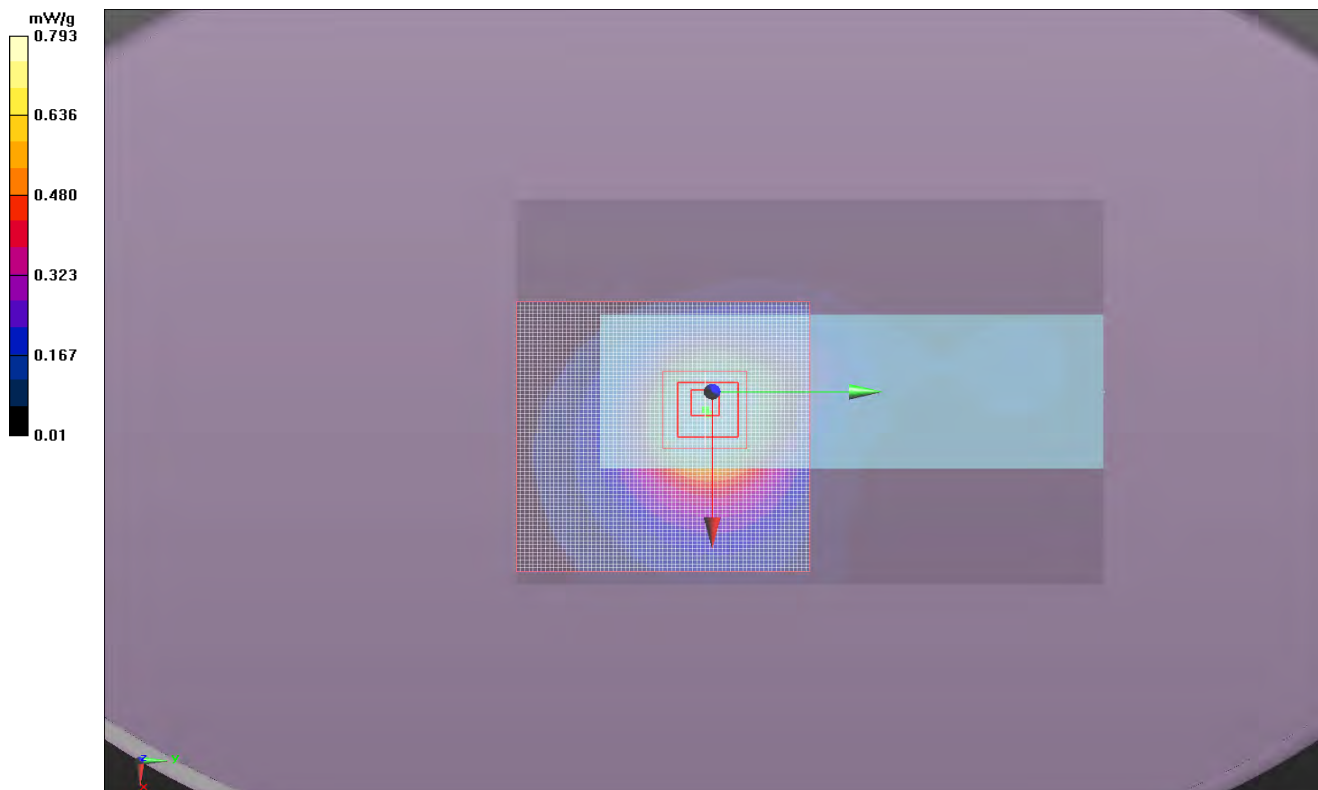
**SAR(1 g) = 0.971 mW/g; SAR(10 g) = 0.599 mW/g**

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.183 mW/g

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

Maximum value of Total (measured) = 22.648 V/m



Room Temperature (°C):	22.8	Humidity (%):	42.9	Test Date:	10/05/11
Liquid Temperature (°C):	21.2	Barometric Pressure (mb):	1015.2	Tested by:	Ethan Schoonover

### Body Test 8e 10-5-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1851.25 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 1851.25$  MHz;  $\sigma = 1.513$  mho/m;  $\epsilon_r = 52.125$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.51163$  mho/m,  $\epsilon_r = 52.1297$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(4.55, 4.55, 4.55); Calibrated: 2/23/2011  
 Sensor-Surface: 3mm (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)

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

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

Maximum value of SAR (interpolated) = 1.322 mW/g

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

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

Maximum value of SAR (interpolated) = 1.392 mW/g

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

Reference Value = 29.020 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.706 W/kg

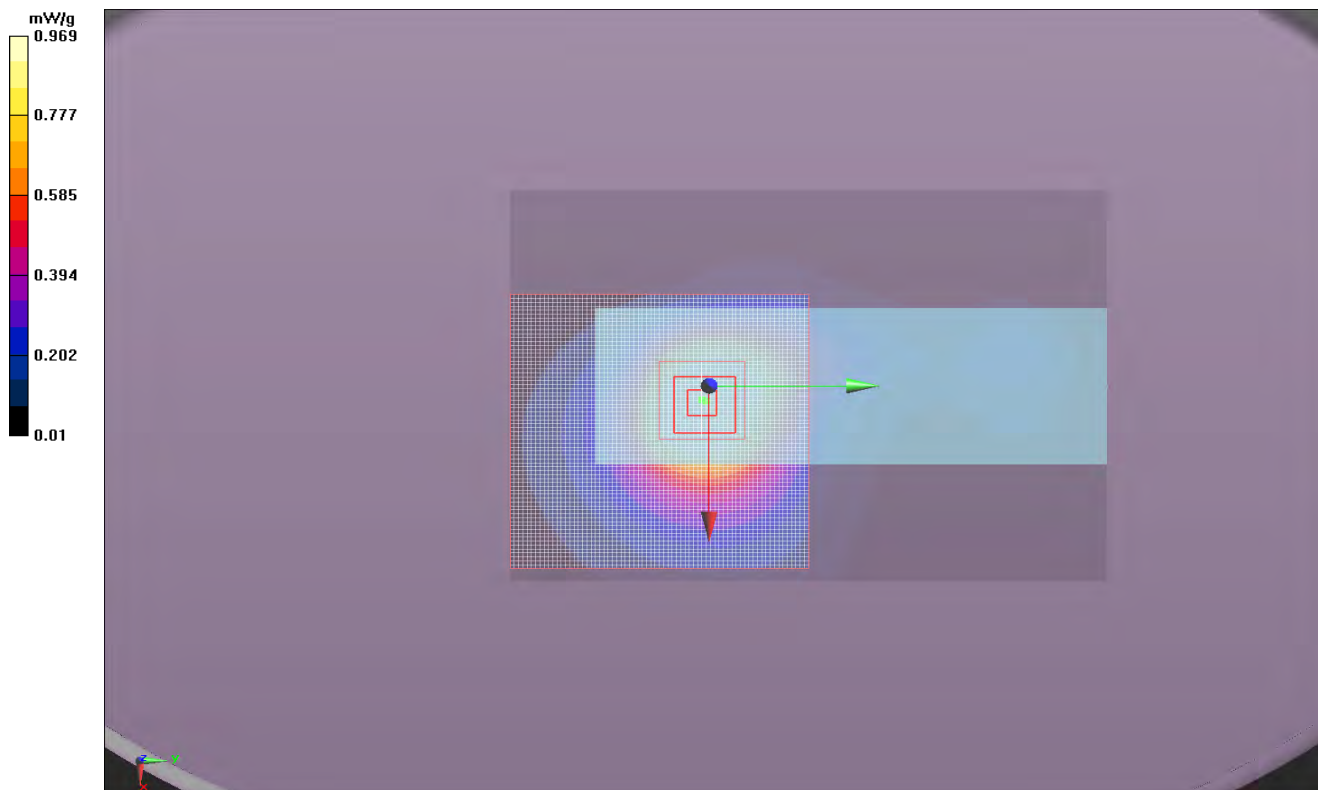
**SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.740 mW/g**

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

Maximum value of SAR (measured) = 1.396 mW/g

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

Maximum value of Total (measured) = 25.306 V/m



Room Temperature (°C):	23.2	Humidity (%):	45.7	Test Date:	10/05/11
Liquid Temperature (°C):	22.4	Barometric Pressure (mb):	1015.2	Tested by:	Ethan Schoonover

### Body Test 8f 10-5-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1908.75 MHz; Communication System PAR: 0 dB  
 Medium parameters used (interpolated):  $f = 1908.75$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 51.881$ ;  $\rho = 1000$  kg/m<sup>3</sup>, Medium parameters used:  $\sigma = 1.58477$  mho/m,  $\epsilon_r = 51.8651$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
 Phantom section: Flat Section  
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3173; ConvF(4.55, 4.55, 4.55); Calibrated: 2/23/2011  
 Sensor-Surface: 3mm (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)

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

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

Maximum value of SAR (interpolated) = 0.956 mW/g

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

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

Maximum value of SAR (interpolated) = 1.056 mW/g

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

Reference Value = 26.835 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.385 W/kg

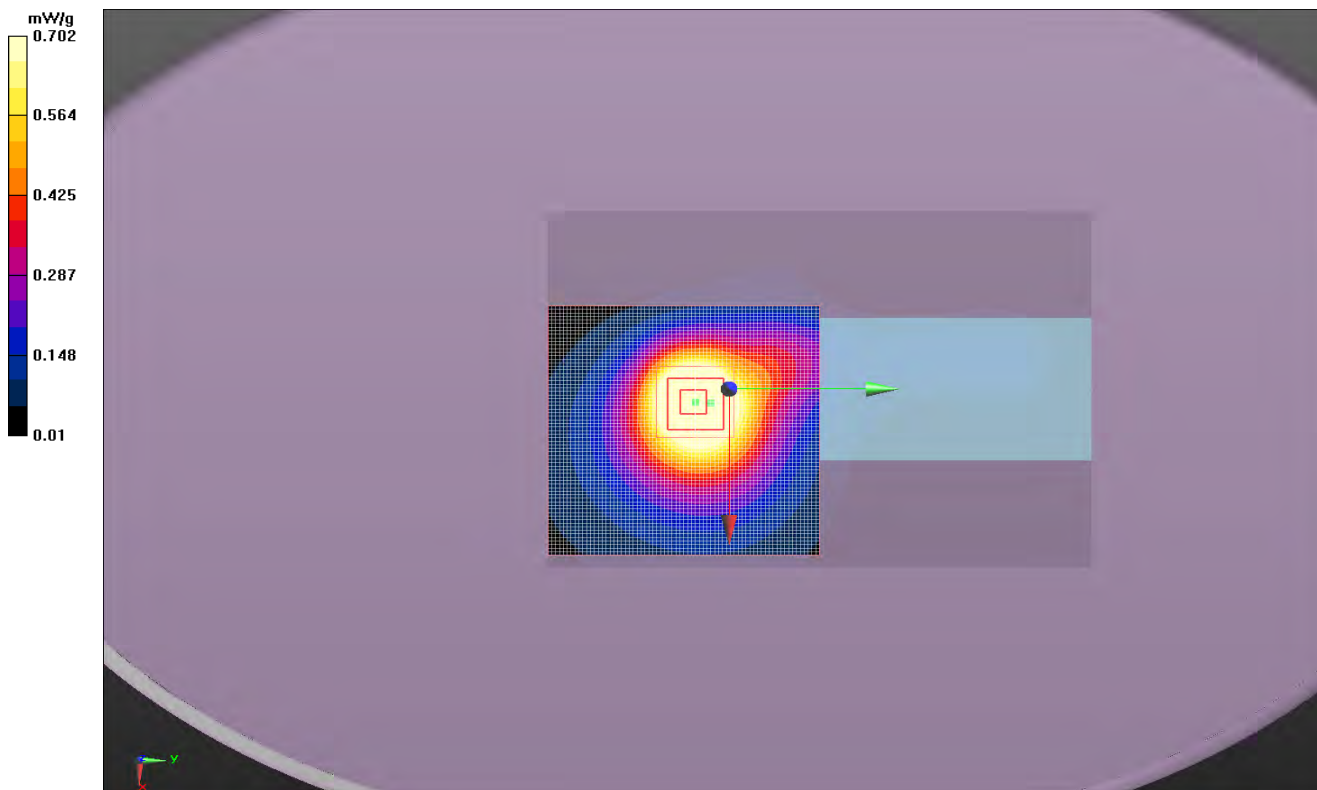
**SAR(1 g) = 0.910 mW/g; SAR(10 g) = 0.563 mW/g**

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

Maximum value of SAR (measured) = 1.075 mW/g

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

Maximum value of Total (measured) = 21.079 V/m



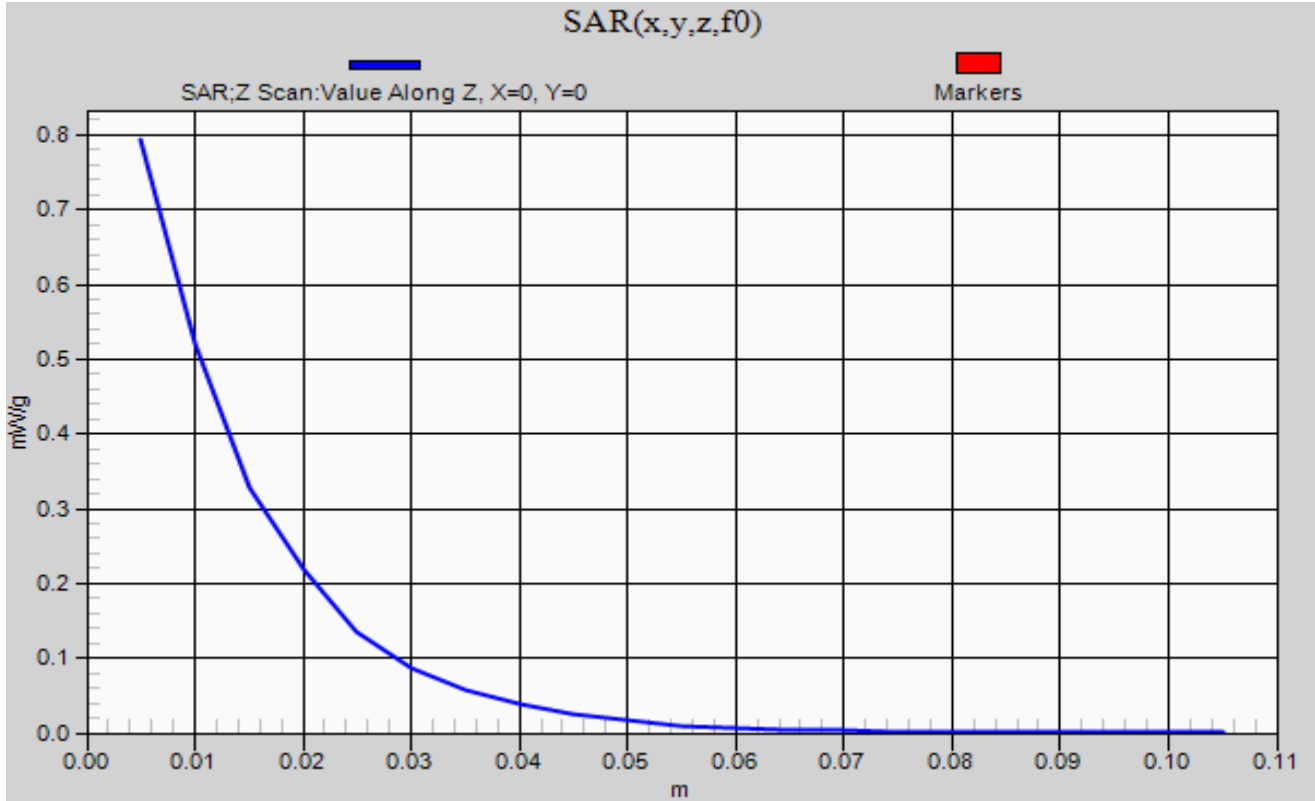
# EMC

# SAR TEST DATA

Room Temperature (°C):	22.8	Humidity (%):	42.9	Test Date:	10/05/11
Liquid Temperature (°C):	21.2	Barometric Pressure (mb):	1015.2	Tested by:	Ethan Schoonover

## Body Test 8e 10-5-11

DUT: Handheld Computer; Type: 1000CP03C; Serial: 42016

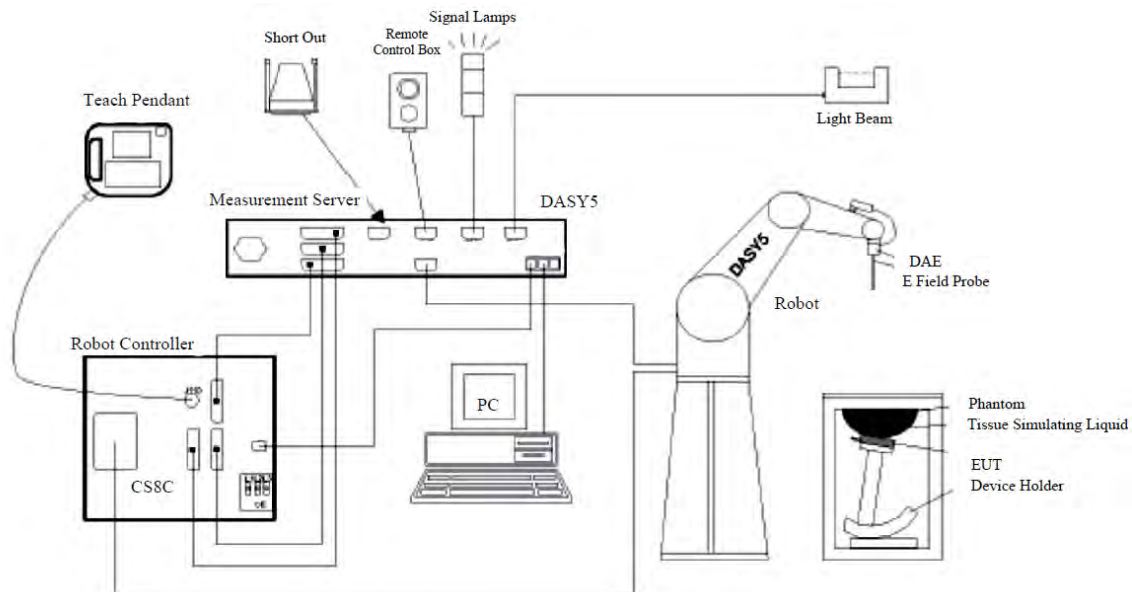


## SAR Measurement System

## Schmid &amp; 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:



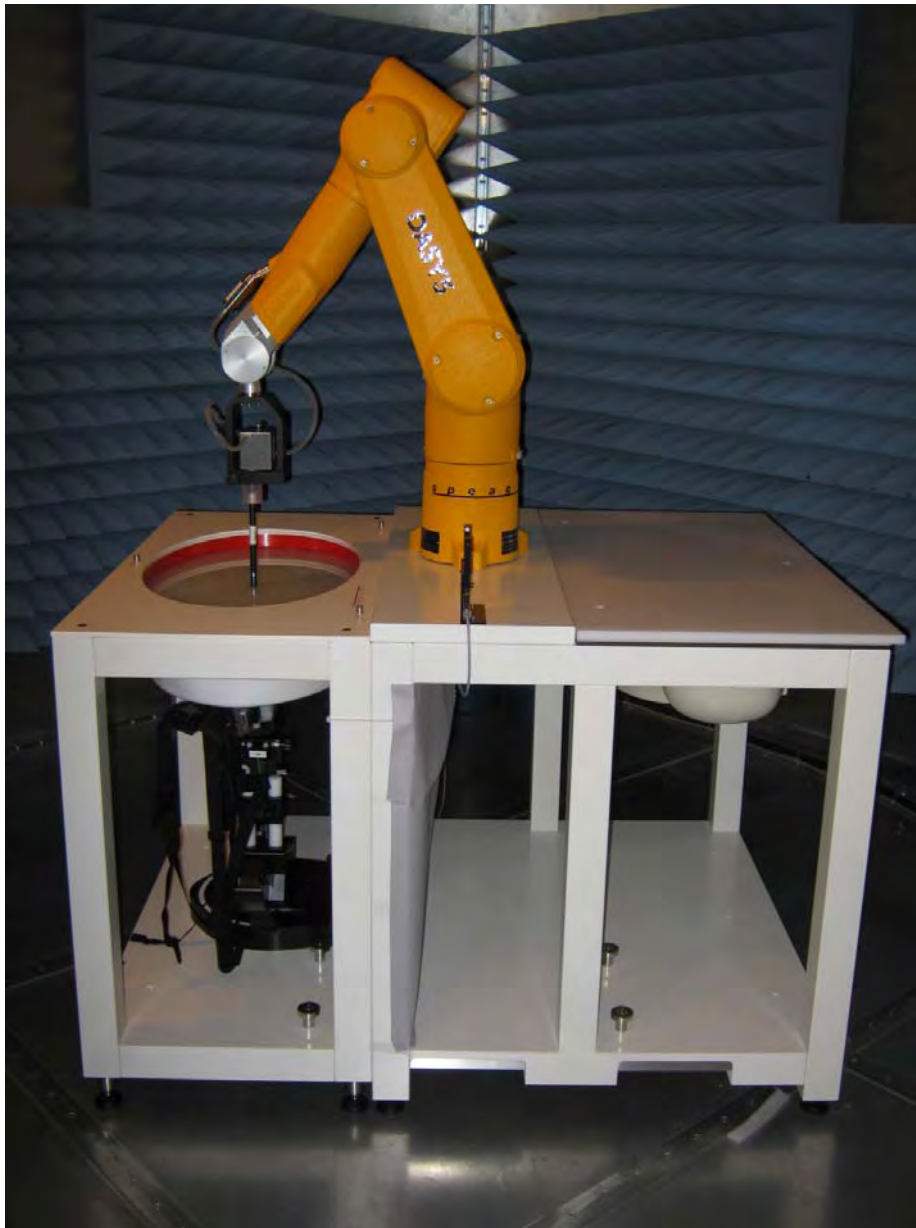
- A standard high precision 6-axis robot (Staubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) 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
Wireless Communication Test Set	Agilent	E5515C	BSV	NCR	0 mo
Humidity Temperature Meter	Omegaette	HH311	DTY	3/29/2011	24 mo
Humidity Temperature Meter	Omegaette	HH311	DTX	3/29/2011	24 mo
Ultrawideband Amplifier, SMA, 800-2000 MHz	Mini Circuits	ZHL-5W-2G-S+	TRZ	NCR	0 mo
MXG Analog Signal Generator	Agilent	N5181A	TIG	NCR	0 mo
Power Sensor	Agilent	E9300H	SQO	6/6/2011	24 mo
Power Meter	Agilent	N1913A	SQR	6/6/2011	24 mo
Dielectric Probe Kit	Agilent	85070E	IPP	9/8/2010	24 mo
Network Analyzer	Hewlett Packard	N5230A	NAD	8/3/2011	12 mo
Antenna, Dipole 1900MHz SAR	SPEAG	D1900v2	ADO	11/24/2010	12 mo
Antenna, Dipole 835MHz SAR	SPEAG	D835V2	ADK	10/19/2010	12 mo
Device Holder	SPEAG	N/A	SAW	NCR	0 mo
Body Solution	SPEAG	MSL 900	SAT	Within 24 of hours of a measurement	
Head Solution	SPEAG	HSL 900	SAS		
Body Solution	SPEAG	MSL 1900	SAO		
Head Solution	SPEAG	HSL 1900	SAN		
DASY5 Measurement Server	Staeubli	DAYS5	SAK	NCR	0 mo
Robot Chasis and power Supply	Staeubli	N/A	SAJ	NCR	0 mo
Robot Controller	Staeubli	CS8C	SAI	11/11/2010	12 mo
DAE	SPEAG	SD 000 D04 EJ	SAH	11/11/2010	12 mo
SAR Probe	SPEAG	ES3DV3	R035	2/23/2011	12 mo
Light Beam Unit	SPEAG	SE UKS 030 AA	SAD	NCR	0 mo
Phantom, 2mm Oval ELI4 (Body)	SPEAG	QD OVA 001 BB	SAC	NCR	0 mo
Phantom, Twin SAM (Head)	SPEAG	QD 000 P40 CC	SAB	NCR	0 mo
Robot Arm	Staeubli	TX60LSPEAG	SAA	NCR	0 mo



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

**Probe Calibration**

Please see attached calibration data

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



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

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

Accreditation No.: **SCS 108**

Client **SPEAG Replacement**

Certificate No: **ES3-3173\_Feb11**

## CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3173**

Calibration procedure(s) **QA CAL-01.v7, QA CAL-23.v4, QA CAL-25.v3  
Calibration procedure for dosimetric E-field probes**

Calibration date: **February 23, 2011**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	01-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	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	23-Apr-10 (No. DAE4-654_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

Calibrated by:	Name <b>Claudio Leubler</b>	Function Laboratory Technician	Signature 
Approved by:	Name <b>Katja Pokovic</b>	Function Technical Manager	Signature 

Issued: February 24, 2011

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

### Glossary:

TSL	tissue simulating liquid
NORM <sub>x,y,z</sub>	sensitivity in free space
ConvF	sensitivity in TSL / NORM <sub>x,y,z</sub>
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization $\varphi$	$\varphi$ rotation around probe axis
Polarization $\vartheta$	$\vartheta$ 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<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)<sub>x,y,z</sub> = NORM<sub>x,y,z</sub> \* frequency\_response** (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; VR<sub>x,y,z</sub>; A, B, C** are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe ES3DV3

## SN:3173

Manufactured: January 23, 2008  
Calibrated: February 23, 2011

Calibrated for DASYS/EASY Systems  
(Note: non-compatible with DASYS2 system!)

## DASY/EASY - Parameters of Probe: ES3DV3 - SN:3173

### Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup>	1.21	1.28	1.35	$\pm 10.1\%$
DCP (mV) <sup>B</sup>	95.9	100.2	100.8	

### Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc <sup>E</sup> (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	144.1	$\pm 2.7\%$
			Y	0.00	0.00	1.00	114.9	
			Z	0.00	0.00	1.00	113.4	

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

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the  $E^2$ -field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Numerical linearization parameter; uncertainty not required.

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

## DASY/EASY - Parameters of Probe: ES3DV3 - SN:3173

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	6.25	6.25	6.25	0.99	1.11	± 12.0 %
835	41.5	0.90	6.01	6.01	6.01	0.99	1.12	± 12.0 %
900	41.5	0.97	5.93	5.93	5.93	0.99	1.12	± 12.0 %
1640	40.3	1.29	5.34	5.34	5.34	0.99	1.11	± 12.0 %
1750	40.1	1.37	5.20	5.20	5.20	0.99	1.13	± 12.0 %
1810	40.0	1.40	5.05	5.05	5.05	0.94	1.15	± 12.0 %
1900	40.0	1.40	4.96	4.96	4.96	0.96	1.13	± 12.0 %
1950	40.0	1.40	4.80	4.80	4.80	0.91	1.17	± 12.0 %
2000	40.0	1.40	4.88	4.88	4.88	0.99	1.06	± 12.0 %
2150	39.7	1.53	4.72	4.72	4.72	0.95	1.13	± 12.0 %
2300	39.5	1.67	4.58	4.58	4.58	0.96	1.09	± 12.0 %
2450	39.2	1.80	4.26	4.26	4.26	0.92	1.14	± 12.0 %
2600	39.0	1.96	4.13	4.13	4.13	0.90	1.16	± 12.0 %

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

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

## DASY/EASY - Parameters of Probe: ES3DV3- SN:3173

### Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	6.01	6.01	6.01	0.99	1.15	± 12.0 %
835	55.2	0.97	5.97	5.97	5.97	0.99	1.16	± 12.0 %
900	55.0	1.05	5.89	5.89	5.89	0.99	1.14	± 12.0 %
1640	53.8	1.40	5.30	5.30	5.30	0.99	1.18	± 12.0 %
1750	53.4	1.49	4.87	4.87	4.87	0.95	1.22	± 12.0 %
1810	53.3	1.52	4.71	4.71	4.71	0.95	1.20	± 12.0 %
1900	53.3	1.52	4.55	4.55	4.55	0.90	1.24	± 12.0 %
1950	53.3	1.52	4.61	4.61	4.61	0.93	1.20	± 12.0 %
2000	53.3	1.52	4.49	4.49	4.49	0.89	1.24	± 12.0 %
2150	53.1	1.66	4.37	4.37	4.37	0.98	1.16	± 12.0 %
2300	52.9	1.81	4.19	4.19	4.19	0.99	1.08	± 12.0 %
2450	52.7	1.95	4.05	4.05	4.05	0.99	1.01	± 12.0 %
2600	52.5	2.16	3.90	3.90	3.90	0.99	1.03	± 12.0 %

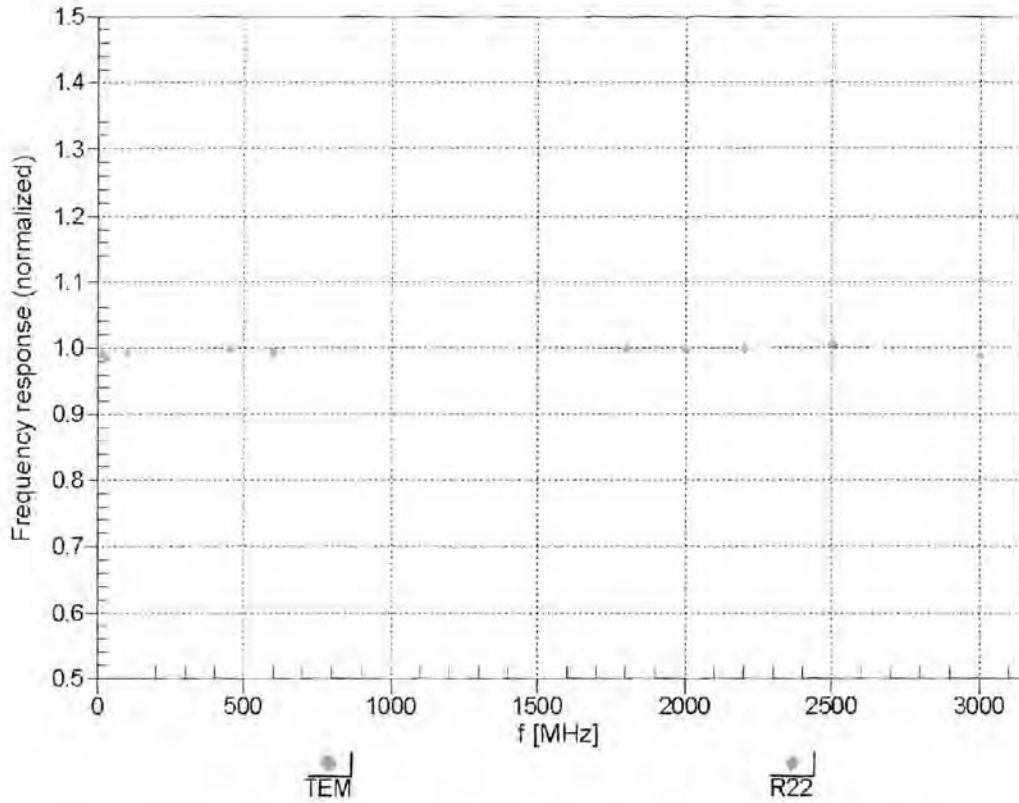
<sup>C</sup> Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

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



# Frequency Response of E-Field

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

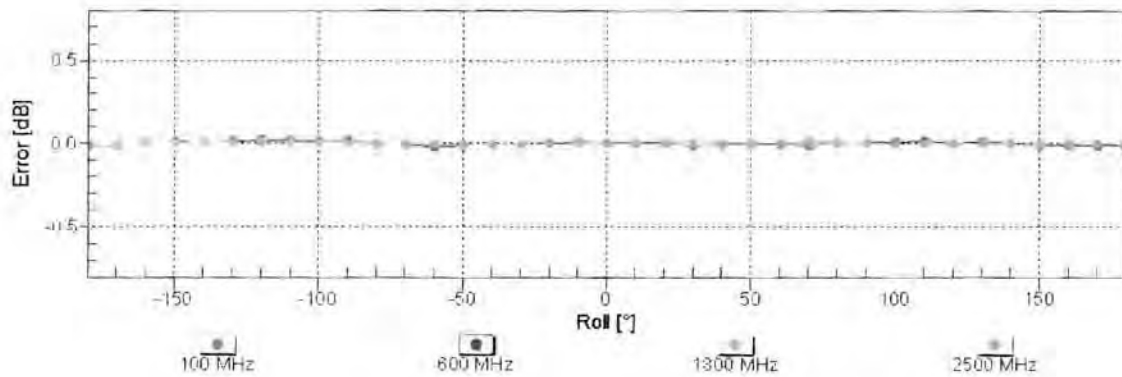
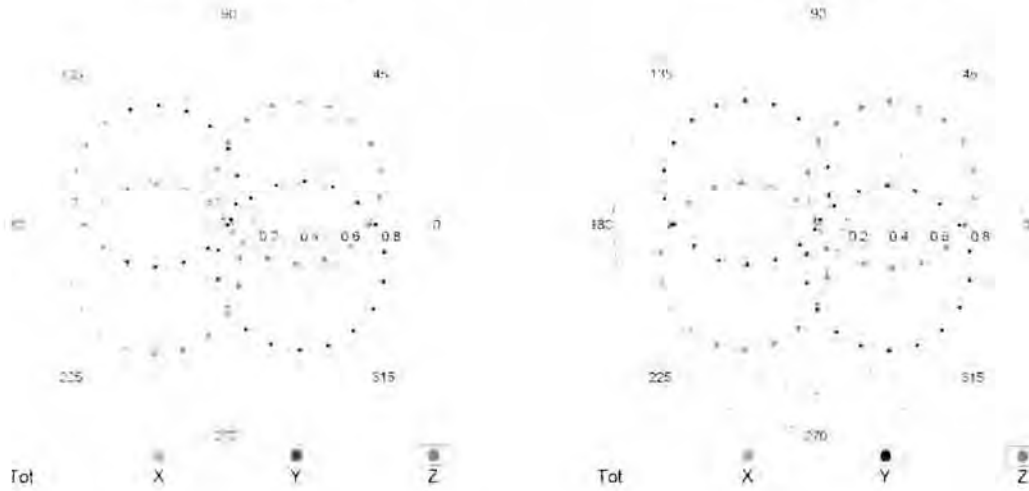


Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  (k=2)

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

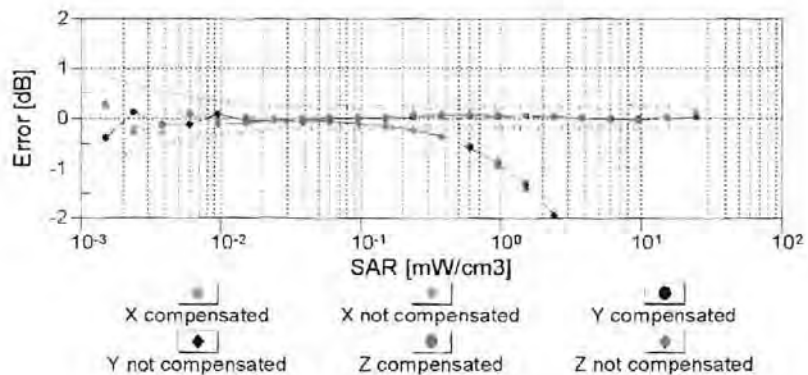
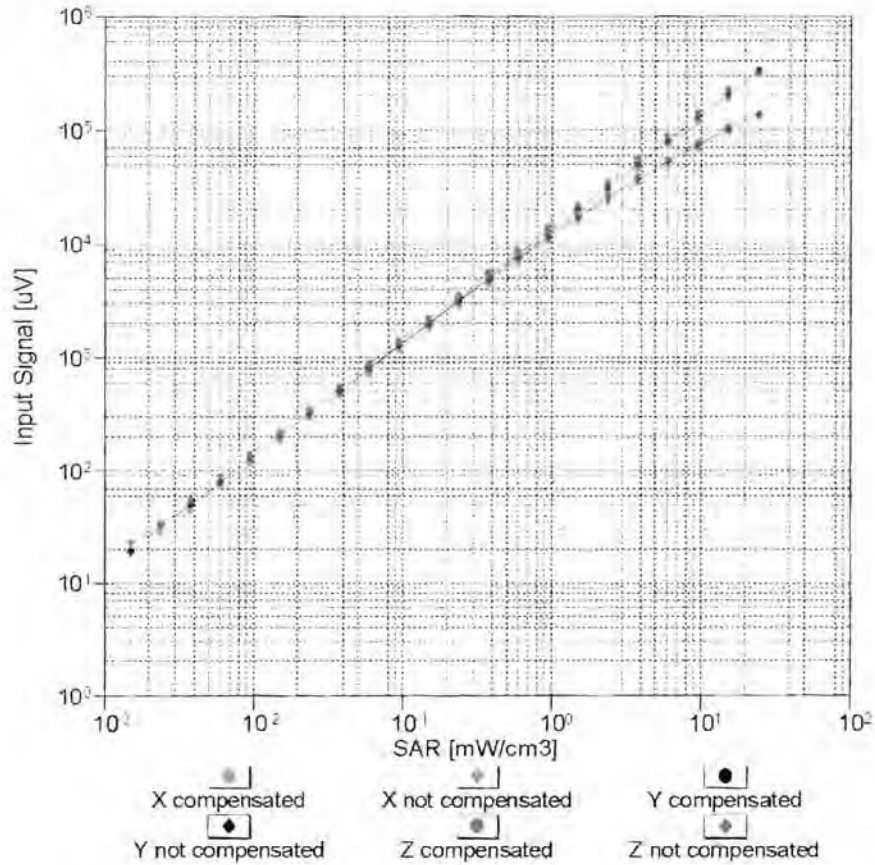
f=600 MHz,TEM

f=1800 MHz,R22



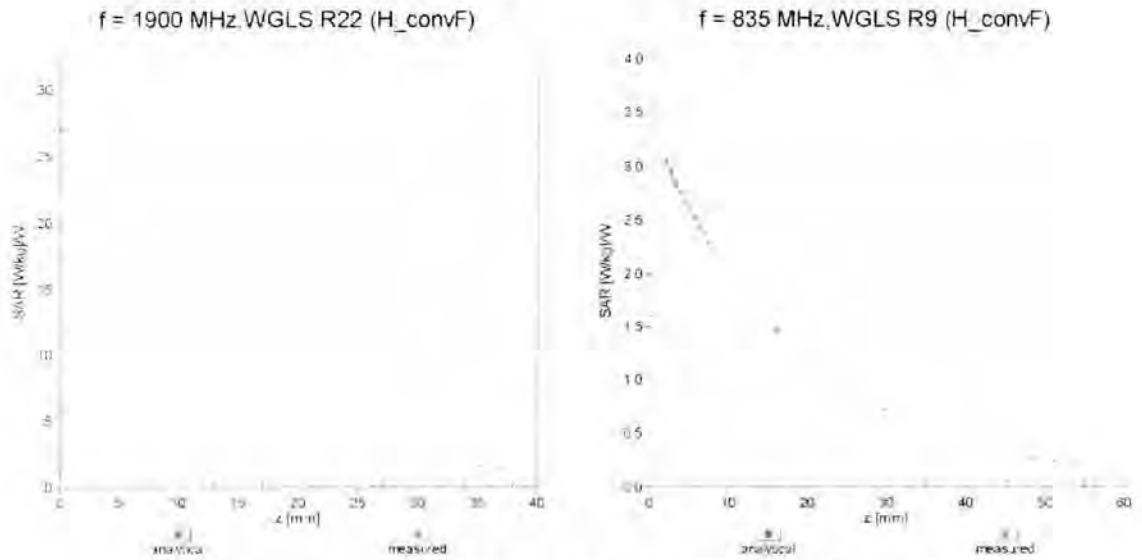
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

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



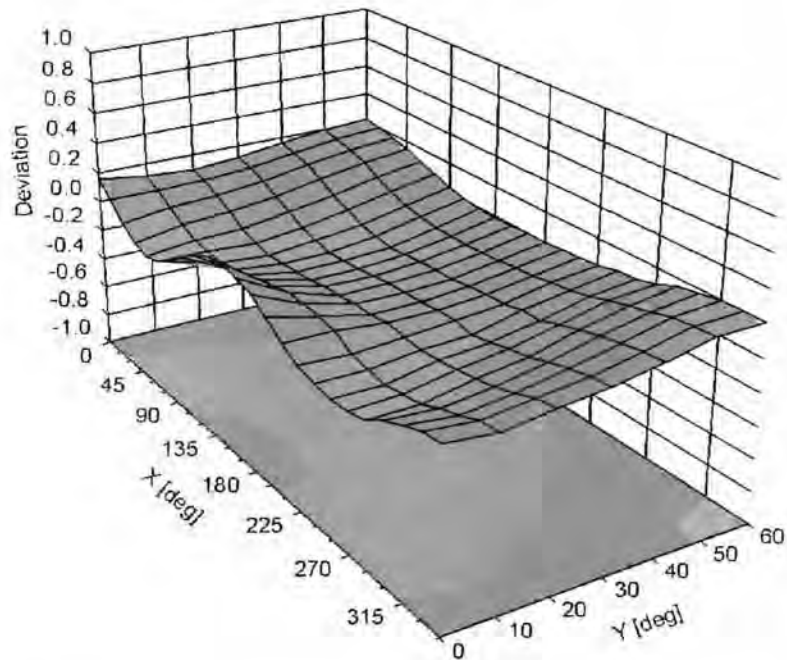
**Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )**

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid

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



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

**DASY/EASY - Parameters of Probe: ES3DV3 - SN:3173****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	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

**Dipole Calibration**

Please see attached calibration data

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



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

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Northwest EMC**

Certificate No: **D835V2-4d108\_Oct10**

## CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d108**

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

Calibration date: **October 19, 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:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 19, 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:**

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

**Additional Documentation:**

- DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

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



## Measurement Conditions

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

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

## Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.3 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

## SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.40 mW / g
SAR normalized	normalized to 1W	9.60 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>9.64 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 mW / g
SAR normalized	normalized to 1W	6.28 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>6.29 mW / g ± 16.5 % (k=2)</b>

### Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.4 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature during test	(21.8 ± 0.2) °C	----	----

### SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.53 mW / g
SAR normalized	normalized to 1W	10.1 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	<b>9.93 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.65 mW / g
SAR normalized	normalized to 1W	6.60 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	<b>6.51 mW / g ± 16.5 % (k=2)</b>

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8 $\Omega$ - 3.2 j $\Omega$
Return Loss	- 28.8 dB

### Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.0 $\Omega$ - 4.4 j $\Omega$
Return Loss	- 26.2 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.396 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 26, 2010

## DASY5 Validation Report for Head TSL

Date/Time: 18.10.2010 12:32:33

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d108**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL900

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.9$  mho/m;  $\epsilon_r = 42.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; 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)

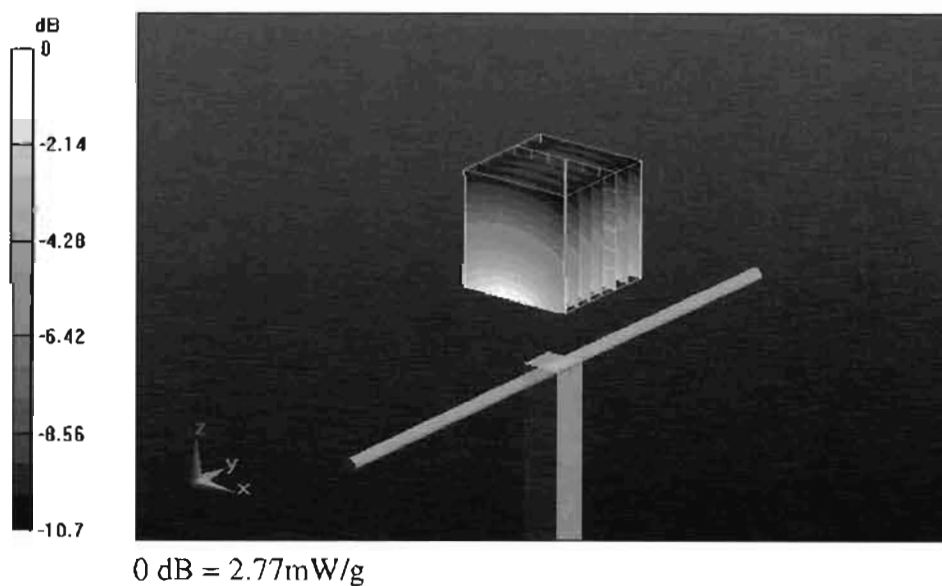
**Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.1 V/m; Power Drift = 0.000575 dB

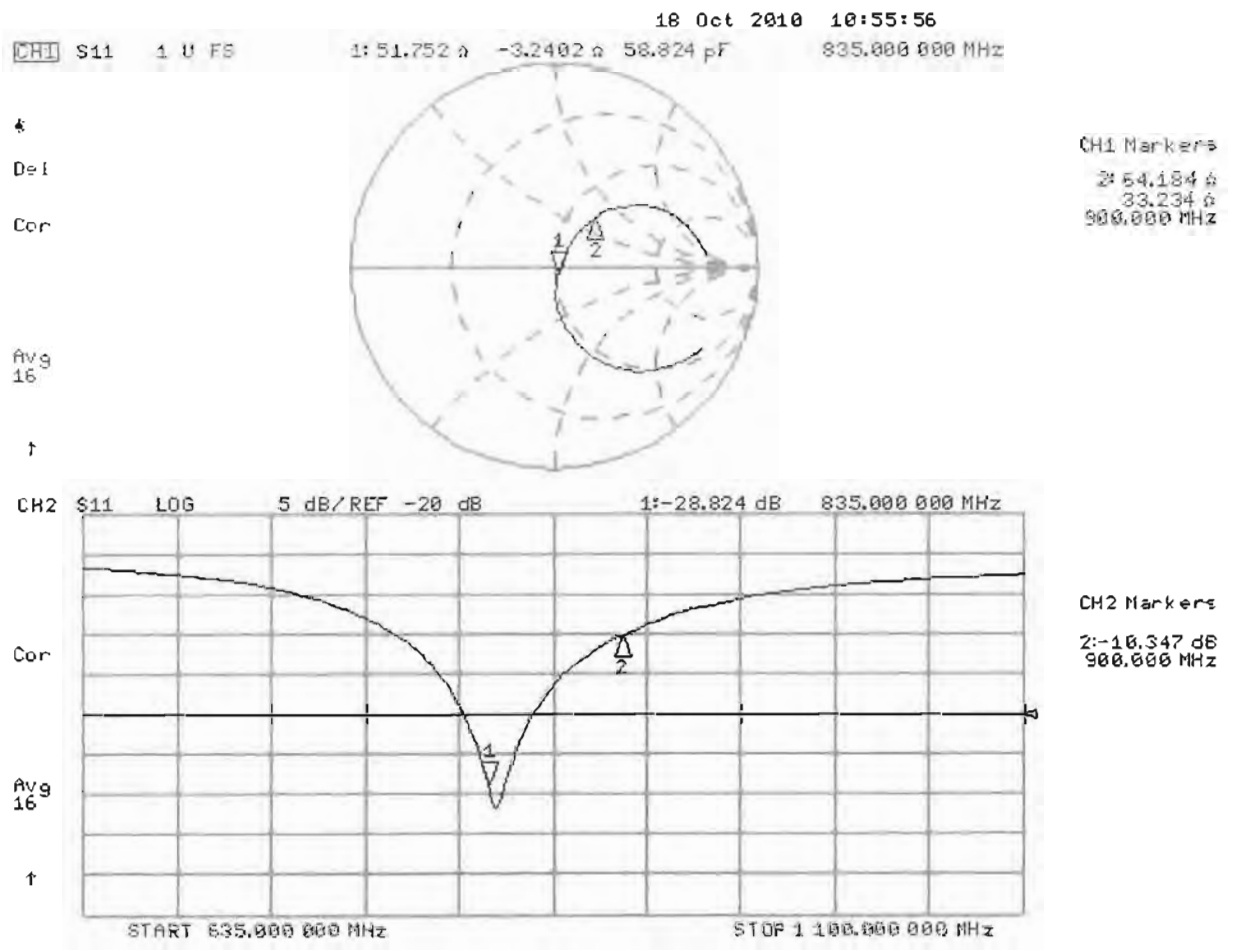
Peak SAR (extrapolated) = 3.61 W/kg

**SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.57 mW/g**

Maximum value of SAR (measured) = 2.77 mW/g



# Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body

Date/Time: 19.10.2010 11:59:09

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d108**

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL900

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.99$  mho/m;  $\epsilon_r = 54.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; 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)

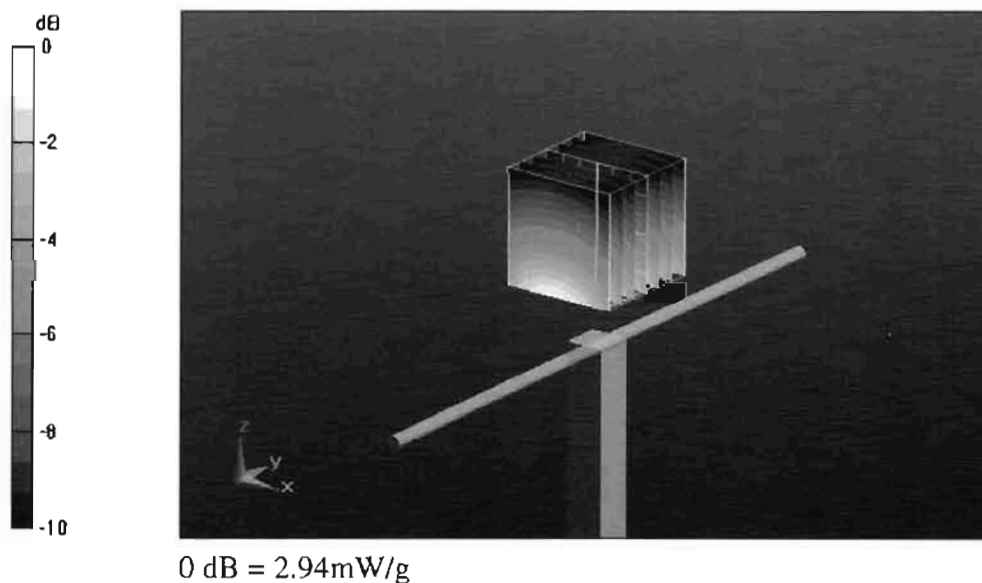
**Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.4 V/m; Power Drift = 0.0047 dB

Peak SAR (extrapolated) = 3.73 W/kg

**SAR(1 g) = 2.53 mW/g; SAR(10 g) = 1.65 mW/g**

Maximum value of SAR (measured) = 2.94 mW/g



# Impedance Measurement Plot for Body TSL

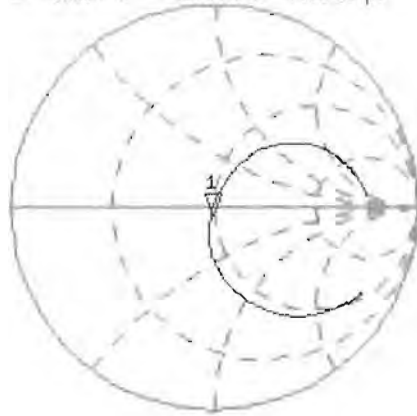
19 Oct 2010 09:56:43  
CH1 S11 1 U FS 1: 48.027  $\Omega$  -4.3809  $\Omega$  43.509 pF 835.000 000 MHz

\*  
De1

Cor

avg  
16

↑

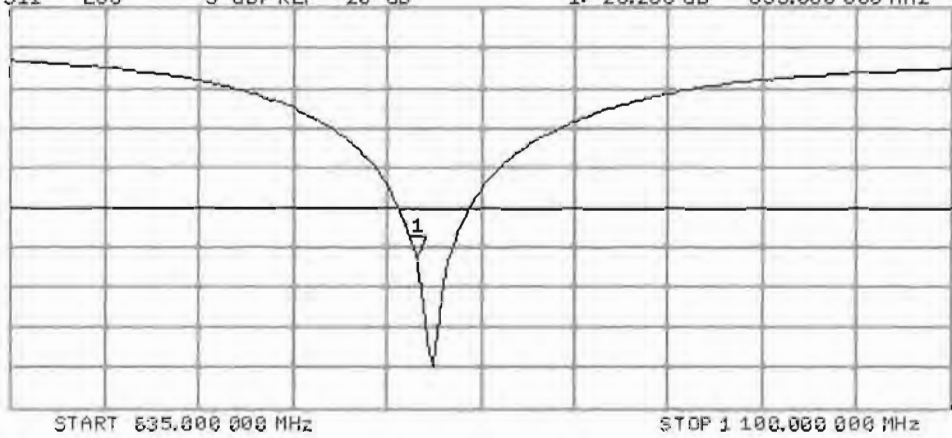


CH2 S11 LOG 5 dB/REF -20 dB 1: -26.208 dB 835.000 000 MHz

Cor

avg  
16

↑



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



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

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Accreditation No.: **SCS 108**

Client **Northwest EMC**

Certificate No: **D1900V2-5d131\_Nov10**

## CALIBRATION CERTIFICATE

Object: **D1900V2 - SN: 5d131**

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

Calibration date: **November 24, 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

	<b>Name</b>	<b>Function</b>	<b>Signature</b>
Calibrated by:	<b>Claudio Leubler</b>	<b>Laboratory Technician</b>	
Approved by:	<b>Katja Pokovic</b>	<b>Technical Manager</b>	

Issued: November 25, 2010





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Accreditation No.: **SCS 108**

### Glossary:

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

### Calibration is Performed According to the Following Standards:

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

### Additional Documentation:

- DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

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

## Measurement Conditions

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

DASY Version	DASY5	V52.2
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	1900 MHz $\pm$ 1 MHz	

## Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.3 $\pm$ 6 %	1.40 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.0 $\pm$ 0.2) °C	----	----

## SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR normalized	normalized to 1W	40.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>40.2 mW / g <math>\pm</math> 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.23 mW / g
SAR normalized	normalized to 1W	20.9 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	<b>20.9 mW / g <math>\pm</math> 16.5 % (k=2)</b>

## Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.8 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

## SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.0 mW / g
SAR normalized	normalized to 1W	40.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	<b>39.9 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.25 mW / g
SAR normalized	normalized to 1W	21.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	<b>21.0 mW / g ± 16.5 % (k=2)</b>

## Appendix

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	$52.7 \Omega + 6.5 j\Omega$
Return Loss	- 23.3 dB

### Antenna Parameters with Body TSL

Impedance, transformed to feed point	$48.1 \Omega + 6.9 j\Omega$
Return Loss	- 22.8 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.206 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

### Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 14, 2010

## DASY5 Validation Report for Head TSL

Date/Time: 10.11.2010 16:31:30

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d131**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U12 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.4$  mho/m;  $\epsilon_r = 39.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); 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)

**Head/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:**

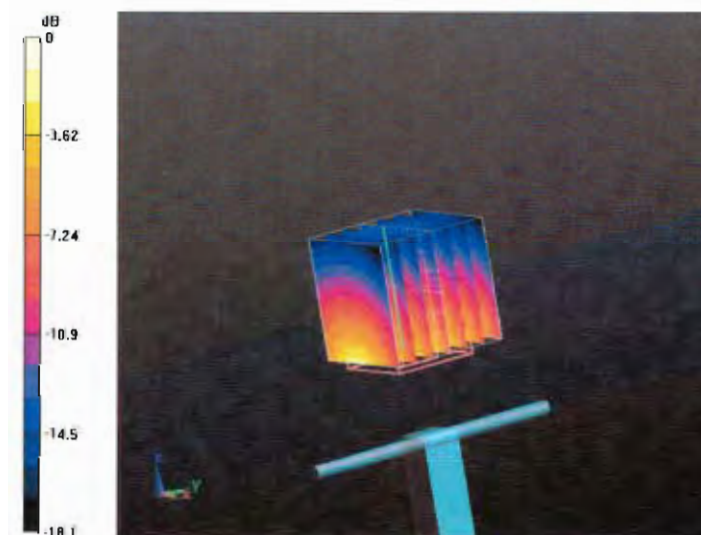
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.1 V/m; Power Drift = 0.064 dB

Peak SAR (extrapolated) = 18.4 W/kg

**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.23 mW/g**

Maximum value of SAR (measured) = 12.6 mW/g



0 dB = 12.6mW/g

# Impedance Measurement Plot for Head TSL

10 Nov 2010 13:03:53

CH1 S11 1 U FS

1: 52.686  $\Omega$  6.4824  $\Omega$  543.01  $\mu\text{H}$

1 900,000 000 MHz

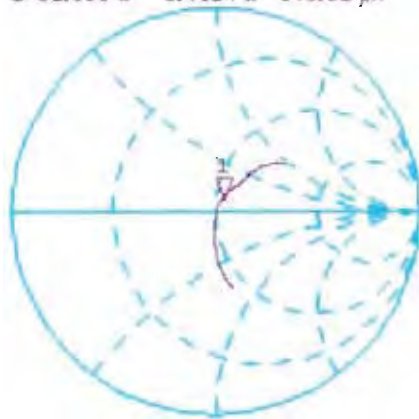
+

Del

CA

Avg 16

↑

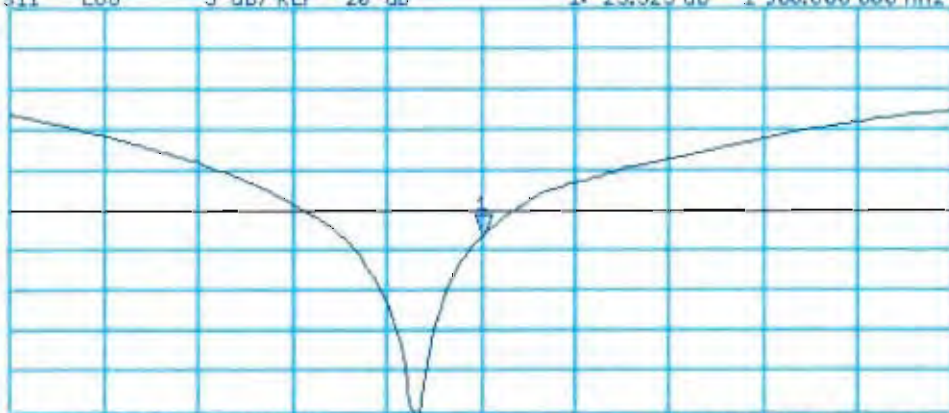


CH2 S11 LOG 5 dB/REF -20 dB 1: -23.325 dB 1 900,000 000 MHz

CA

Avg 16

↑



START 1 700,000 000 MHz

STOP 2 100,000 000 MHz

## DASY5 Validation Report for Body

Date/Time: 24.11.2010 12:48:29

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d131**

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL U12 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.52$  mho/m;  $\epsilon_r = 52.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); 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)

**Body/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:**

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

Reference Value = 95.7 V/m; Power Drift = -0.00519 dB

Peak SAR (extrapolated) = 17.2 W/kg

**SAR(1 g) = 10 mW/g; SAR(10 g) = 5.25 mW/g**

Maximum value of SAR (measured) = 12.3 mW/g



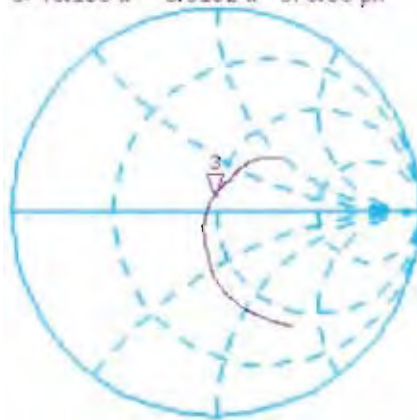
0 dB = 12.3mW/g

# Impedance Measurement Plot for Body TSL

24 Nov 2010 10:39:26

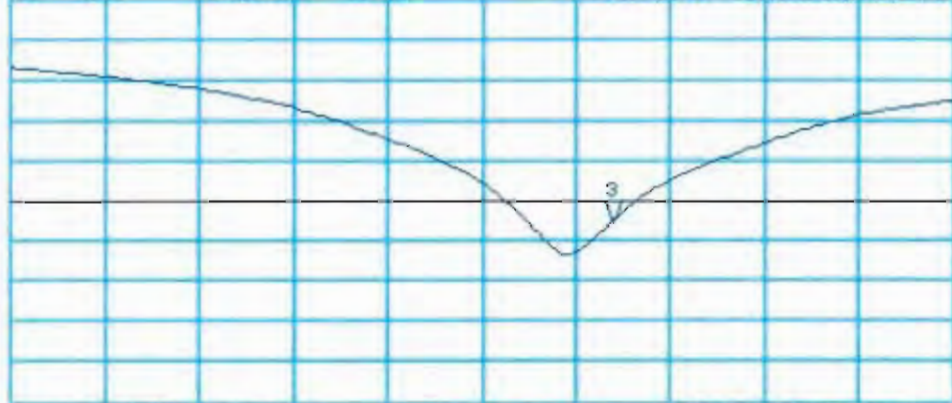
CH1 S11 1 V FS 3: 48.105  $\Omega$  6.9102  $\Omega$  578.83 pF 1 900.000 000 MHz

Del  
Cor  
Avg 16  
↑



CH2 S11 LOG 5 dB/REF -20 dB 3:-22.750 dB 1 900.000 000 MHz

Cor  
Avg 16  
↑



START 1 550.000 000 MHz STOP 2 100.000 000 MHz