

Intermec Technologies Corporation

Model: 1000CP03S

Evaluated to the following SAR Specifications:

FCC 2.1093: 2012
Health Safety Code 6:2009

Report No. INMC0746.1

Report Prepared By



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

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SAR Evaluation Report

Certificate of Evaluation
Last Date of Test: January 5, 2012
Intermec Technologies Corporation
Model: 1000CP03S

Applicable Standards			
Test Description	Specification	Test Method	Pass/Fail
SAR Evaluation	FCC 2.1093:2012	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	0.439	0.790	1.6	General Population Uncontrolled
PCS	0.722	0.753		

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

Test Facility

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

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

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

Approved By:



Don Facteau, IS Manager



NVLAP Lab Code: 200630-0

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

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

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.



Accreditations and Authorizations

FCC

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

NVLAP

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

Industry Canada

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

CAB

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

Australia/New Zealand

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



Accreditations and Authorizations

VCCI

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

BSMI

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

GOST

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

KCC

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

VIETNAM

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

SCOPE

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

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



Northwest EMC Locations



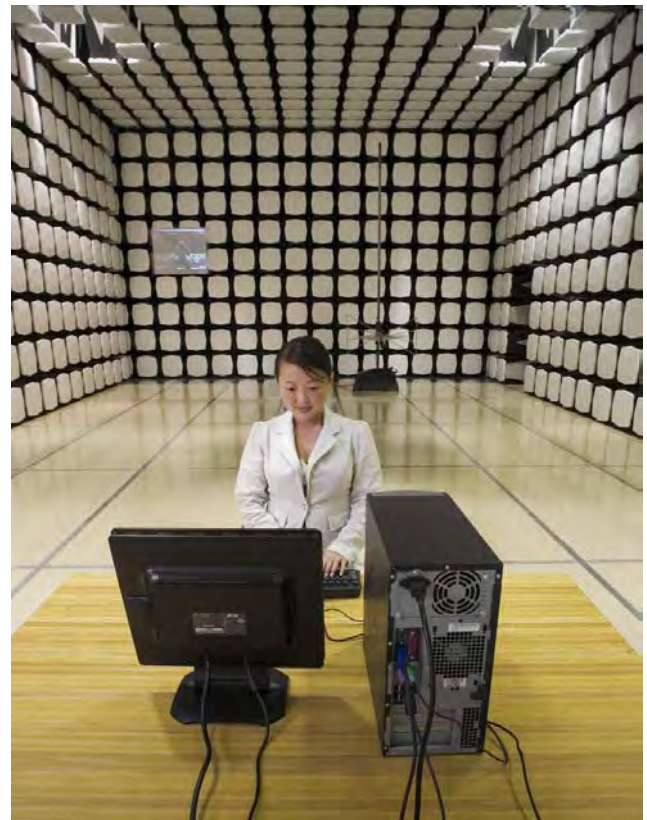
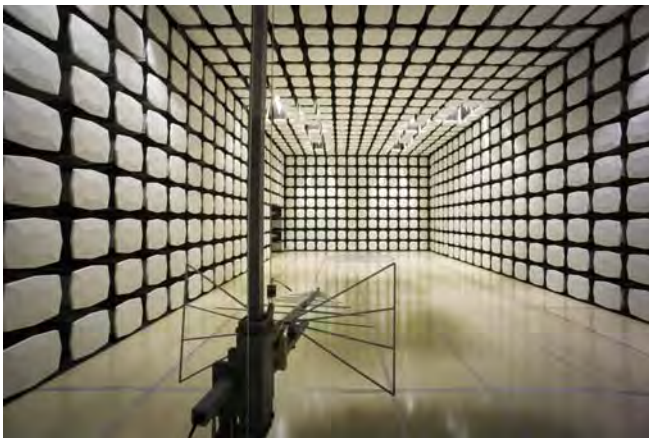
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Washington
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14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

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



Party Requesting the Test

Company Name:	Intermec Technologies Corporation
Address:	550 Second St. SE
City, State, Zip:	Cedar Rapids, IA 52401-2023
Test Requested By:	Stu Adams
Model:	1000CP03S
First Date of Test:	December 27, 2011
Last Date of Test:	January 5, 2012
Receipt Date of Samples:	December 21, 2011
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test)

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

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

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

The frequency range of the Bluetooth radio:

- 2402 – 2480 MHz

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

UMTS

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

CDMA (EVDO Rev A)

- 824.7 – 848.31 MHz
- 1851.25 – 1908.8 MHz

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

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

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

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

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

Overview of the SAR Evaluation

Objective

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

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

Scope

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

The UMTS portion of the WWAN 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 INMC0746

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

CONFIGURATION 2 INMC0746

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

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	12/27/11	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	01/05/12	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: 1000CP03S			Work Order: INMC0746		
Serial Number: 187U1191613			Date: 12/27/11		
Customer: Intermec Technologies Corporation			Temperature: 23		
Attendees: None			Humidity: 49%		
Project:			Barometric Pres.: 30.01"		
Tested by: Rod Peloquin		EUT Power	Battery	Job Site: EV12	
TEST SPECIFICATIONS				Test Method	
FCC 2.1093:2011				FCC OET 65C:2001	
COMMENTS					
Conducted output power					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	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)	24.14	0.259	
				SO32 (FCH+SCH)	23.18	0.208	
				S032(FCH)	23.91	0.246	
	384	836.52	RC3 (Fwd3, Rvs3)	RC1(Fwd1, Rvs1)	SO55 (Loopback)	24.23	0.265
				SO55 (Loopback)	24.21	0.264	
				SO32 (FCH+SCH)	23.07	0.203	
	777	848.31	RC3 (Fwd3, Rvs3)	SO32(FCH)	23.98	0.250	
				RC1(Fwd1, Rvs1)	SO55 (Loopback)	24.25	0.266
				SO55 (Loopback)	24.13	0.259	
PCS Band	25	1851.25	RC3 (Fwd3, Rvs3)	SO32 (FCH+SCH)	23.26	0.212	
				S032(FCH)	23.89	0.245	
				RC1(Fwd1, Rvs1)	SO55 (Loopback)	24.21	0.264
	600	1880	RC3 (Fwd3, Rvs3)	SO55 (Loopback)	24.39	0.275	
				SO32 (FCH+SCH)	23.31	0.214	
				S032(FCH)	24.27	0.267	
	1175	1908.75	RC3 (Fwd3, Rvs3)	RC1(Fwd1, Rvs1)	SO55 (Loopback)	24.49	0.281
				SO55 (Loopback)	24.16	0.261	
				SO32 (FCH+SCH)	23.92	0.247	
777	848.31	RC3 (Fwd3, Rvs3)	SO32(FCH)	23.98	0.250		
			RC1(Fwd1, Rvs1)	SO55 (Loopback)	24.35	0.272	
			SO55 (Loopback)	23.83	0.242		
25	1851.25	RC3 (Fwd3, Rvs3)	SO32 (FCH+SCH)	22.7	0.186		
			S032(FCH)	23.73	0.236		
			RC1(Fwd1, Rvs1)	SO55 (Loopback)	24.05	0.254	

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	24.15	0.260
	384	836.52			24.31	0.270
	777	848.31			24.18	0.262
PCS	25	1851.25	307.2 (2 slot, QPSK)	153.6	24.46	0.279
	600	1880.00			24.38	0.274
	1175	1908.75			24.06	0.255

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	24.24	0.265
	384	836.52			24.39	0.275
	777	848.31			24.28	0.268
PCS	25	1851.25	307.2 (QPSK/ACK channel is transmitted at all the slots)	4096	24.49	0.281
	600	1880.00			24.39	0.275
	1175	1908.75			24.15	0.260

Characterization of tissue-equivalent liquid dielectric properties

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

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

Target values of dielectric parameters

Per FCC OET 65C, Appendix C:

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

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

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

Composition of Ingredients for Liquid Tissue Phantoms

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

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

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

Salt: 99⁺% Pure Sodium Chloride

Sugar: 98⁺% Pure Sucrose

Water: De-ionized, 16 M Ω ⁺ resistivity

HEC: Hydroxyethyl Cellulose

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

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

NORTHWEST		EMC		Tissue - Equivalent Liquid		SAR 2011.02.21	
EUT: MSL900				Work Order: INMC0746			
Serial Number: SAT				Date: 12/27/2011			
Customer: Intermec Technologies Corporation				Temperature (°C): 22.8			
Attendees: None				Humidity: 34.8%			
Project: None				Barometric Pres. (mb): 1023.4			
Tested by: Jennifer Herrett				Power: None			
Job Site: Cal Lab							
TEST SPECIFICATIONS				Test Method			
FCC 2.1093:2011				FCC OET 65C:2001			
COMMENTS							
None							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #		None		Signature <i>Jennifer Herrett</i>			
Tissue: MSL900				Liquid Temperature (°C): 23			

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
835	54.896	1.013	55.200	0.970	0.55	-4.44
700.0	56.3	0.874				
705.0	56.2	0.889				
710.0	56.2	0.894				
715.0	56.1	0.898				
720.0	56.1	0.903				
725.0	56.0	0.908				
730.0	56.0	0.912				
735.0	55.9	0.917				
740.0	55.9	0.922				
745.0	55.8	0.926				
750.0	55.8	0.931				
755.0	55.7	0.936				
760.0	55.7	0.940				
765.0	55.6	0.945				
770.0	55.6	0.950				
775.0	55.5	0.955				
780.0	55.5	0.959				
785.0	55.4	0.964				
790.0	55.4	0.969				
795.0	55.3	0.974				
800.0	55.3	0.979				
805.0	55.2	0.983				
810.0	55.2	0.988				
815.0	55.1	0.993				
820.0	55.1	0.998				
825.0	55.0	1.003				
830.0	55.0	1.008				
835.0	54.9	1.013				
840.0	54.8	1.018				
845.0	54.8	1.023				
850.0	54.8	1.028				
855.0	54.7	1.034				
860.0	54.7	1.038				
865.0	54.6	1.044				
870.0	54.6	1.049				
875.0	54.5	1.054				
880.0	54.5	1.059				
885.0	54.4	1.065				
890.0	54.4	1.070				
895.0	54.3	1.075				
900.0	54.3	1.080				
905.0	54.2	1.086				
910.0	54.2	1.090				
915.0	54.2	1.095				
920.0	54.1	1.100				
925.0	54.1	1.105				
930.0	54.0	1.110				
935.0	54.0	1.115				
940.0	54.0	1.120				
945.0	53.9	1.125				
950.0	53.9	1.130				
955.0	53.9	1.136				
960.0	53.8	1.141				
965.0	53.8	1.146				
970.0	53.7	1.151				
975.0	53.7	1.156				
980.0	53.6	1.161				
985.0	53.6	1.166				
990.0	53.6	1.171				
995.0	53.5	1.176				
1000.0	53.5	1.181				
1005.0	53.4	1.186				
1010.0	53.4	1.191				
1015.0	53.3	1.197				
1020.0	53.3	1.202				
1025.0	53.2	1.207				
1030.0	53.2	1.211				
1035.0	53.2	1.217				
1040.0	53.1	1.221				
1045.0	53.1	1.226				
1050.0	53.0	1.232				
1055.0	53.0	1.237				
1060.0	53.0	1.242				
1065.0	52.9	1.247				
1070.0	52.9	1.253				
1075.0	52.9	1.258				
1080.0	52.8	1.263				
1085.0	52.8	1.269				
1090.0	52.7	1.274				
1095.0	52.7	1.280				
1100.0	52.7	1.286				
1105.0	52.6	1.291				
1110.0	52.6	1.296				
1115.0	52.5	1.302				
1120.0	52.5	1.307				
1125.0	52.4	1.312				
1130.0	52.4	1.317				
1135.0	52.4	1.323				
1140.0	52.3	1.328				
1145.0	52.3	1.333				
1150.0	52.2	1.338				
1155.0	52.2	1.343				
1160.0	52.2	1.348				
1165.0	52.1	1.353				
1170.0	52.1	1.358				
1175.0	52.0	1.364				
1180.0	52.0	1.368				
1185.0	52.0	1.374				
1190.0	51.9	1.379				
1195.0	51.9	1.384				
1200.0	51.9	1.390				

NORTHWEST EMC		Tissue - Equivalent Liquid		SAR 2011.02.21	
EUT:	MSL900	Work Order:	INMC0746		
Serial Number:	SAT	Date:	12/29/2011		
Customer:	Intermec Technologies Corporation	Temperature (°C):	22.1		
Attendees:	None	Humidity:	40.6		
Project:	None	Barometric Pres. (mb):	1020.1		
Tested by:	Jennifer Herrett and Khanh Tran	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: MSL900			Liquid Temperature (°C): 22.4		

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
835	54.317	1.004	55.200	0.970	1.60	-3.51
700.0	55.8	0.871				
705.0	55.7	0.876				
710.0	55.7	0.881				
715.0	55.6	0.886				
720.0	55.6	0.891				
725.0	55.5	0.895				
730.0	55.4	0.900				
735.0	55.4	0.905				
740.0	55.3	0.909				
745.0	55.3	0.914				
750.0	55.2	0.919				
755.0	55.2	0.924				
760.0	55.1	0.928				
765.0	55.1	0.933				
770.0	55.0	0.938				
775.0	55.0	0.943				
780.0	54.9	0.948				
785.0	54.8	0.952				
790.0	54.8	0.958				
795.0	54.7	0.963				
800.0	54.7	0.968				
805.0	54.6	0.973				
810.0	54.6	0.978				
815.0	54.5	0.983				
820.0	54.5	0.988				
825.0	54.4	0.993				
830.0	54.4	0.998				
835.0	54.3	1.004				
840.0	54.3	1.009				
845.0	54.2	1.014				
850.0	54.2	1.019				
855.0	54.1	1.024				
860.0	54.1	1.029				
865.0	54.0	1.035				
870.0	54.0	1.040				
875.0	53.9	1.045				
880.0	53.9	1.050				
885.0	53.8	1.055				
890.0	53.8	1.060				
895.0	53.7	1.065				
900.0	53.7	1.070				
905.0	53.7	1.076				
910.0	53.6	1.080				
915.0	53.6	1.085				
920.0	53.5	1.091				
925.0	53.5	1.096				
930.0	53.4	1.101				
935.0	53.4	1.106				
940.0	53.4	1.111				
945.0	53.3	1.116				
950.0	53.3	1.121				
955.0	53.2	1.127				
960.0	53.2	1.132				
965.0	53.1	1.137				
970.0	53.1	1.143				
975.0	53.0	1.148				
980.0	53.0	1.152				
985.0	53.0	1.158				
990.0	52.9	1.163				
995.0	52.9	1.168				
1000.0	52.8	1.173				
1005.0	52.8	1.178				
1010.0	52.7	1.184				
1015.0	52.7	1.189				
1020.0	52.6	1.194				
1025.0	52.6	1.198				
1030.0	52.5	1.204				
1035.0	52.5	1.209				
1040.0	52.5	1.214				
1045.0	52.4	1.218				
1050.0	52.4	1.224				
1055.0	52.3	1.229				
1060.0	52.3	1.234				
1065.0	52.2	1.239				
1070.0	52.2	1.244				
1075.0	52.2	1.250				
1080.0	52.1	1.255				
1085.0	52.1	1.261				
1090.0	52.0	1.267				
1095.0	52.0	1.272				
1100.0	52.0	1.278				
1105.0	51.9	1.284				
1110.0	51.9	1.289				
1115.0	51.8	1.295				
1120.0	51.8	1.300				
1125.0	51.7	1.305				
1130.0	51.7	1.311				
1135.0	51.6	1.316				
1140.0	51.6	1.321				
1145.0	51.5	1.327				
1150.0	51.5	1.332				
1155.0	51.5	1.337				
1160.0	51.4	1.342				
1165.0	51.4	1.347				
1170.0	51.3	1.353				
1175.0	51.3	1.358				
1180.0	51.3	1.363				
1185.0	51.2	1.368				
1190.0	51.2	1.373				
1195.0	51.1	1.379				
1200.0	51.1	1.384				

EMC**Tissue - Equivalent Liquid**

EUT: HSL1900		Work Order: INMC0746	
Serial Number: SAN		Date: 12/30/2011	
Customer: Intermec Technologies Corporation		Temperature (°C): 22.4	
Attendees: None		Humidity: 41.7	
Project: None		Barometric Pres. (mb): 1008.20	
Tested by: Jennifer Herrett and Khanh Tran		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: HSL1900		Liquid Temperature (°C): 22	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
1900	38.088	1.423	40.000	1.400	4.78	-1.67
1600.0	39.5	1.124				
1612.5	39.4	1.136				
1625.0	39.4	1.149				
1637.5	39.3	1.162				
1650.0	39.3	1.175				
1662.5	39.2	1.188				
1675.0	39.1	1.200				
1687.5	39.1	1.212				
1700.0	39.0	1.224				
1712.5	38.9	1.236				
1725.0	38.9	1.248				
1737.5	38.8	1.260				
1750.0	38.8	1.272				
1762.5	38.7	1.284				
1775.0	38.7	1.297				
1787.5	38.6	1.310				
1800.0	38.6	1.323				
1812.5	38.5	1.337				
1825.0	38.4	1.350				
1837.5	38.4	1.363				
1850.0	38.3	1.375				
1862.5	38.3	1.388				
1875.0	38.2	1.400				
1887.5	38.1	1.412				
1900.0	38.1	1.423				
1912.5	38.0	1.436				
1925.0	38.0	1.448				
1937.5	37.9	1.460				
1950.0	37.9	1.473				
1962.5	37.9	1.486				
1975.0	37.8	1.499				
1987.5	37.8	1.513				
2000.0	37.7	1.526				

EMC**Tissue - Equivalent Liquid**

EUT: MSL1900	Work Order: INMC0746
Serial Number: SAO	Date: 01/03/2012
Customer: Intermec Technologies Corporation	Temperature (°C): 23
Attendees: None	Humidity: 39
Project: None	Barometric Pres. (mb): 1027.20
Tested by: Jennifer Herrett and Khanh Tran	Power: None
Job Site: Cal Lab	
TEST SPECIFICATIONS	
FCC 2.1093:2012	Test Method FCC OET 65C:2001
COMMENTS	
None	
DEVIATIONS FROM TEST STANDARD	
None	
Configuration #	None
Signature <i>Jennifer Herrett</i>	
Tissue: MSL1900	
Liquid Temperature (°C): 22.1	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
1900	53.259	1.533	53.300	1.520	0.08	-0.87


1600.0	54.3	1.201
1612.5	54.3	1.215
1625.0	54.3	1.228
1637.5	54.2	1.243
1650.0	54.2	1.257
1662.5	54.1	1.271
1675.0	54.1	1.284
1687.5	54.0	1.297
1700.0	53.9	1.312
1712.5	53.9	1.325
1725.0	53.9	1.338
1737.5	53.8	1.352
1750.0	53.8	1.365
1762.5	53.7	1.378
1775.0	53.7	1.392
1787.5	53.7	1.406
1800.0	53.6	1.421
1812.5	53.6	1.435
1825.0	53.5	1.450
1837.5	53.5	1.464
1850.0	53.4	1.479
1862.5	53.4	1.493
1875.0	53.3	1.507
1887.5	53.3	1.520
1900.0	53.3	1.533
1912.5	53.2	1.547
1925.0	53.2	1.560
1937.5	53.2	1.574
1950.0	53.1	1.587
1962.5	53.1	1.601
1975.0	53.1	1.616
1987.5	53.0	1.632
2000.0	53.0	1.647

EMC**Tissue - Equivalent Liquid**

EUT: MSL1900	Work Order: INMC0746
Serial Number: SAO	Date: 01/04/2012
Customer: Intermec Technologies Corporation	Temperature (°C): 22
Attendees: None	Humidity: 35.5
Project: None	Barometric Pres. (mb): 1024.00
Tested by: Jennifer Herrett	Power: None
Job Site: Cal Lab	
TEST SPECIFICATIONS	
FCC 2.1093:2012	Test Method: FCC OET 65C:2001
COMMENTS	
None	
DEVIATIONS FROM TEST STANDARD	
None	
Configuration #	None
Signature <i>Jennifer Herrett</i>	
Tissue: MSL1900 Liquid Temperature (°C): 22.4	


Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
1900	53.174	1.526	53.300	1.520	0.24	-0.38
1600.0	54.2	1.197				
1612.5	54.2	1.211				
1625.0	54.1	1.224				
1637.5	54.1	1.238				
1650.0	54.1	1.252				
1662.5	54.0	1.265				
1675.0	53.9	1.279				
1687.5	53.9	1.292				
1700.0	53.8	1.307				
1712.5	53.8	1.319				
1725.0	53.7	1.334				
1737.5	53.7	1.347				
1750.0	53.7	1.360				
1762.5	53.6	1.373				
1775.0	53.6	1.386				
1787.5	53.6	1.400				
1800.0	53.5	1.414				
1812.5	53.5	1.428				
1825.0	53.4	1.442				
1837.5	53.4	1.457				
1850.0	53.3	1.472				
1862.5	53.3	1.486				
1875.0	53.2	1.500				
1887.5	53.2	1.513				
1900.0	53.2	1.526				
1912.5	53.1	1.539				
1925.0	53.1	1.551				
1937.5	53.1	1.565				
1950.0	53.1	1.578				
1962.5	53.0	1.592				
1975.0	53.0	1.606				
1987.5	53.0	1.622				
2000.0	52.9	1.637				

EMC**Tissue - Equivalent Liquid**

EUT:	HSL1750	Work Order:	INMC0746
Serial Number:	SAP	Date:	01/04/2012
Customer:	Intermec Technologies Corporation	Temperature (°C):	24.4
Attendees:	None	Humidity:	35.4
Project:	None	Barometric Pres. (mb):	1021.4
Tested by:	Ethan Schoonover	Power:	None
TEST SPECIFICATIONS		Test Method	
FCC 2.1093:2012		FCC OET 65C:2001	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	None	Signature 	
Tissue: HSL1750		Liquid Temperature (°C): 21.6	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
1800	40.049	1.375	40.000	1.400	-0.12	1.82
1400.0	41.8	1.007				
1425.0	41.7	1.028				
1450.0	41.6	1.051				
1475.0	41.5	1.073				
1500.0	41.4	1.096				
1525.0	41.3	1.120				
1550.0	41.2	1.144				
1575.0	41.0	1.167				
1600.0	40.9	1.190				
1625.0	40.8	1.213				
1650.0	40.7	1.235				
1675.0	40.6	1.258				
1700.0	40.5	1.283				
1725.0	40.3	1.306				
1750.0	40.2	1.329				
1775.0	40.1	1.352				
1800.0	40.0	1.375				
1825.0	40.0	1.398				
1850.0	39.9	1.422				
1875.0	39.8	1.446				
1900.0	39.7	1.469				

EMC**Tissue - Equivalent Liquid**

EUT: MSL1750	Work Order: INMC0746
Serial Number: SAQ	Date: 01/04/2012
Customer: Intermec Technologies Corporation	Temperature (°C): 24.4
Attendees: None	Humidity: 35.4
Project: None	Barometric Pres. (mb): 1021.4
Tested by: Ethan Schoonover	Power: None
Job Site: Cal Lab	
TEST SPECIFICATIONS	
FCC 2.1093:2012	Test Method: FCC OET 65C:2001
COMMENTS	
None	
DEVIATIONS FROM TEST STANDARD	
None	
Configuration #	None
Signature 	
Tissue: MSL1750 Liquid Temperature (°C): 21.8	

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
1800	53.184	1.471	53.300	1.520	0.22	3.25
1400.0	54.5	1.087				
1425.0	54.4	1.109				
1450.0	54.4	1.132				
1475.0	54.3	1.155				
1500.0	54.2	1.178				
1525.0	54.1	1.203				
1550.0	54.0	1.228				
1575.0	54.0	1.253				
1600.0	53.8	1.278				
1625.0	53.7	1.301				
1650.0	53.7	1.325				
1675.0	53.6	1.351				
1700.0	53.5	1.377				
1725.0	53.4	1.401				
1750.0	53.3	1.425				
1775.0	53.2	1.447				
1800.0	53.2	1.471				
1825.0	53.1	1.495				
1850.0	53.1	1.521				
1875.0	53.0	1.548				
1900.0	53.0	1.573				

NORTHWEST EMC		Tissue - Equivalent Liquid		SAR 2011.02.21	
EUT:	HSL900	Work Order:	INMC0746		
Serial Number:	SAS	Date:	01/05/2012		
Customer:	Intermec Technologies Corporation	Temperature (°C):	22.4		
Attendees:	None	Humidity:	38.1		
Project:	None	Barometric Pres. (mb):	1030.40		
Tested by:	Jennifer Herrett	Power:	None	Job Site:	Cal Lab
TEST SPECIFICATIONS		Test Method			
FCC 2.1093:2012		FCC OET 65C:2001			
COMMENTS					
None					
DEVIATIONS FROM TEST STANDARD					
None					
Configuration #	None	Signature <i>Jennifer Herrett</i>			
Tissue: HSL900			Liquid Temperature (°C): 22		

Frequency (GHz)	Actual Values		Target Values		Deviation (%)	
	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity	Relative Permittivity	Conductivity
835	42.280	0.898	41.500	0.900	-1.88	0.18
700.0	44.1	0.770				
705.0	44.0	0.775				
710.0	43.9	0.780				
715.0	43.9	0.785				
720.0	43.8	0.790				
725.0	43.7	0.794				
730.0	43.6	0.799				
735.0	43.6	0.804				
740.0	43.5	0.809				
745.0	43.4	0.813				
750.0	43.4	0.818				
755.0	43.3	0.823				
760.0	43.2	0.828				
765.0	43.2	0.832				
770.0	43.1	0.837				
775.0	43.0	0.842				
780.0	43.0	0.847				
785.0	42.9	0.851				
790.0	42.9	0.856				
795.0	42.8	0.860				
800.0	42.7	0.865				
805.0	42.7	0.870				
810.0	42.6	0.875				
815.0	42.5	0.880				
820.0	42.5	0.884				
825.0	42.4	0.889				
830.0	42.3	0.893				
835.0	42.3	0.898				
840.0	42.2	0.903				
845.0	42.2	0.908				
850.0	42.1	0.913				
855.0	42.0	0.917				
860.0	42.0	0.922				
865.0	41.9	0.927				
870.0	41.9	0.932				
875.0	41.8	0.937				
880.0	41.7	0.941				
885.0	41.7	0.946				
890.0	41.6	0.951				
895.0	41.6	0.955				
900.0	41.5	0.960				
905.0	41.5	0.965				
910.0	41.4	0.969				
915.0	41.4	0.974				
920.0	41.3	0.979				
925.0	41.3	0.984				
930.0	41.2	0.989				
935.0	41.1	0.994				
940.0	41.1	0.999				
945.0	41.0	1.004				
950.0	41.0	1.009				
955.0	40.9	1.014				
960.0	40.9	1.018				
965.0	40.8	1.023				
970.0	40.8	1.028				
975.0	40.7	1.032				
980.0	40.7	1.037				
985.0	40.6	1.042				
990.0	40.5	1.046				
995.0	40.5	1.051				
1000.0	40.4	1.055				
1005.0	40.4	1.060				
1010.0	40.4	1.065				
1015.0	40.3	1.070				
1020.0	40.2	1.074				
1025.0	40.2	1.079				
1030.0	40.2	1.084				
1035.0	40.1	1.089				
1040.0	40.1	1.094				
1045.0	40.0	1.099				
1050.0	40.0	1.103				
1055.0	39.9	1.109				
1060.0	39.9	1.113				
1065.0	39.8	1.119				
1070.0	39.8	1.124				
1075.0	39.7	1.129				
1080.0	39.6	1.134				
1085.0	39.6	1.139				
1090.0	39.5	1.143				
1095.0	39.5	1.148				
1100.0	39.4	1.153				
1105.0	39.4	1.157				
1110.0	39.3	1.162				
1115.0	39.3	1.167				
1120.0	39.2	1.171				
1125.0	39.2	1.175				
1130.0	39.1	1.180				
1135.0	39.1	1.184				
1140.0	39.1	1.188				
1145.0	39.0	1.193				
1150.0	39.0	1.197				
1155.0	38.9	1.202				
1160.0	38.9	1.206				
1165.0	38.8	1.211				
1170.0	38.8	1.215				
1175.0	38.7	1.220				
1180.0	38.7	1.225				
1185.0	38.7	1.230				
1190.0	38.6	1.235				
1195.0	38.6	1.240				
1200.0	38.5	1.245				

Requirement

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

Test Description

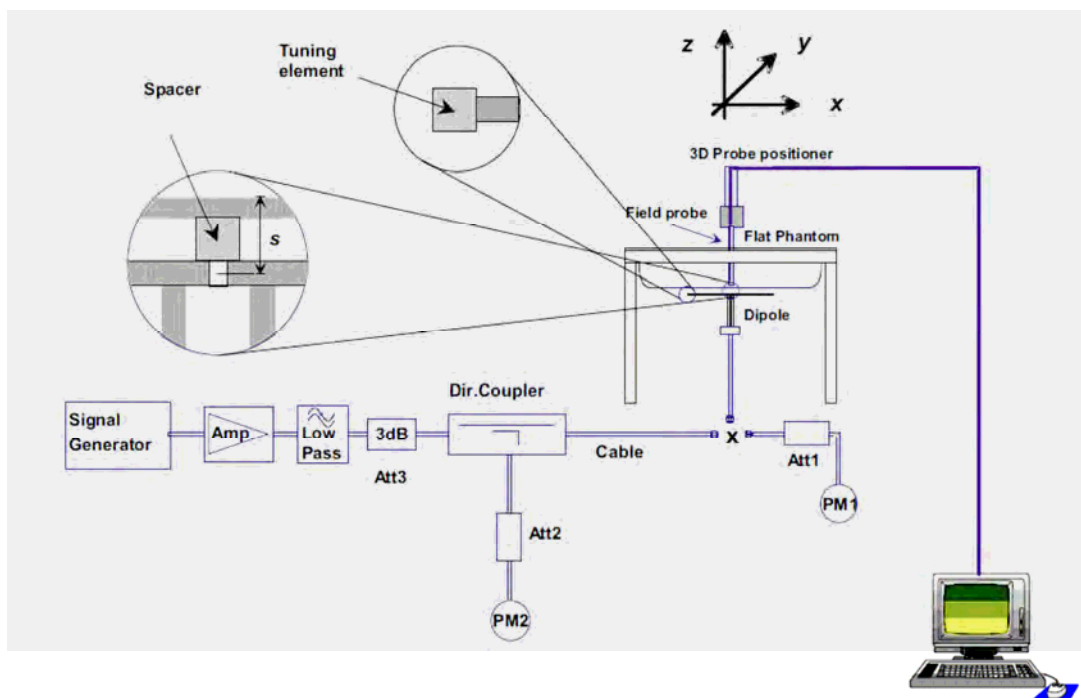
Within 24 hours of a measurement, Northwest EMC used the system validation kit (calibrated reference dipole) to test whether the system was operating within its specifications. The validation was performed in the indicated bands by making SAR measurements of the reference dipole with the phantom filled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


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

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

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

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



EUT: System Verifications		Work Order: INMC0746
Serial Number: Various	Date: See Data Sheets	
Customer: Intermec Technologies Corporation	Temperature: See Data Sheets	
Attendees: None	Humidity: See Data Sheets	
Project:	Barometric Pres.: See Data Sheets	
Tested by: Ethan Schoonover	Job Site: EV08	
TEST SPECIFICATIONS		Test Method
FCC 2.1093:2012		FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 941225 D01 v02, and D03 FCC KDB 648474 D01 V01r05
Health Safety Code 6:2009		RSS-102, Issue 4:2010
COMMENTS		
None		
DEVIATIONS FROM TEST STANDARD		
No Deviations		
Configuration #	NA	<i>Signature</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
12/27/2011	MSL900 835MHz	20.00	10.00	0.94	0.65	9.43	6.48	9.93	6.51	-5.04	-0.46	
12/29/2011	MSL900 835MHz	20.00	10.00	0.98	0.65	9.79	6.47	9.93	6.51	-1.41	-0.61	
12/30/2012	HSL1900 1900MHz	20.00	10.00	4.19	2.17	41.90	21.70	39.70	20.50	5.54	5.85	
1/3/2012	HSL1900 1900MHz	20.00	10.00	4.20	2.19	42.00	21.90	39.70	20.50	5.79	6.83	
1/4/2012	MSL1900 1900MHz	20.05	9.89	4.26	2.25	42.11	22.24	39.70	20.50	6.08	8.50	
1/5/2012	MSL1750 1750MHz	20.00	10.00	3.67	1.97	36.70	19.70	38.40	20.10	-4.43	-1.99	
1/5/2012	MSL1750 1750MHz	20.00	10.00	3.67	1.97	36.70	19.70	37.60	20.20	-2.39	-2.48	
1/6/2012	HSL900 835MHz	10.00	100.00	0.10	0.07	9.80	6.60	9.28	6.08	5.60	8.55	

Room Temperature (°C):	24.9	Humidity (%):	32	Test Date:	12/27/11
Liquid Temperature (°C):	23.6	Barometric Pressure (mb):	1023.8	Tested by:	Jennifer Herrett and Khanh Tran

MSL900 System Check_835MHz 12-27-11

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: $\sigma = 1.01306$ mho/m, $\epsilon = 54.8958$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 835$ MHz; $\sigma = 1.013$ mho/m; $\epsilon = 54.896$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

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

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

Maximum value of Total (measured) = 37.030 V/m

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

Reference Value = 30.235 V/m; Power Drift = 0.09 dB

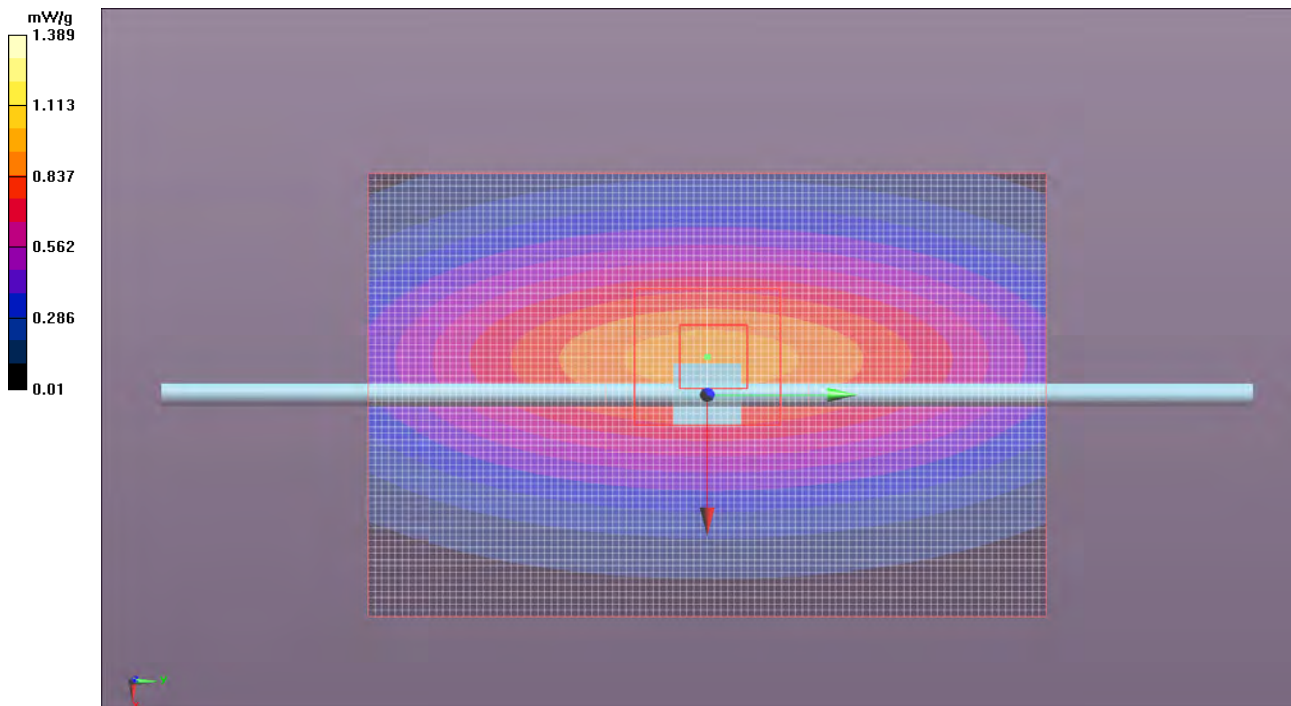
Peak SAR (extrapolated) = 1.426 W/kg

SAR(1 g) = 0.983 mW/g; SAR(10 g) = 0.648 mW/g

Maximum value of SAR (measured) = 0.988 mW/g

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

Maximum value of SAR (interpolated) = 0.984 mW/g



Room Temperature (°C):	23	Humidity (%):	41.6	Test Date:	12/29/11
Liquid Temperature (°C):	22.4	Barometric Pressure (mb):	1020.1	Tested by:	Jennifer Herrett and Khanh Tran

MSL900 System Check_835MHz 12-29-11

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: $\sigma = 1.004$ mho/m, $\epsilon_r = 54.3166$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 835$ MHz; $\sigma = 1.004$ mho/m; $\epsilon_r = 54.317$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

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

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

Maximum value of Total (measured) = 34.579 V/m

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

Reference Value = 31.715 V/m; Power Drift = -0.04 dB

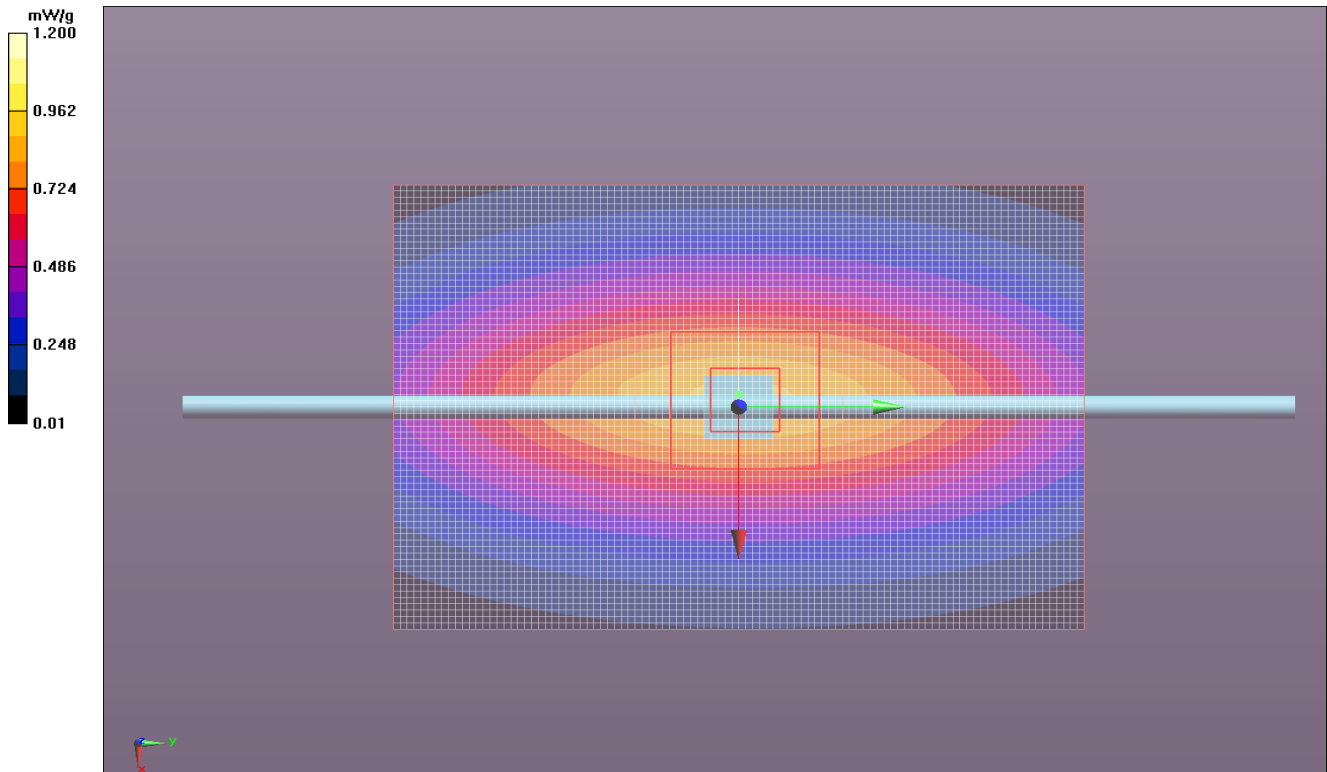
Peak SAR (extrapolated) = 1.419 W/kg

SAR(1 g) = 0.979 mW/g; SAR(10 g) = 0.647 mW/g

Maximum value of SAR (measured) = 0.981 mW/g

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

Maximum value of SAR (interpolated) = 0.984 mW/g



Room Temperature (°C):	23	Humidity (%):	41.7	Test Date:	12/30/11
Liquid Temperature (°C):	22	Barometric Pressure (mb):	1008.2	Tested by:	Jennifer Herrett and Khanh Tran

HSL1900 System Check_1900MHz 12-30-11

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; $\sigma = 1.423$ mho/m; $\epsilon = 38.087$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.42336$ mho/m, $\epsilon = 38.0875$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

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

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

Reference Value = 53.137 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 7.933 W/kg

SAR(1 g) = 4.19 mW/g; SAR(10 g) = 2.17 mW/g

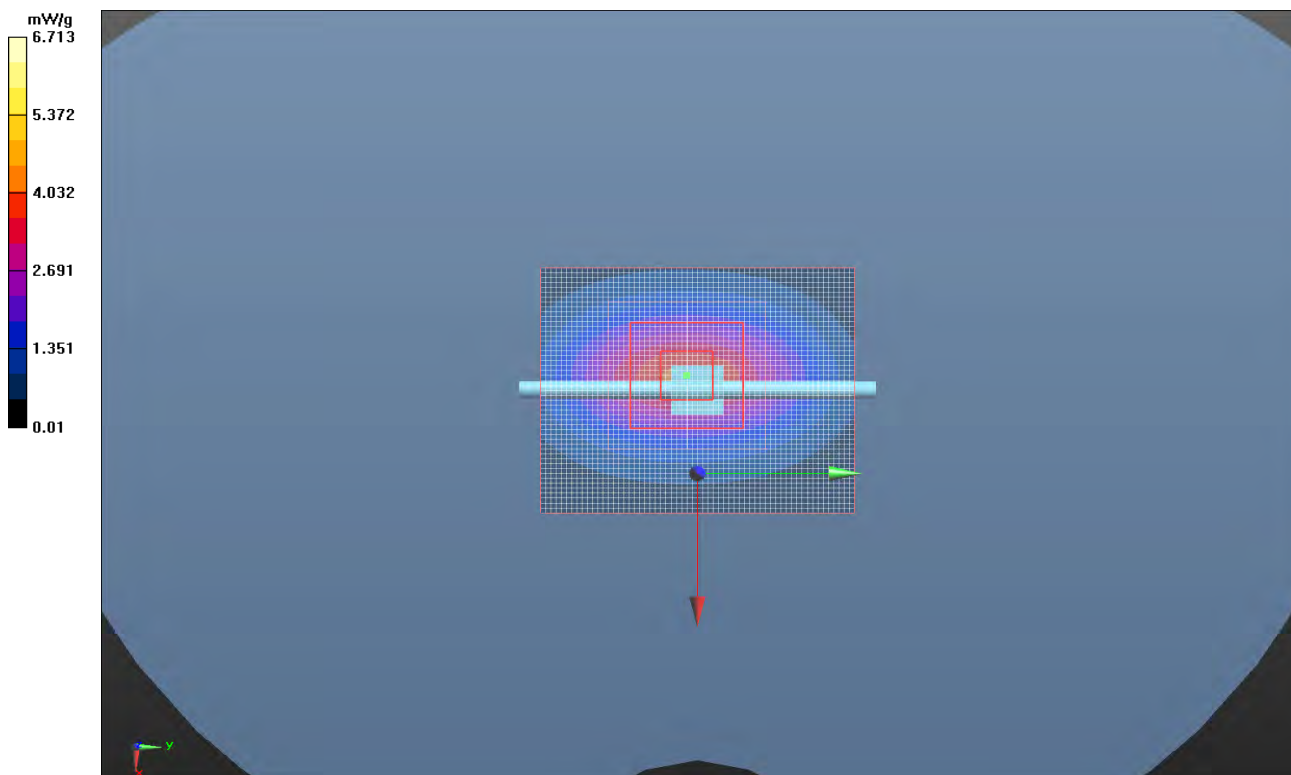
Maximum value of SAR (measured) = 4.165 mW/g

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

Maximum value of SAR (interpolated) = 4.154 mW/g

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

Maximum value of Total (measured) = 68.673 V/m



Room Temperature (°C):	23.1	Humidity (%):	30.5	Test Date:	01/03/12
Liquid Temperature (°C):	22.5	Barometric Pressure (mb):	1027.2	Tested by:	Jennifer Herrett

HSL1900 System Check_1900MHz 1-3-12

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN5d131

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.429$ mho/m; $\epsilon = 38.061$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.42928$ mho/m, $\epsilon = 38.0612$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASYS2, Version 52.8 (0); 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 = 53.519 V/m; Power Drift = 0.00019 dB

Peak SAR (extrapolated) = 7.871 W/kg

SAR(1 g) = 4.2 mW/g; SAR(10 g) = 2.19 mW/g

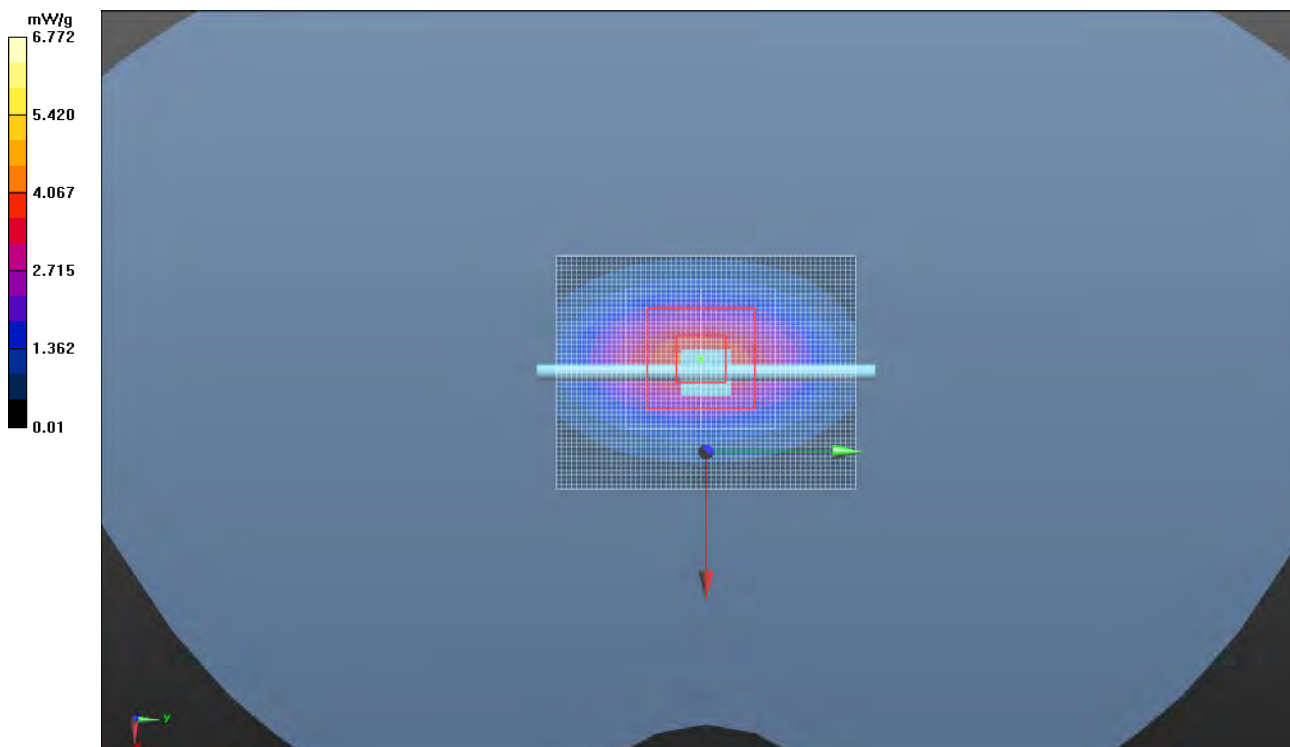
Maximum value of SAR (measured) = 4.177 mW/g

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

Maximum value of SAR (interpolated) = 4.213 mW/g

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

Maximum value of Total (measured) = 68.831 V/m



EMC

SAR TEST DATA

Room Temperature (°C):	23.1	Humidity (%):	37.2	Test Date:	01/04/12
Liquid Temperature (°C):	22.7	Barometric Pressure (mb):	1024	Tested by:	Jennifer Herrett

MSL1900 System Check_1900MHz 1-4-12b

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; $\sigma = 1.526$ mho/m; $\epsilon = 53.174$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.52571$ mho/m, $\epsilon = 53.1738$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

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

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

Maximum value of SAR (interpolated) = 4.331 mW/g

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

Reference Value = 52.713 V/m; Power Drift = -0.01 dB

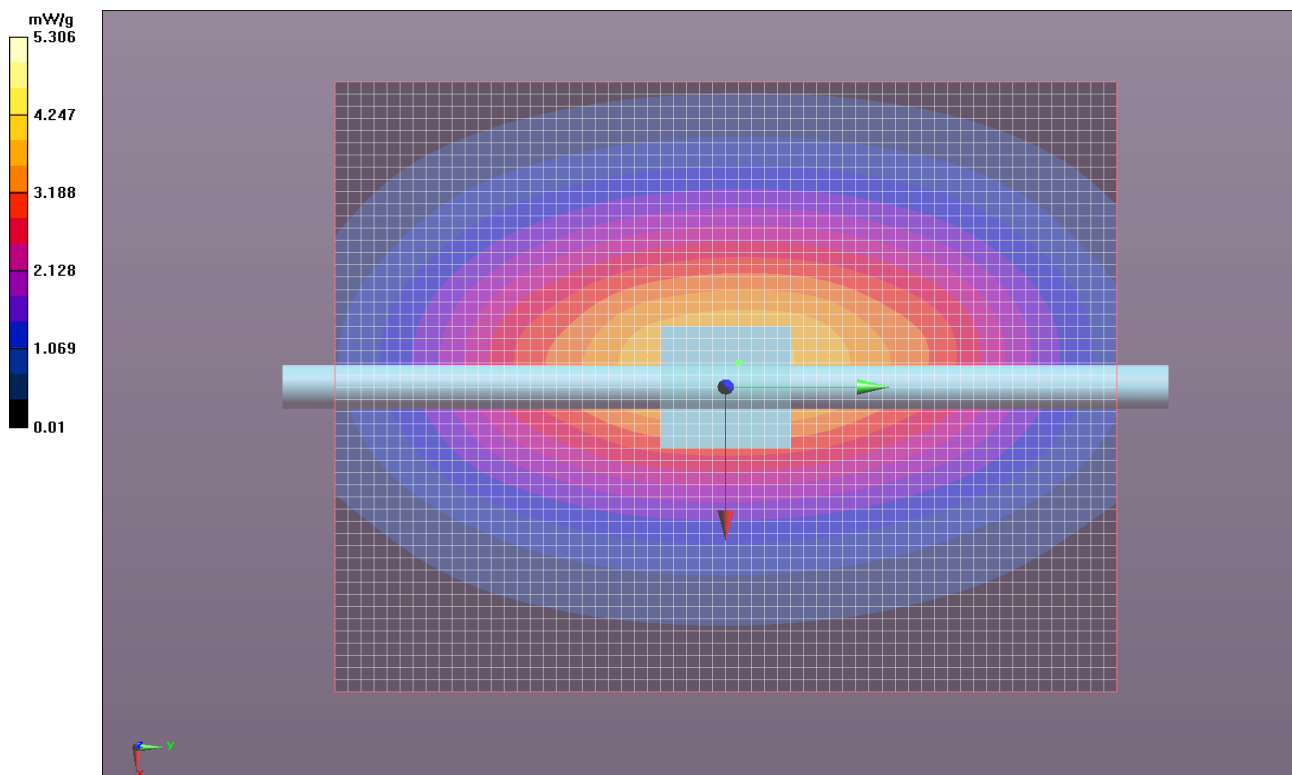
Peak SAR (extrapolated) = 7.741 W/kg

SAR(1 g) = 4.26 mW/g; SAR(10 g) = 2.25 mW/g

Maximum value of SAR (measured) = 4.277 mW/g

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

Maximum value of Total (measured) = 58.970 V/m



Room Temperature (°C):	23.3	Humidity (%):	38.9	Test Date:	01/05/12
Liquid Temperature (°C):	23	Barometric Pressure (mb):	1028.9	Tested by:	Jennifer Herrett

MSL1750 System Check_1750MHz 1-5-12

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1040

Communication System: CW; Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz; Communication System PAR: 0 dB
 Medium parameters used: $\sigma = 1.42515$ mho/m, $\epsilon_r = 53.3256$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 1750$ MHz; $\sigma = 1.425$ mho/m; $\epsilon_r = 53.326$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

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

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

Maximum value of Total (measured) = 55.820 V/m

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

Reference Value = 51.417 V/m; Power Drift = 0.03 dB

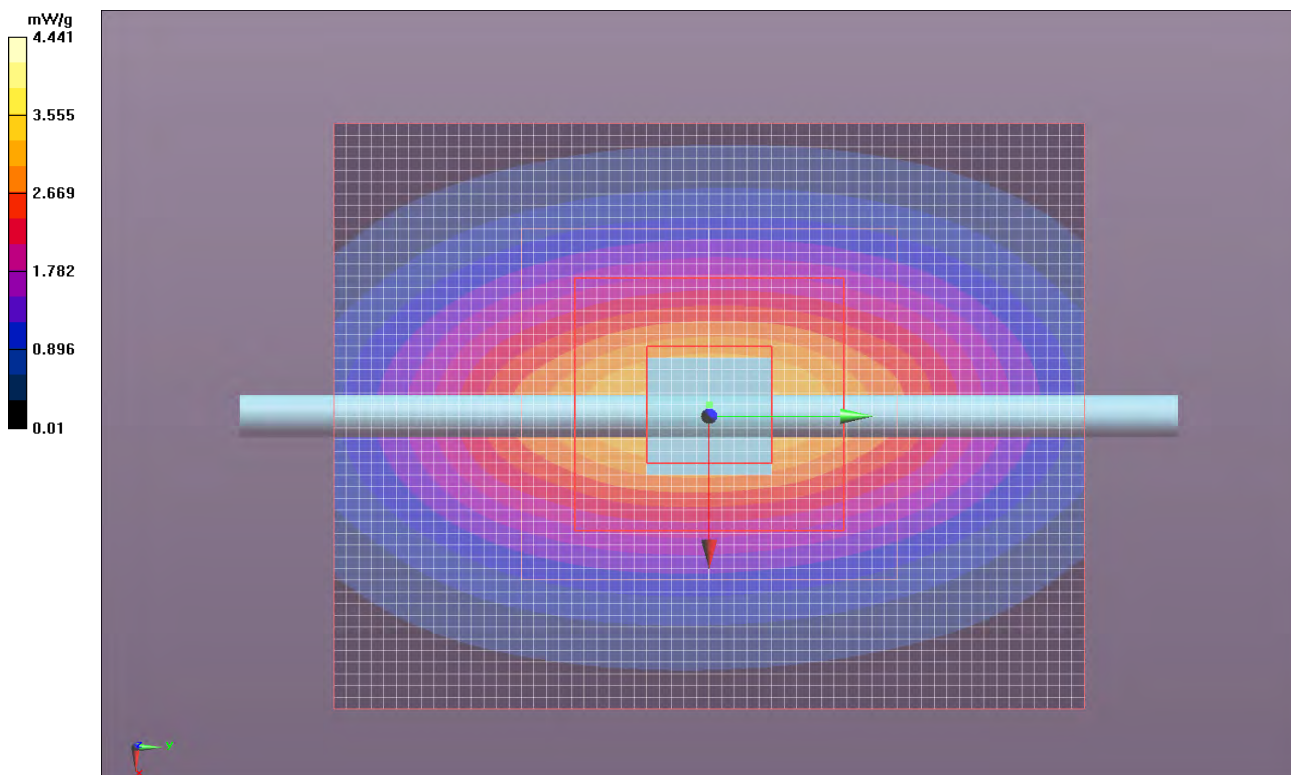
Peak SAR (extrapolated) = 6.569 W/kg

SAR(1 g) = 3.67 mW/g; SAR(10 g) = 1.97 mW/g

Maximum value of SAR (measured) = 3.711 mW/g

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

Maximum value of SAR (interpolated) = 3.729 mW/g



Room Temperature (°C):	23.7	Humidity (%):	38.4	Test Date:	01/05/12
Liquid Temperature (°C):	23	Barometric Pressure (mb):	1028.9	Tested by:	Jennifer Herrett

HSL1750 System Check_1750MHz 1-5-12

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1040

Communication System: CW; Communication System Band: D1750 (1750.0 MHz); Frequency: 1750 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 1750$ MHz; $\sigma = 1.329$ mho/m; $\epsilon = 40.235$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.32889$ mho/m, $\epsilon = 40.2353$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

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

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

Reference Value = 51.777 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 6.495 W/kg

SAR(1 g) = 3.56 mW/g; SAR(10 g) = 1.9 mW/g

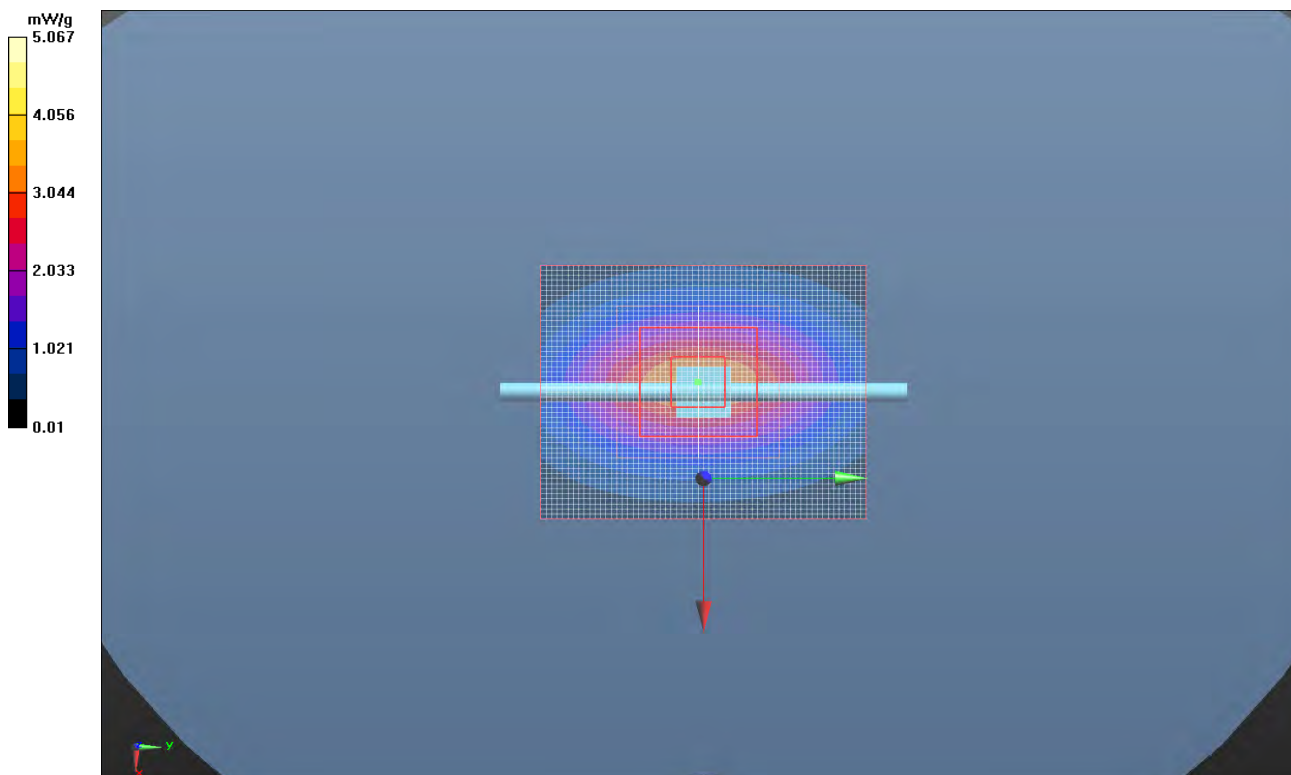
Maximum value of SAR (measured) = 3.550 mW/g

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

Maximum value of SAR (interpolated) = 3.547 mW/g

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

Maximum value of Total (measured) = 61.746 V/m



Room Temperature (°C):	22.8	Humidity (%):	31.5	Test Date:	01/06/12
Liquid Temperature (°C):	22.2	Barometric Pressure (mb):	1028.1	Tested by:	Ethan Schoonover

HSL900 System Check_835MHz 1-6-12

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; $\sigma = 0.898$ mho/m; $\epsilon_r = 42.28$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 0.898403$ mho/m, $\epsilon_r = 42.2796$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

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

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

Maximum value of SAR (interpolated) = 0.101 mW/g

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

Reference Value = 10.454 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.139 W/kg

SAR(1 g) = 0.098 mW/g; SAR(10 g) = 0.066 mW/g

Maximum value of SAR (measured) = 0.099 mW/g

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

Maximum value of Total (measured) = 9.500 V/m

Date/Time: 1/6/2012 3:13:50 PM

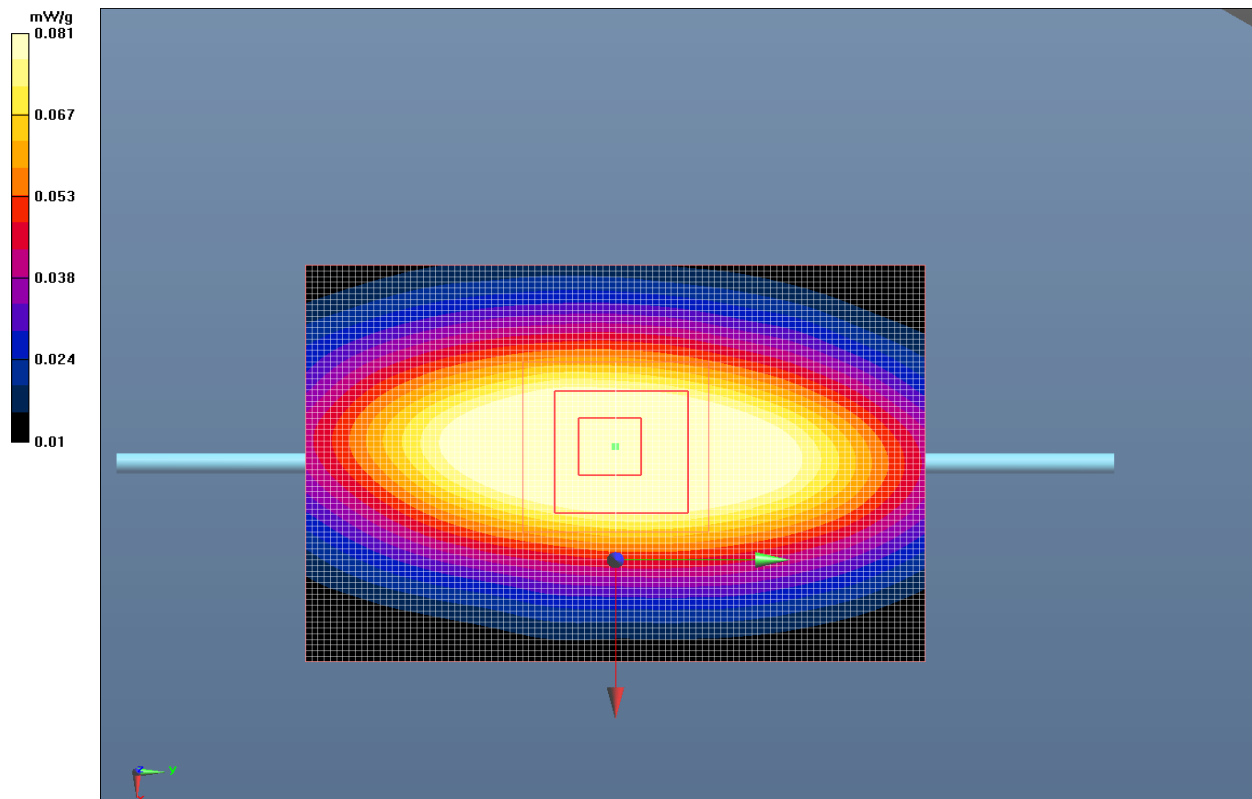
Test Laboratory: Northwest EMC Inc.

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; $\sigma = 0.898$ mho/m; $\epsilon_r = 42.28$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

Probe: ES3DV3 - SN3246; ConvF(6.04, 6.04, 6.04); Calibrated: 11/11/2010



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.

NORTHWEST EMC		SAR TEST DATA		SAR 2011.02.07
EUT:	1000CP03S	Work Order:	INMC0746	
Serial Number:	187U1191613	Date:	See Data Sheets	
Customer:	Intermec Technologies Corporation	Temperature:	See Data Sheets	
Attendees:	None	Humidity:	See Data Sheets	
Project:	None	Barometric Pres.:	See Data Sheets	
Tested by:	Jennifer Herrett and Khanh Tran	Job Site:	EV08	
TEST SPECIFICATIONS		Test Method		
FCC 2.1093:2012		FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 941225 D01 v02, and D03 FCC KDB 648474 D01 V01r05		
Health Safety Code 6:2009		RSS-102, Issue 4:2010		
COMMENTS				
None				
DEVIATIONS FROM TEST STANDARD				
No Deviations				
Configuration #	1	Signature <i>Jennifer Herrett</i>		

Test Configuration	Frequency Band	Transmit Frequency (MHz)	Transmit Channel	Transmit Mode	Data Rate (kbps)	Audio Accessory	EUT Position	SAR Drift During Test (dB)	Measured 1g SAR Level (mW/g)	Test #
Head	Cellular	836.52	384	RC3 (Fwd 3, Rvs 3). SO55 (Loopback)	9.6	None	Right-Cheek	-0.01	0.439	9
	Cellular	836.52	384	RC3 (Fwd 3, Rvs 3). SO55 (Loopback)	9.6	None	Right-Tilt	-0.55	0.029	10

Room Temperature (°C):	22.8	Humidity (%):	38.5	Test Date:	01/05/12
Liquid Temperature (°C):	22.3	Barometric Pressure (mb):	1024	Tested by:	Jennifer Herrett and Khanh Tran

Test 9 1-5-12

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

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 836.52 MHz; Communication System PAR: 0 dB
 Medium parameters used: $\sigma = 0.898403$ mho/m, $\epsilon_r = 42.2796$; $\rho = 1000$ kg/m³, Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.9$ mho/m; $\epsilon_r = 42.258$; $\rho = 1000$ kg/m³
 Phantom section: Right Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

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

Head - Right/Cheek - Mid/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
 Maximum value of Total (measured) = 19.685 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) = 0.455 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) = 0.539 mW/g

Head - Right/Cheek - Mid/Area scan 2 (71x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.058 mW/g

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

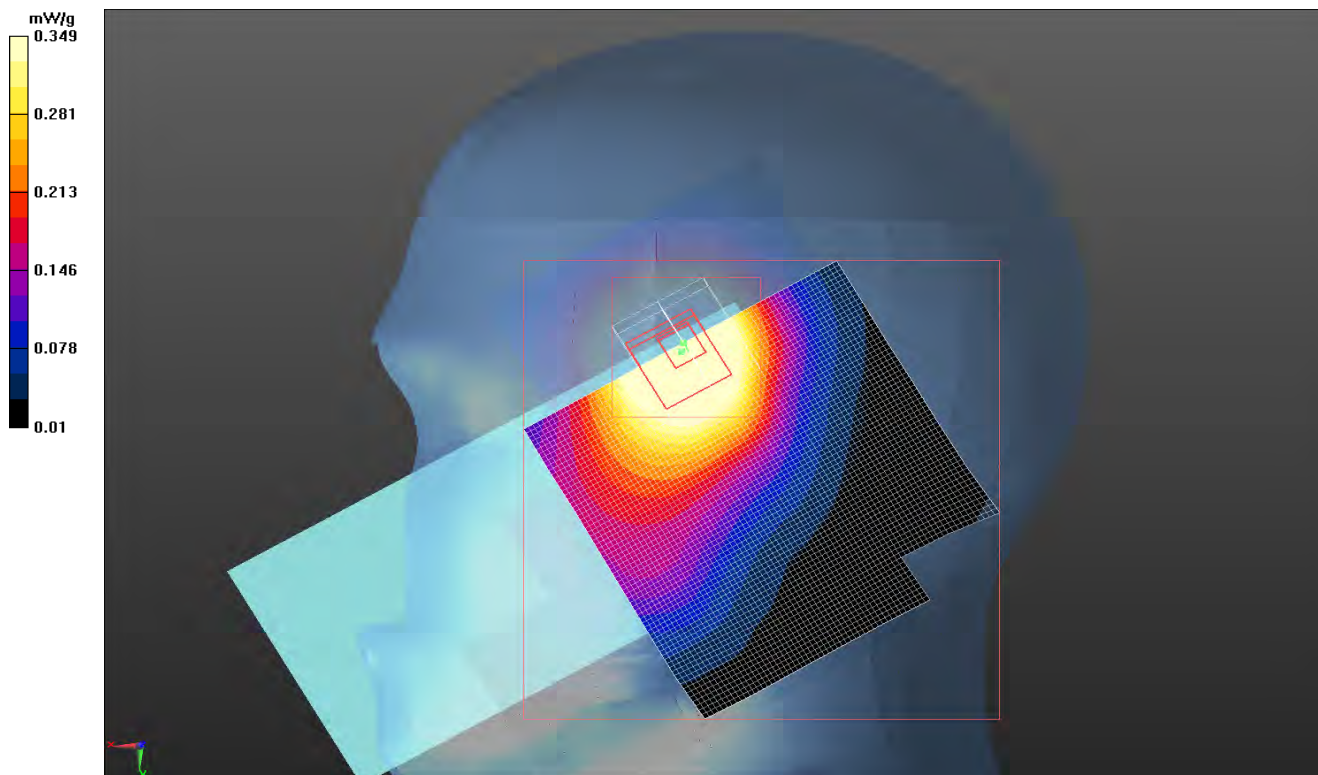
Reference Value = 24.244 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.630 W/kg

SAR(1 g) = 0.439 mW/g; SAR(10 g) = 0.290 mW/g

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

Maximum value of SAR (measured) = 0.516 mW/g



EMC

SAR TEST DATA

Room Temperature (°C):	22.8	Humidity (%):	38.5	Test Date:	01/05/12
Liquid Temperature (°C):	22.3	Barometric Pressure (mb):	1024	Tested by:	Jennifer Herrett and Khanh Tran

Test 10 1-5-12

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

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; $\sigma = 0.9$ mho/m; $\epsilon_r = 42.258$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 0.898403$ mho/m, $\epsilon_r = 42.2796$; $\rho = 1000$ kg/m³
 Phantom section: Right Section
 Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

Measurement SW: DASY52, 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) = 0.035 mW/g

Head - Right/Tilt - Mid/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.684 V/m; Power Drift = -0.55 dB

Peak SAR (extrapolated) = 0.043 W/kg

SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.020 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

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

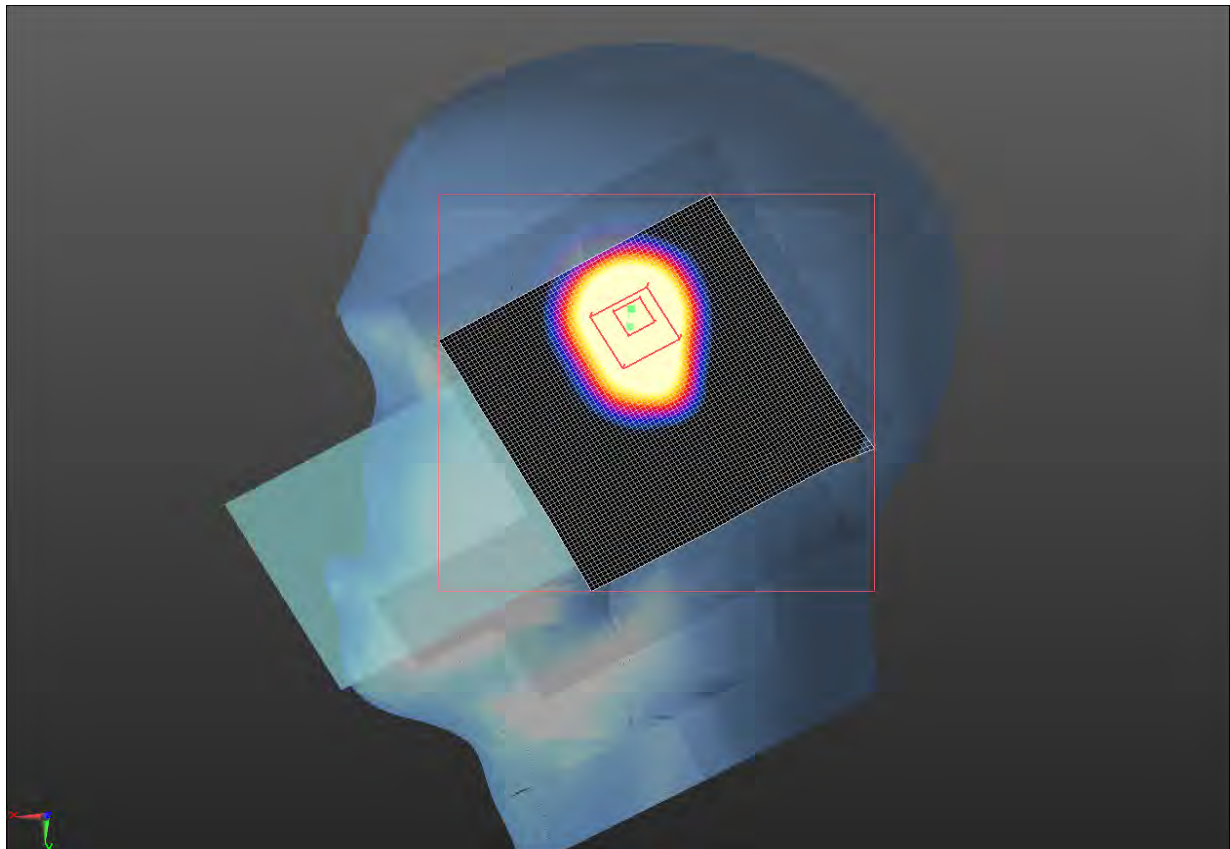
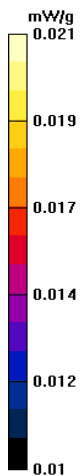
Head - Right/Tilt - Mid/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 4.875 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) = 0.031 mW/g

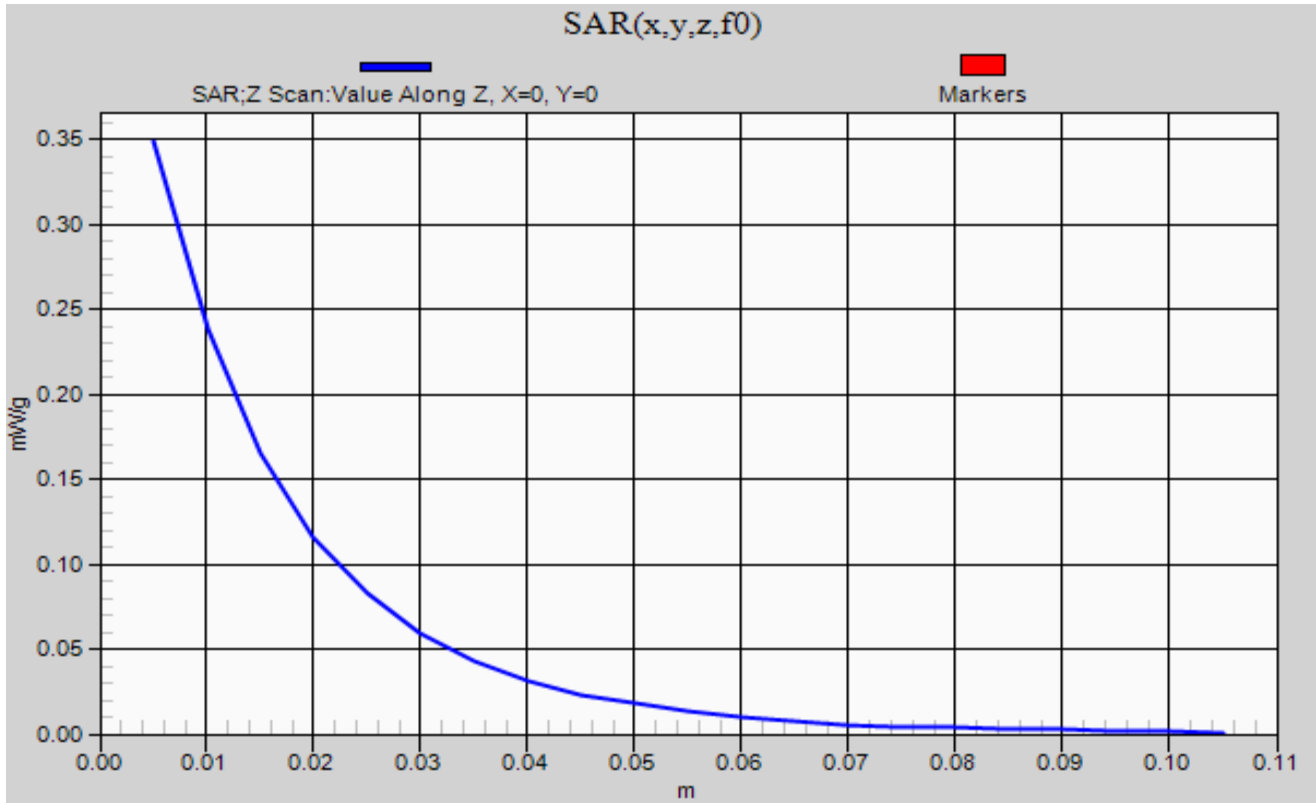


EMC

SAR TEST DATA

Room Temperature (°C):	22.8	Humidity (%):	38.5	Test Date:	01/05/12
Liquid Temperature (°C):	22.3	Barometric Pressure (mb):	1024	Tested by:	Jennifer Herrett and Khanh Tran

Test #9



SAR TEST DATA

SAR 2011.02.07

EUT: 1000CP03S	Work Order: INMC0746
Serial Number: 187U1191613	Date: See Data Sheets
Customer: Intermec Technologies Corporation	Temperature: See Data Sheets
Attendees: None	Humidity: See Data Sheets
Project: None	Barometric Pres.: See Data Sheets
Tested by: Jennifer Herrett and Khanh Tran	Job Site: EV08

TEST SPECIFICATIONS	Test Method
FCC 2.1093:2012	FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 941225 D01 v02, and D03 FCC KDB 648474 D01 V01r05
Health Safety Code 6:2009	RSS-102, Issue 4:2010

COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

Configuration #	1	<i>Signature</i>
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Test Configuration	Frequency Band	Transmit Frequency (MHz)	Transmit Channel	Transmit Mode	Data Rate	Body-Worn Accessory	Audio Accessory	EUT Position	SAR Drift During Test (dB)	Measured 1g SAR Level (mW/g)	Test #
Body	Cellular	836.52	384	EV-DO Rev. 0	FTAP: 307.2 FTAP:153.6	Wrist Holster	None	Left	-0.04	0.772	1
	Cellular	836.52	384	EV-DO Rev. 0	FTAP: 307.2 FTAP:153.6	Wrist Holster	None	Back	-0.03	0.300	2
	Cellular	836.52	384	EV-DO Rev. 0	FTAP: 307.2 FTAP:153.6	Wrist Holster	None	Right	0.05	0.265	3
	Cellular	836.52	384	EV-DO Rev. A	FETAP: 307.2 RETAP: 4096 Payload	Wrist Holster	None	Worst Case (Left)	0.07	0.790	4

EMC

SAR TEST DATA

Room Temperature (°C):	21.4	Humidity (%):	39.7	Test Date:	12/27/11
Liquid Temperature (°C):	21.1	Barometric Pressure (mb):	1023.8	Tested by:	Jennifer Herrett and Khanh Tran

Test 1 12-27-11

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

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; $\sigma = 1.015$ mho/m; $\epsilon = 54.882$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.01306$ mho/m, $\epsilon = 54.8958$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

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

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.979 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) = 0.880 mW/g

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

Reference Value = 26.889 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.270 W/kg

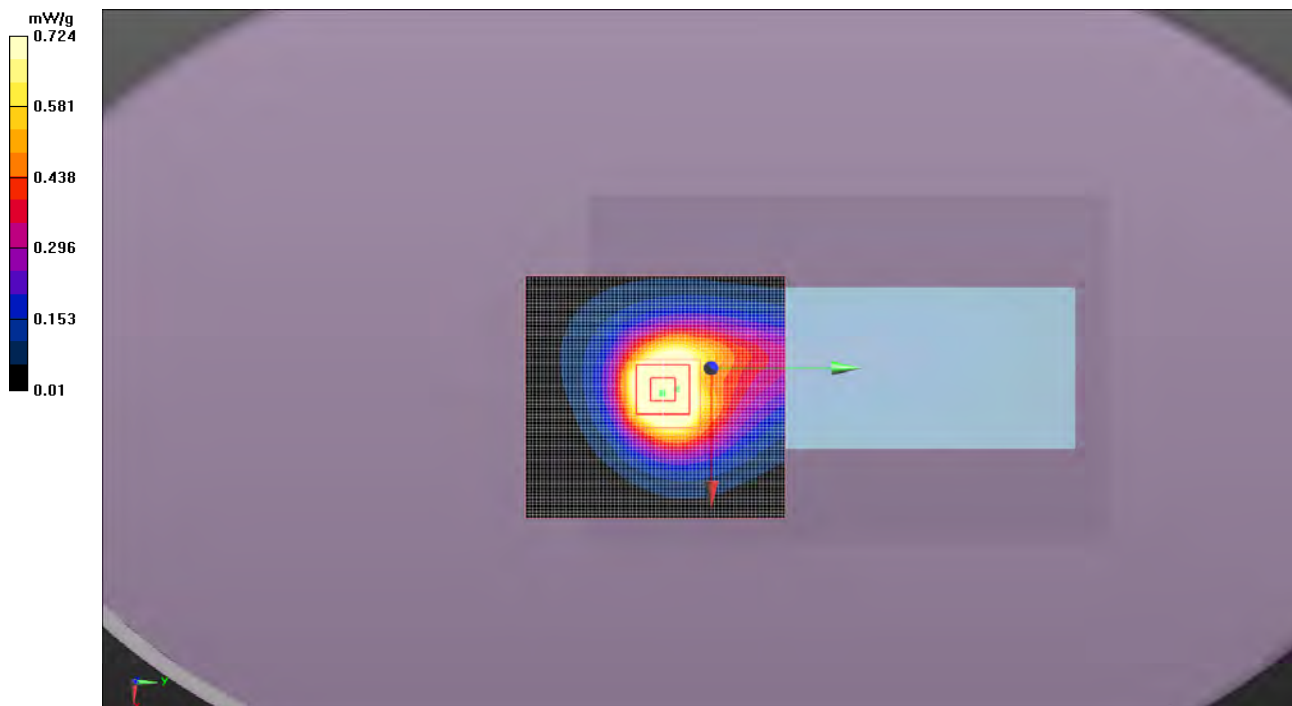
SAR(1 g) = 0.772 mW/g; SAR(10 g) = 0.446 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.940 mW/g

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

Maximum value of Total (measured) = 21.213 V/m



EMC

SAR TEST DATA

Room Temperature (°C):	22.7	Humidity (%):	40.8	Test Date:	12/29/11
Liquid Temperature (°C):	21.6	Barometric Pressure (mb):	1020.1	Tested by:	Jennifer Herrett and Khanh Tran

Test 2 12-29-11

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

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; $\sigma = 1.005$ mho/m; $\epsilon_r = 54.304$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.004$ mho/m; $\epsilon_r = 54.3166$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

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

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.359 mW/g

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.339 mW/g

Body/Body - Mid/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.076 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.396 W/kg

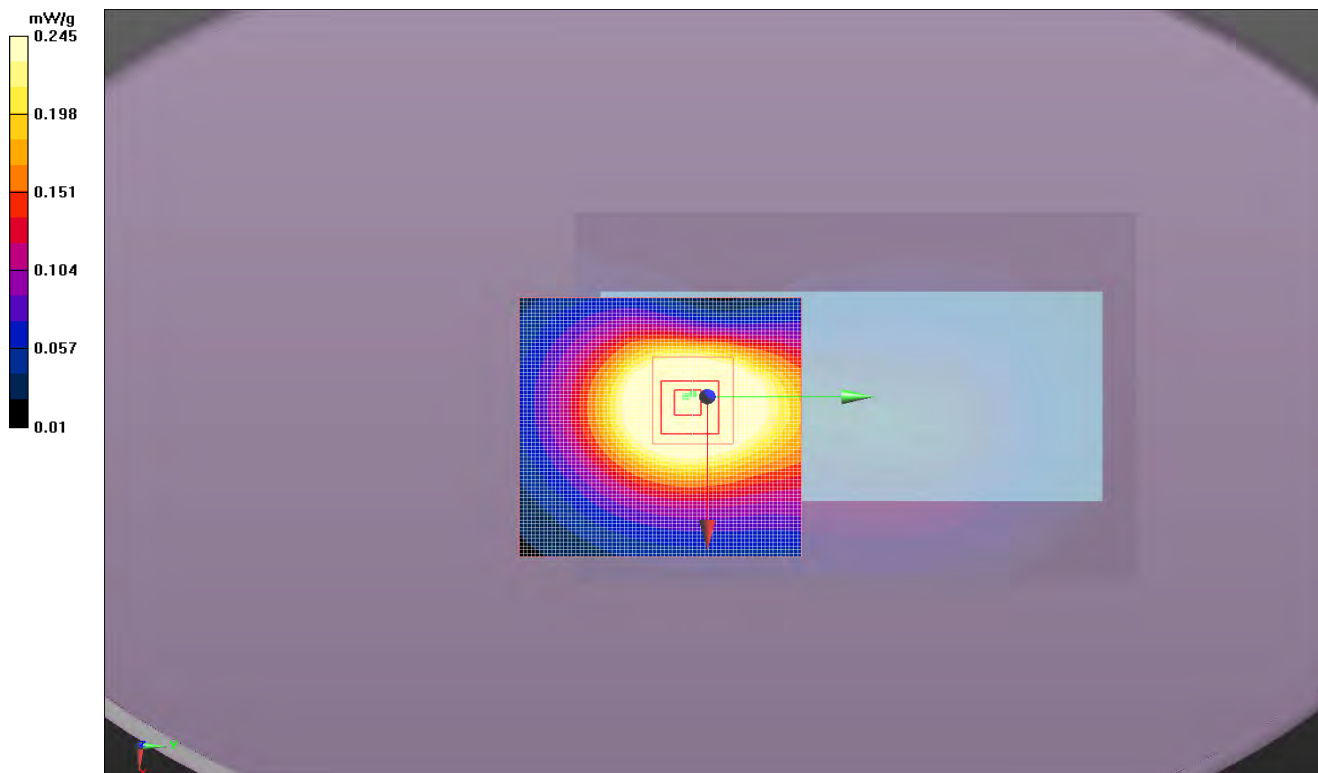
SAR(1 g) = 0.300 mW/g; SAR(10 g) = 0.215 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.340 mW/g

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

Maximum value of Total (measured) = 15.611 V/m



Room Temperature (°C):	22.2	Humidity (%):	38.5	Test Date:	12/29/11
Liquid Temperature (°C):	21.6	Barometric Pressure (mb):	1020.1	Tested by:	Jennifer Herrett and Khanh Tran

Test 3 12-29-11

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

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; $\sigma = 1.005$ mho/m; $\epsilon_r = 54.304$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.004$ mho/m, $\epsilon_r = 54.3166$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

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

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.307 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) = 0.296 mW/g

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

Reference Value = 17.884 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.366 W/kg

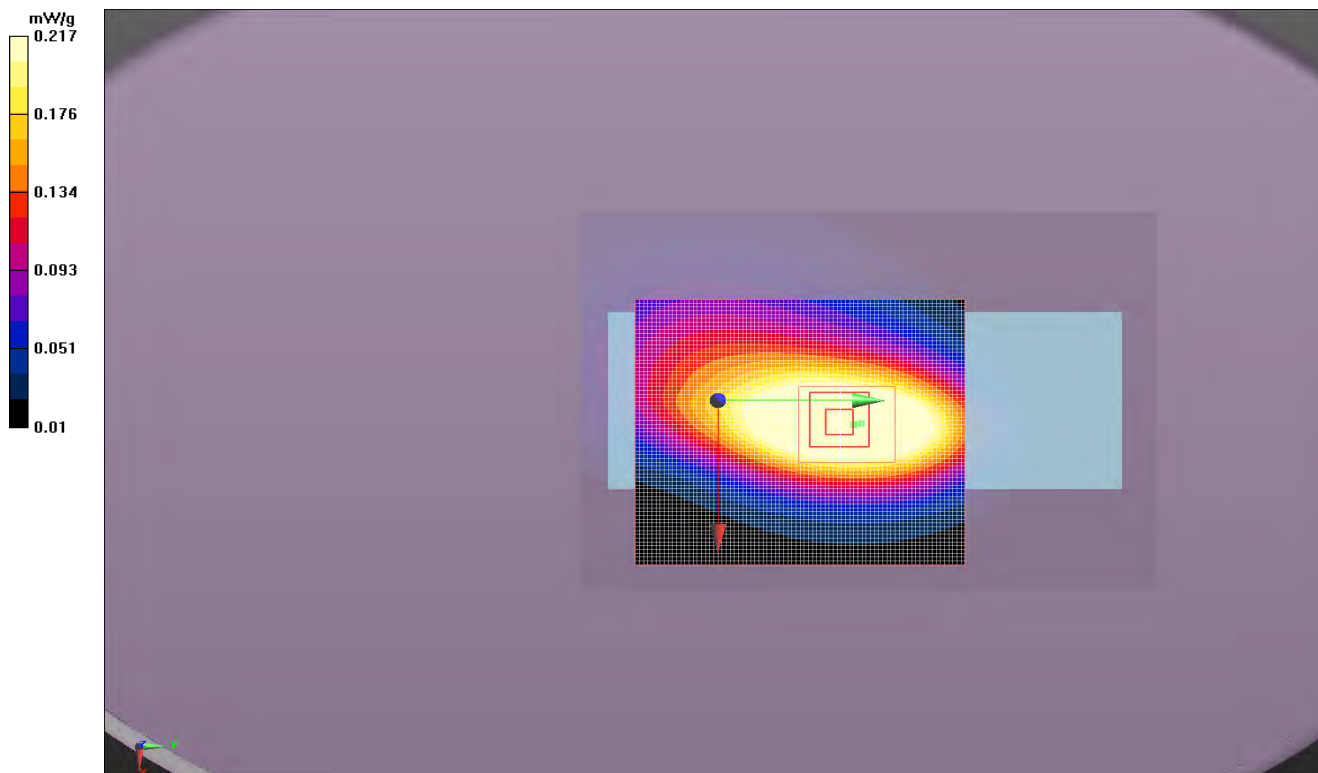
SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.184 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

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

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

Maximum value of Total (measured) = 14.690 V/m



EMC

SAR TEST DATA

Room Temperature (°C):	21.4	Humidity (%):	39.7	Test Date:	12/27/11
Liquid Temperature (°C):	21.1	Barometric Pressure (mb):	1023.8	Tested by:	Jennifer Herrett and Khanh Tran

Test 4 12-27-11

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

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; $\sigma = 1.015$ mho/m; $\epsilon = 54.882$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.01306$ mho/m, $\epsilon = 54.8958$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

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

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.899 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) = 0.983 mW/g

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

Reference Value = 28.355 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.298 W/kg

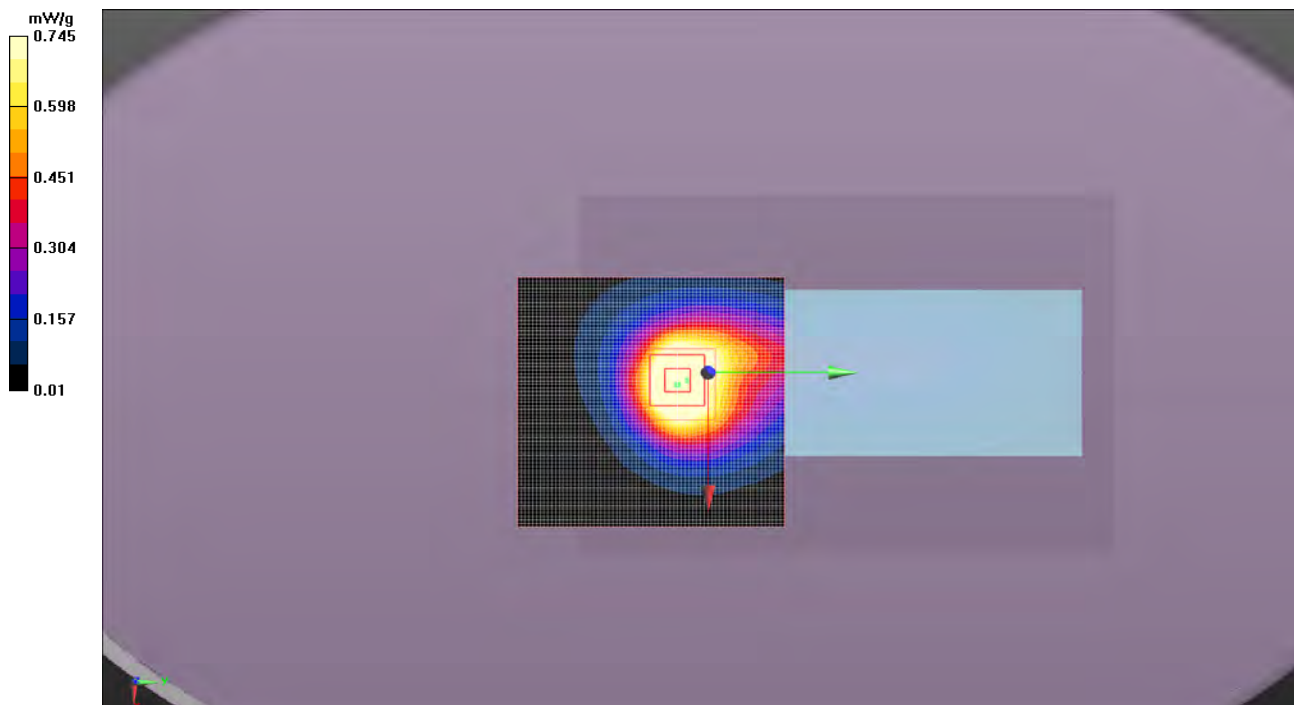
SAR(1 g) = 0.790 mW/g; SAR(10 g) = 0.458 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.959 mW/g

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

Maximum value of Total (measured) = 21.621 V/m



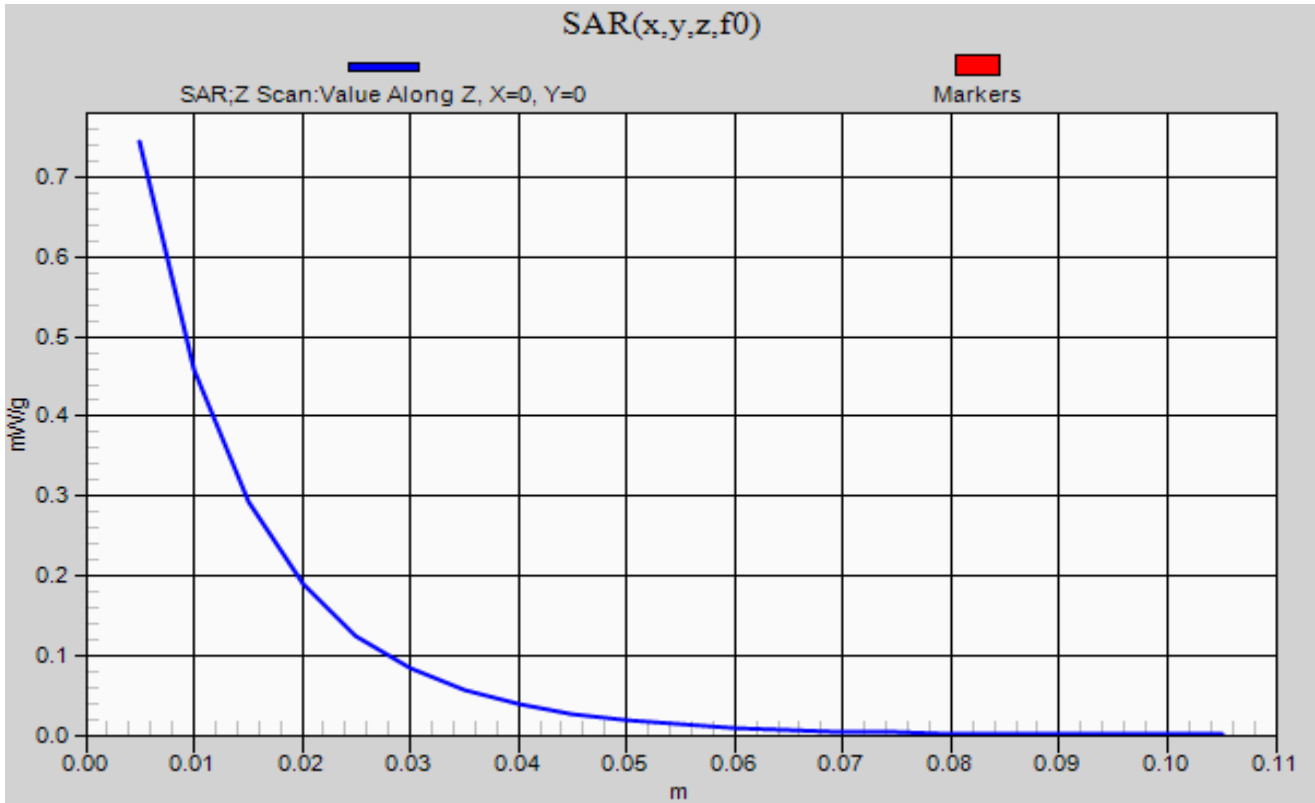
EMC

SAR TEST DATA

Room Temperature (°C):	21.4	Humidity (%):	39.7	Test Date:	12/27/11
Liquid Temperature (°C):	21.1	Barometric Pressure (mb):	1023.8	Tested by:	Jennifer Herrett and Khanh Tran

Test 4 12-27-11

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



SAR TEST DATA

EMC

EUT:	1000CP03S	Work Order:	INMC0746
Serial Number:	187U1191613	Date:	See Data Sheets
Customer:	Intermec Technologies Corporation	Temperature:	See Data Sheets
Attendees:	None	Humidity:	See Data Sheets
Project:	None	Barometric Pres.:	See Data Sheets
Tested by:	Jennifer Herrett and Khanh Tran	Job Site:	EV08
TEST SPECIFICATIONS		Test Method	
FCC 2.1093:2012		FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 941225 D01 v02, and D03 FCC KDB 648474 D01 V01r05	
Health Safety Code 6:2009		RSS-102, Issue 4:2010	
COMMENTS			
None			
DEVIATIONS FROM TEST STANDARD			
No Deviations			
Configuration #	1	Signature <i>Jennifer Herrett</i>	

Test Configuration	Frequency Band	Transmit Frequency (MHz)	Transmit Channel	Transmit Mode	Data Rate	Body-Worn Accessory	Audio Accessory	EUT Position	SAR Drift During Test (dB)	Measured 1g SAR Level (mW/g)	Test #
Head	PCS	1880	600	EV-DO Rev. A	FETAP: 307.2 RETAP: 4096 Payload	None	None	Right - Cheek	-0.08	0.722	11
	PCS	1880	600	EV-DO Rev. A	FETAP: 307.2 RETAP: 4096 Payload	None	None	Right - Tilt	0.03	0.603	12

EMC

SAR TEST DATA

Room Temperature (°C):	22.8	Humidity (%):	45.5	Test Date:	12/30/11
Liquid Temperature (°C):	21.5	Barometric Pressure (mb):	1020.1	Tested by:	Jennifer Herrett and Khanh Tran

Test 11 12-30-11

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 22021142134

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon = 39.74$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.45$ mho/m, $\epsilon = 39.74$; $\rho = 1000$ kg/m³
 Phantom section: Right Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

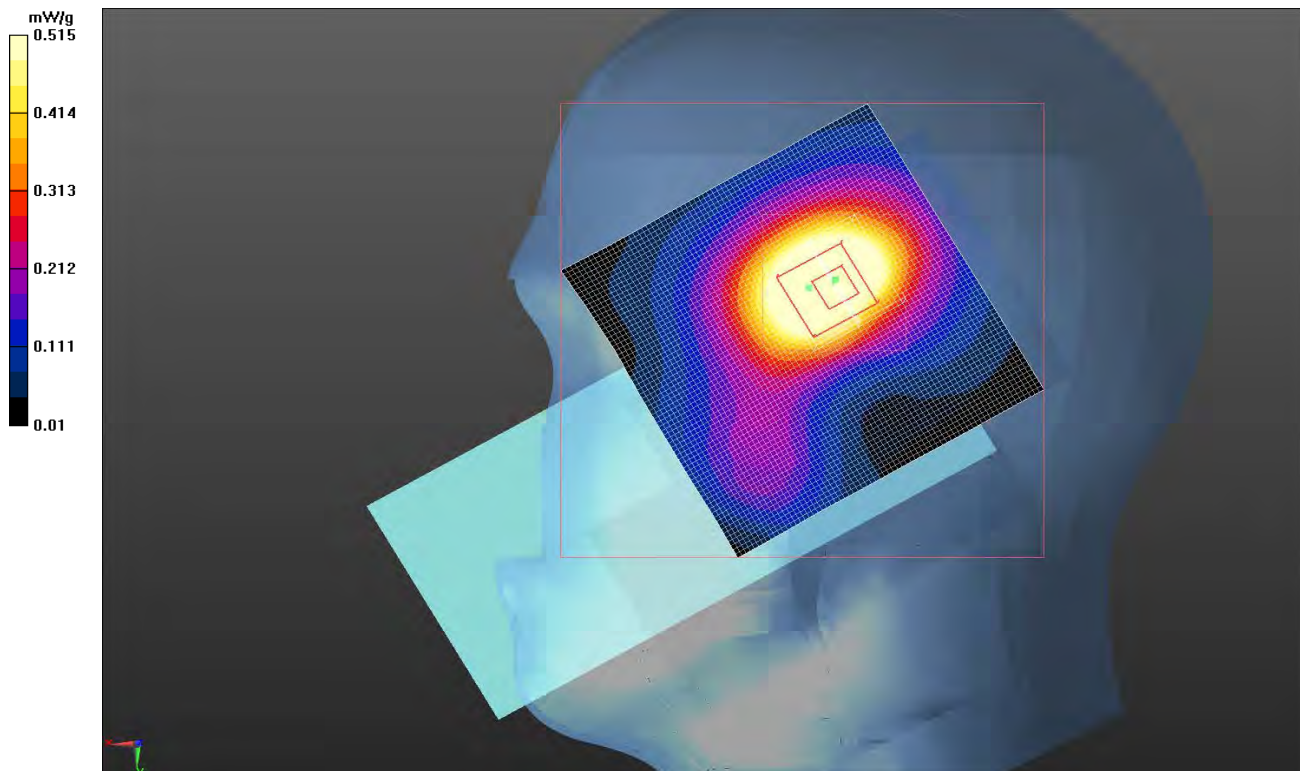
Measurement SW: DASYS2, Version 52.6 (2); SEMCAD X Version 14.4.4 (2829)

Head - Right/Cheek - Mid/Reference scan (41x71x1): Measurement grid: dx=30mm, dy=30mm
 Maximum value of SAR (interpolated) = 0.687 mW/g

Head - Right/Cheek - Mid/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm
 Maximum value of Total (measured) = 18.844 V/m

Head - Right/Cheek - Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 24.506 V/m; Power Drift = -0.08 dB
 Peak SAR (extrapolated) = 1.234 W/kg
SAR(1 g) = 0.722 mW/g; SAR(10 g) = 0.403 mW/g
 Maximum value of SAR (measured) = 0.891 mW/g

Head - Right/Cheek - Mid/Area scan (71x71x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 0.896 mW/g



EMC

SAR TEST DATA

Room Temperature (°C):	22.8	Humidity (%):	45.5	Test Date:	12/30/11
Liquid Temperature (°C):	21.5	Barometric Pressure (mb):	1020.1	Tested by:	Jennifer Herrett

Test 12 12-30-11

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 22021142134

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1880 MHz; Communication System PAR: 0 dB
 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.45$ mho/m; $\epsilon = 39.74$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.45$ mho/m, $\epsilon = 39.74$; $\rho = 1000$ kg/m³
 Phantom section: Right Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

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

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

Reference Value = 23.008 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.028 W/kg

SAR(1 g) = 0.603 mW/g; SAR(10 g) = 0.337 mW/g

Maximum value of SAR (measured) = 0.753 mW/g

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

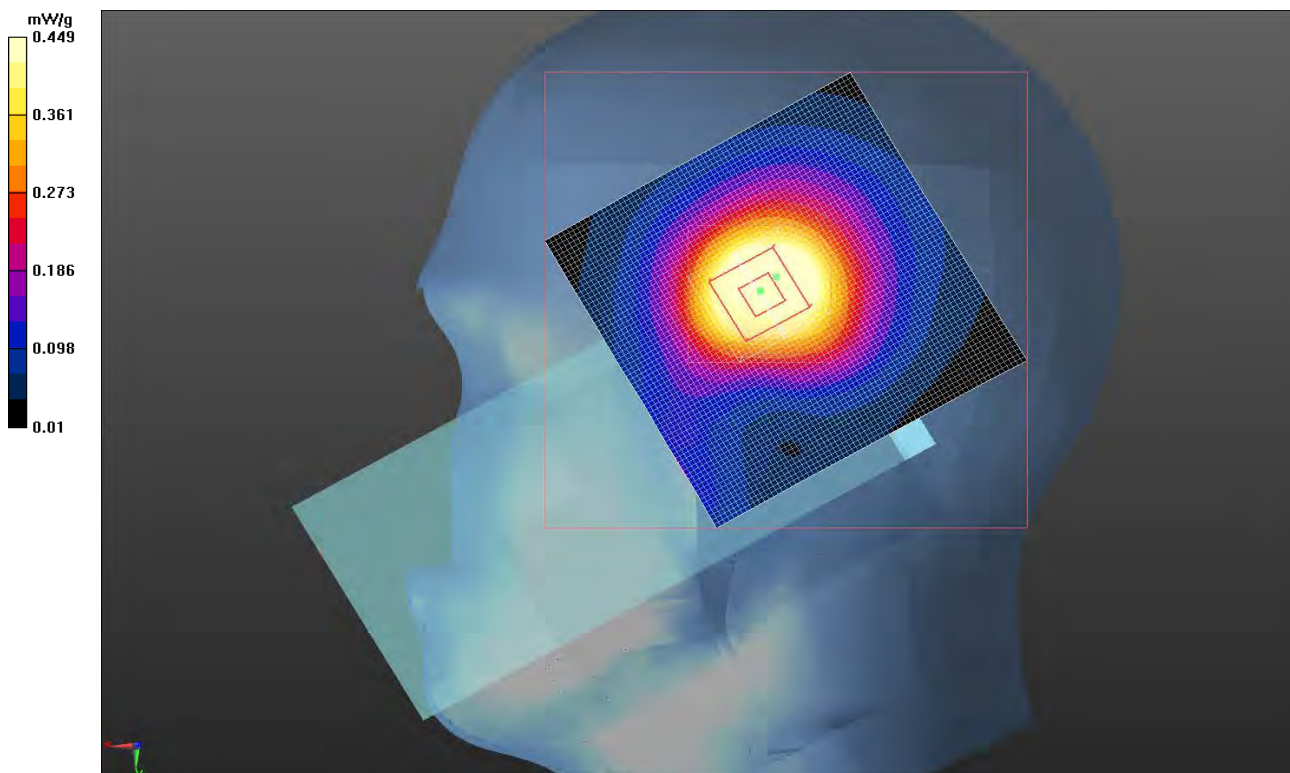
Maximum value of Total (measured) = 17.590 V/m

Head - Right/Tilt - Mid/Reference scan (41x71x1): Measurement grid: dx=30mm, dy=30mm

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

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

Maximum value of SAR (interpolated) = 0.735 mW/g

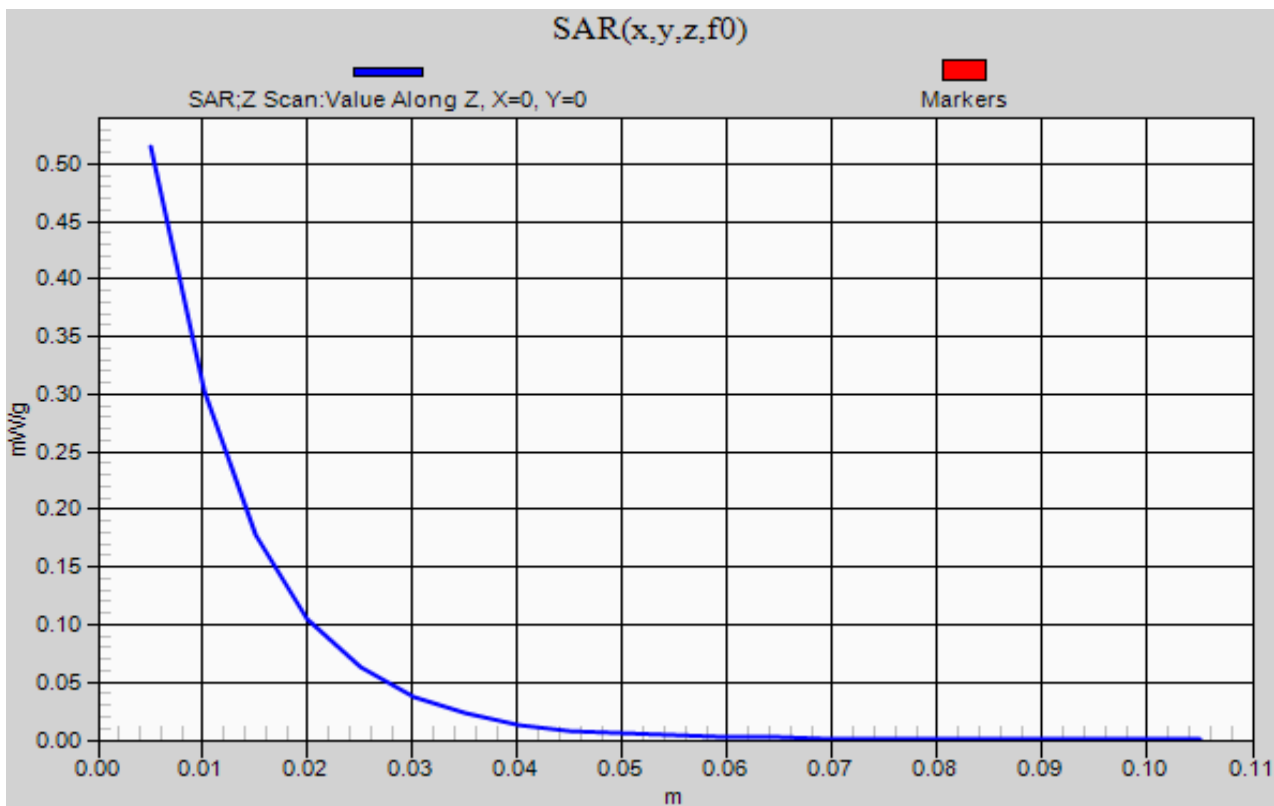


EMC

Room Temperature (°C):	22.8	Humidity (%):	45.5	Test Date:	12/30/11
Liquid Temperature (°C):	21.5	Barometric Pressure (mb):	1020.1	Tested by:	Jennifer Herrett and Khanh Tran

Test 11 12-30-11

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 22021142134



SAR TEST DATA

EUT: 1000CP03S	Work Order: INMC0746
Serial Number: 187U1191613	Date: See Data Sheets
Customer: Intermec Technologies Corporation	Temperature: See Data Sheets
Attendees: None	Humidity: See Data Sheets
Project: None	Barometric Pres.: See Data Sheets
Tested by: Jennifer Herrett and Khanh Tran	Job Site: EV08
TEST SPECIFICATIONS	
FCC 2.1093:2012	Test Method FCC OET 65C:2001 IEEE Std 1528:2003 FCC KDB 447498 D01 v04 FCC KDB 248227 D01 V01r02 FCC KDB 648474 D01 V01r05 FCC 865664
Health Safety Code 6:2009	RSS-102, Issue 4:2010
COMMENTS	
None	
DEVIATIONS FROM TEST STANDARD	
No Deviations	
Configuration #	1
Signature <i>Jennifer Herrett</i>	

Test Configuration	Frequency Band	Transmit Frequency (MHz)	Transmit Channel	Transmit Mode	Data Rate	Body-Worn Accessory	Audio Accessory	EUT Position	SAR Drift During Test (dB)	Measured 1g SAR Level (mW/g)	Test #
Body	PCS	1880	600	EV-DO Rev. 0	FTAP: 307.2 RTAP: 153.6	Wrist Holster	None	Left	0.06	0.753	5
	PCS	1880	600	EV-DO Rev. 0	FTAP: 307.2 RTAP: 153.6	Wrist Holster	None	Back	0.04	0.586	6
	PCS	1880	600	EV-DO Rev. 0	FTAP: 307.2 RTAP: 153.6	Wrist Holster	None	Right	0.22	0.059	7
	PCS	1880	600	EV-DO Rev. A	FETAP: 307.2 RETAP: 4096 Payload	Wrist Holster	None	Worst Case (left)	-0.05	0.737	8

Room Temperature (°C):	22.4	Humidity (%):	37.5	Test Date:	01/04/12
Liquid Temperature (°C):	21.5	Barometric Pressure (mb):	1024	Tested by:	Jennifer Herrett and Khanh Tran

Test 5 1-4-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 22021142134

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; $\sigma = 1.505$ mho/m; $\epsilon_r = 53.229$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.50005$ mho/m, $\epsilon_r = 53.2447$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

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

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

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

Maximum value of SAR (interpolated) = 0.814 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) = 0.883 mW/g

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

Reference Value = 24.562 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.228 W/kg

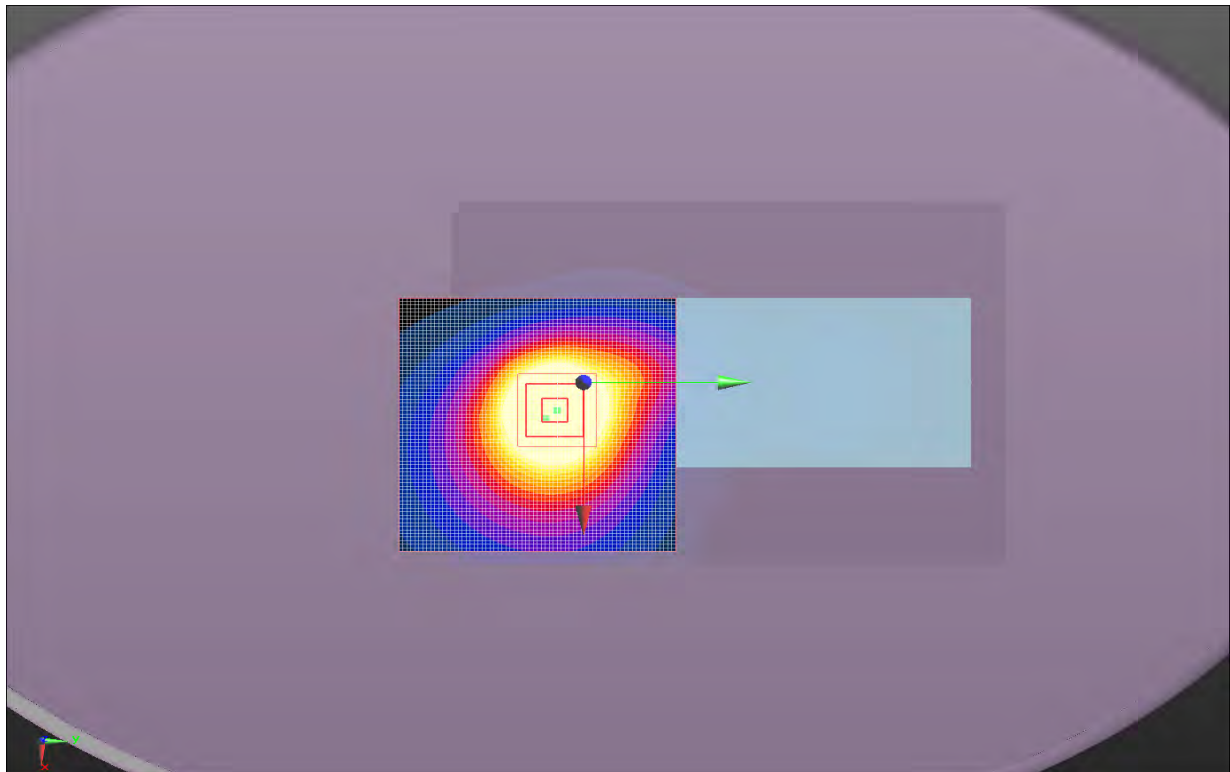
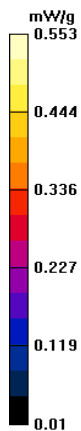
SAR(1 g) = 0.753 mW/g; SAR(10 g) = 0.466 mW/g

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

Maximum value of SAR (measured) = 0.896 mW/g

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

Maximum value of Total (measured) = 19.173 V/m



Room Temperature (°C):	22.2	Humidity (%):	38.9	Test Date:	01/04/12
Liquid Temperature (°C):	21	Barometric Pressure (mb):	1024	Tested by:	Jennifer Herrett and Khanh Tran

Test 6 1-4-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 22021142134

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; $\sigma = 1.505$ mho/m; $\epsilon_r = 53.229$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.50005$ mho/m, $\epsilon_r = 53.2447$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

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

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.697 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) = 0.718 mW/g

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

Reference Value = 21.655 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.946 W/kg

SAR(1 g) = 0.586 mW/g; SAR(10 g) = 0.369 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.691 mW/g

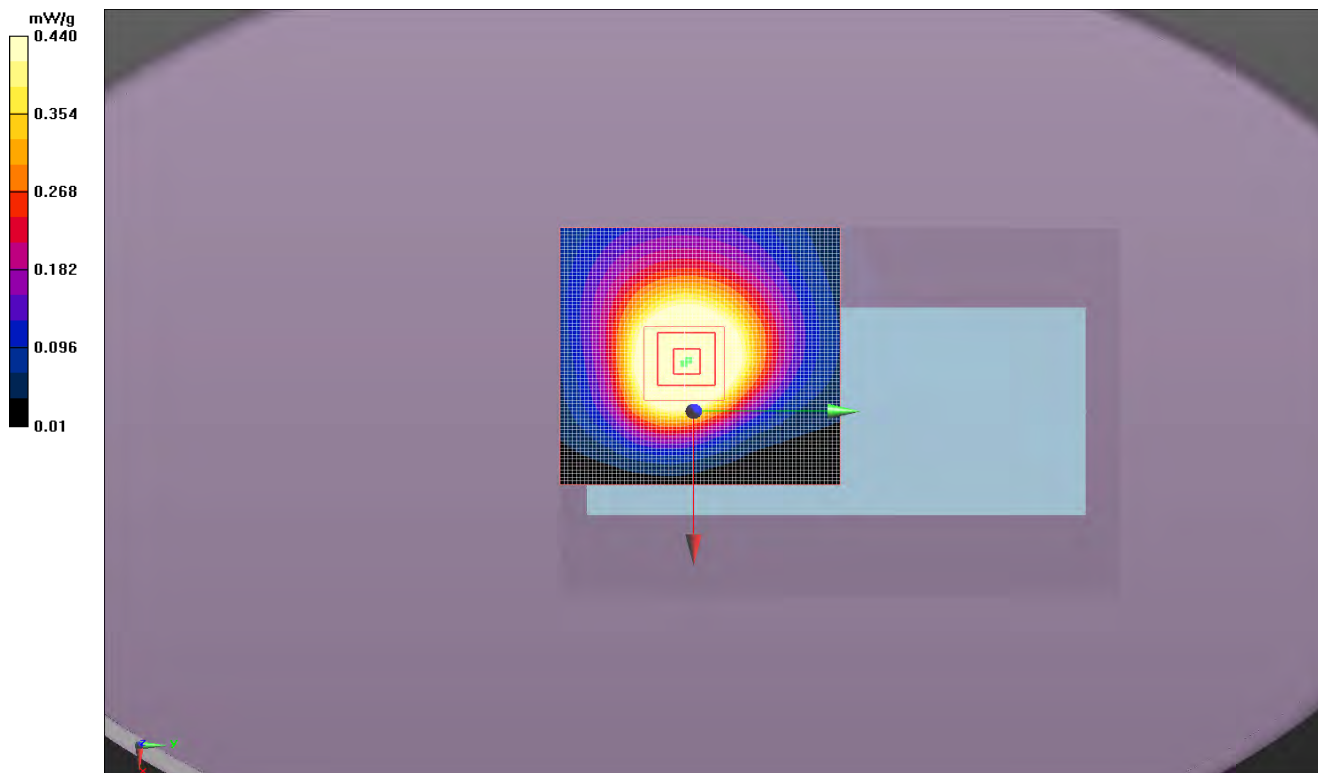
Body/Body - Mid/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 17.095 V/m

Date/Time: 1/4/2012 11:46:28 AM

Test Laboratory: Northwest EMC Inc.

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 22021142134



Room Temperature (°C):	23	Humidity (%):	37	Test Date:	01/04/12
Liquid Temperature (°C):	21.7	Barometric Pressure (mb):	1023.3	Tested by:	Jennifer Herrett and Khanh Tran

Test 7 1-4-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 22021142134

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; $\sigma = 1.505$ mho/m; $\epsilon_r = 53.229$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.50005$ mho/m, $\epsilon_r = 53.2447$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

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

Body/Body - Mid/Area scan 2 (71x51x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.057 mW/g

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

Reference Value = 6.600 V/m; Power Drift = 0.35 dB

Peak SAR (extrapolated) = 0.081 W/kg

SAR(1 g) = 0.045 mW/g; SAR(10 g) = 0.025 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.055 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) = 0.069 mW/g

Body/Body - Mid/Area scan (71x121x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

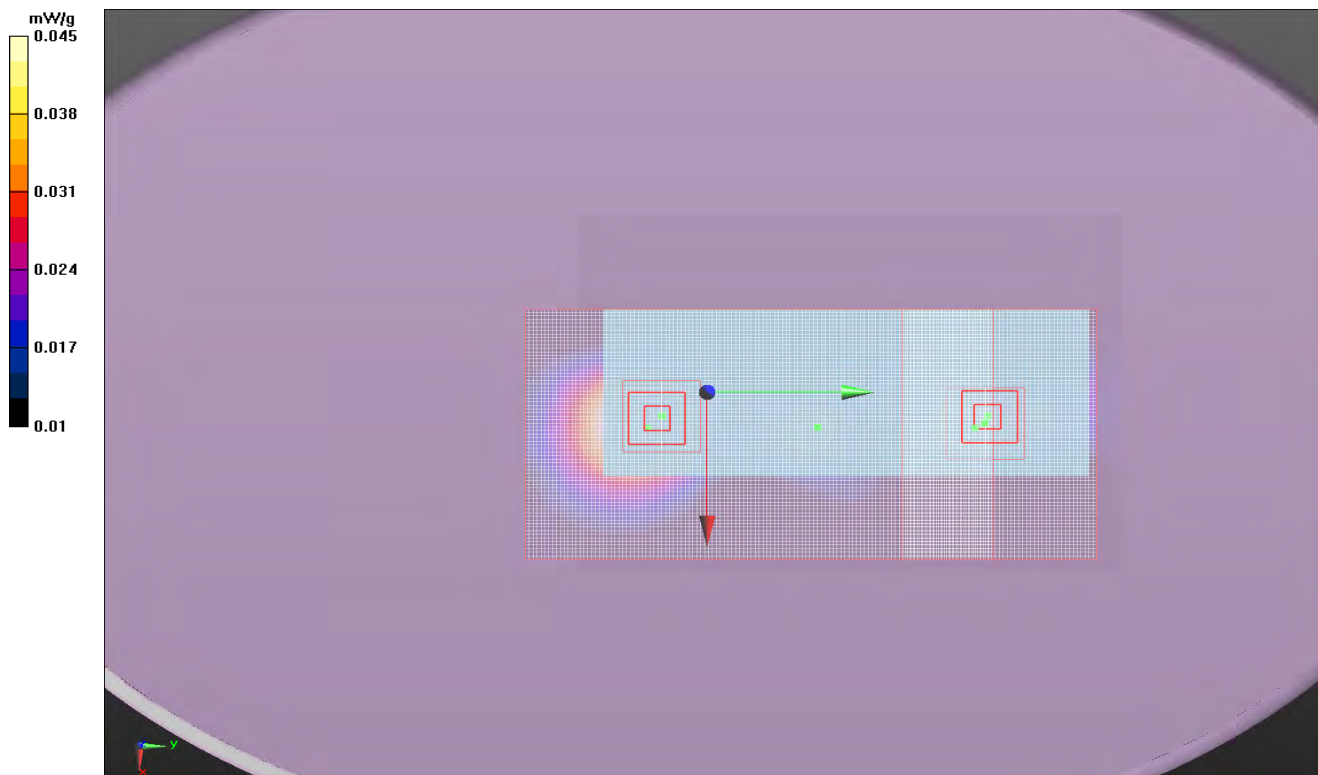
Maximum value of SAR (interpolated) = 0.078 mW/g

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

Reference Value = 6.600 V/m; Power Drift = 0.22 dB

Peak SAR (extrapolated) = 0.096 W/kg

SAR(1 g) = 0.059 mW/g; SAR(10 g) = 0.036 mW/g



Room Temperature (°C):	22.4	Humidity (%):	37.5	Test Date:	01/04/12
Liquid Temperature (°C):	21.5	Barometric Pressure (mb):	1024	Tested by:	Jennifer Herrett and Khanh Tran

Test 8 1-4-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 22021142134

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; $\sigma = 1.505$ mho/m; $\epsilon_r = 53.229$; $\rho = 1000$ kg/m³, Medium parameters used: $\sigma = 1.50005$ mho/m, $\epsilon_r = 53.2447$; $\rho = 1000$ kg/m³
 Phantom section: Flat Section
 Measurement Standard: DASYS5 (IEEE/IEC/ANSI C63.19-2007)

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

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

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (interpolated) = 0.836 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) = 0.873 mW/g

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

Reference Value = 22.929 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.202 W/kg

SAR(1 g) = 0.737 mW/g; SAR(10 g) = 0.457 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.875 mW/g

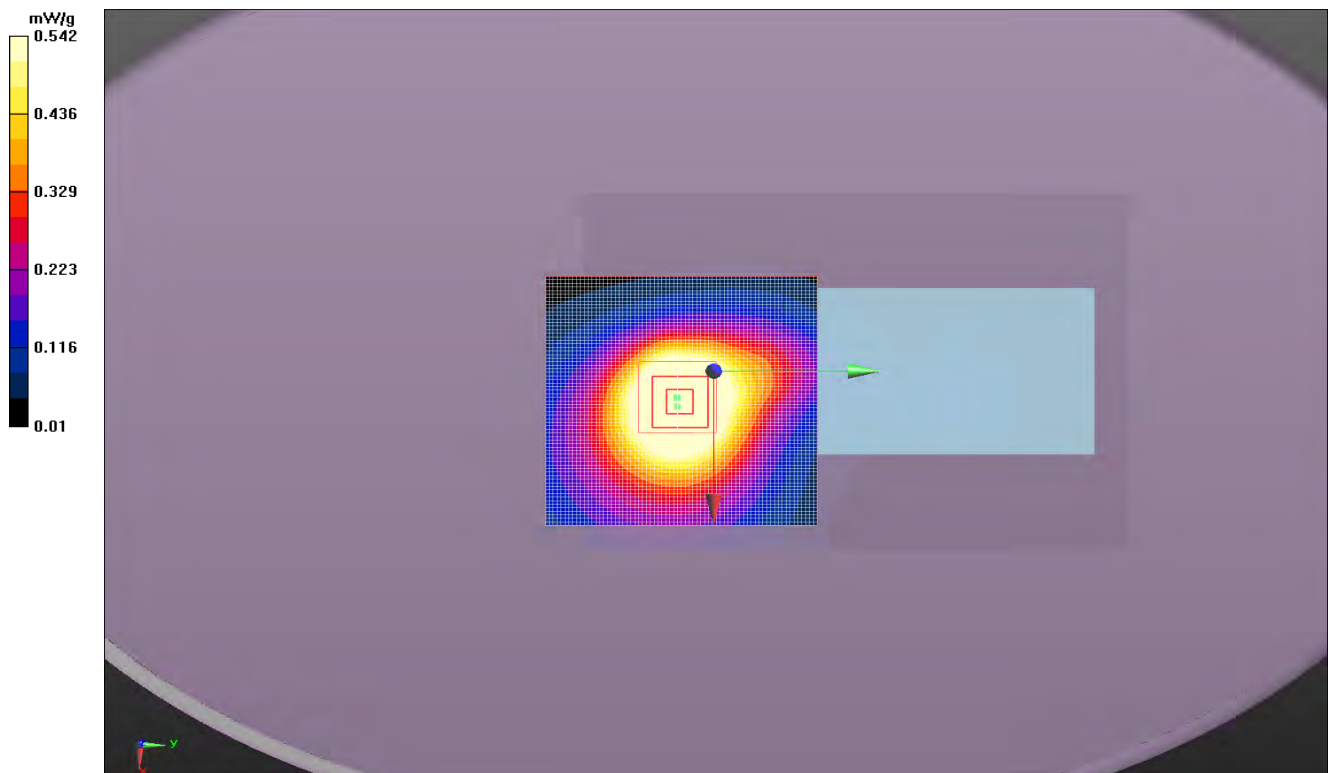
Body/Body - Mid/Z Scan (1x1x21): Measurement grid: dx=20mm, dy=20mm, dz=5mm

Maximum value of Total (measured) = 18.979 V/m

Date/Time: 1/4/2012 12:45:53 PM

Test Laboratory: Northwest EMC Inc.

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 22021142134



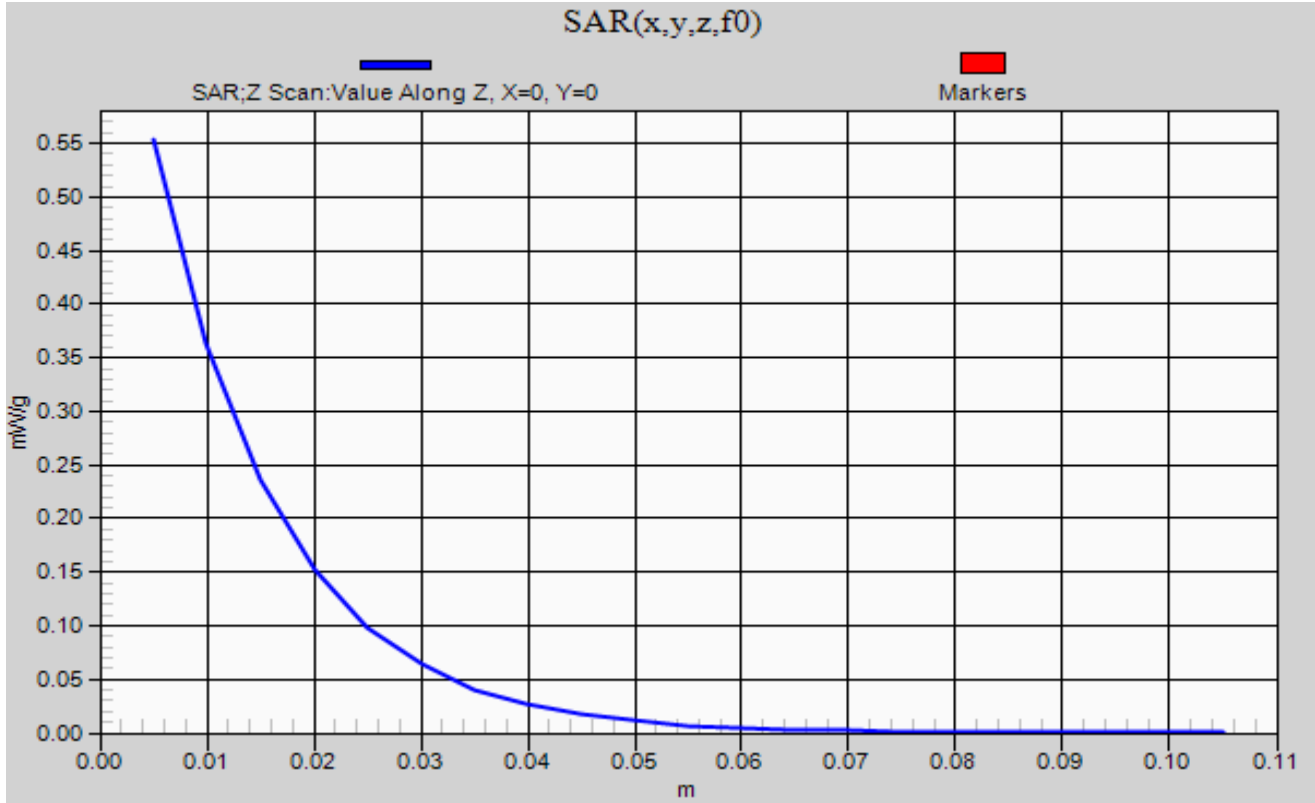
EMC

SAR TEST DATA

Room Temperature (°C):	22.4	Humidity (%):	37.5	Test Date:	01/04/12
Liquid Temperature (°C):	21.5	Barometric Pressure (mb):	1024	Tested by:	Jennifer Herrett and Khanh Tran

Test 5 1-4-12

DUT: Hand Held Computer; Type: 1000CP03S; Serial: 22021142134

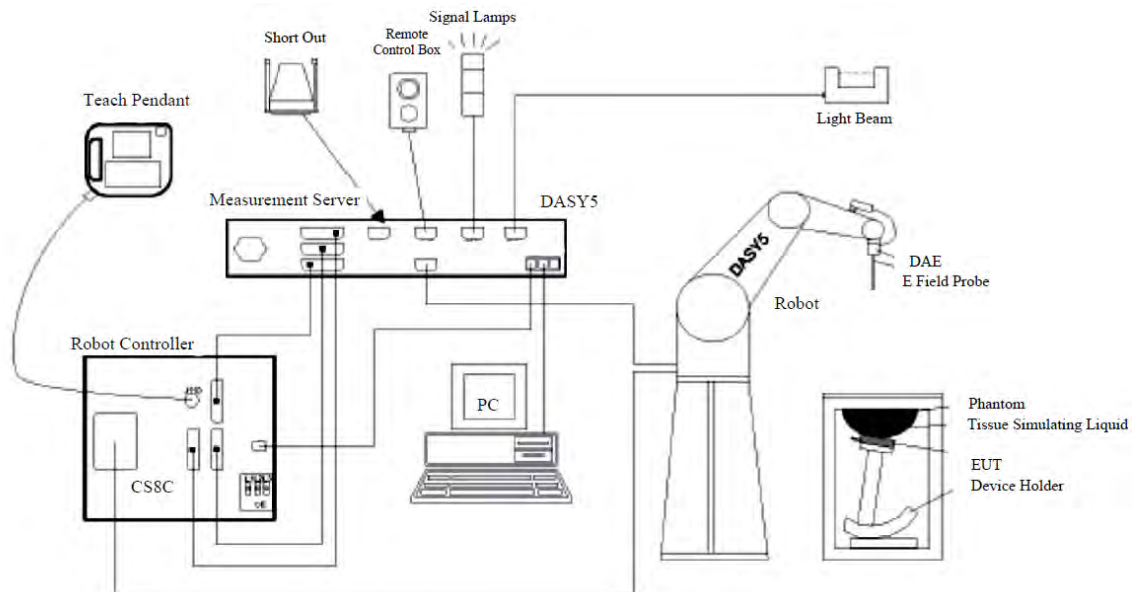


SAR Measurement System

Schmid & Partner Engineering AG, DASY52

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

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



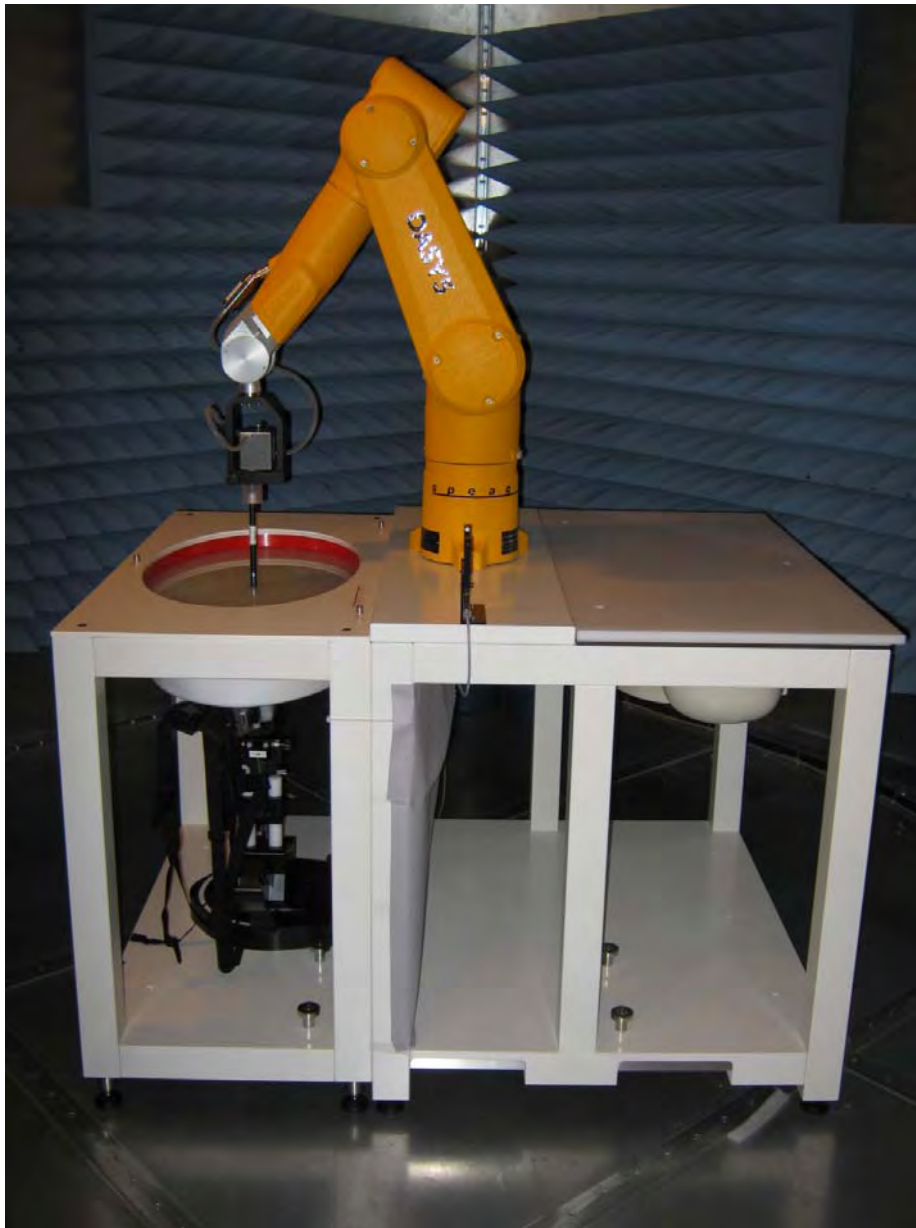
- A standard high precision 6-axis robot (Staubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom, oval flat phantom, device holder, tissue simulating liquids, and validation dipole kits.

Test Site

Northwest EMC, Lab EV08

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

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



TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
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
Wideband 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	12/6/2011	12 mo
Antenna, Dipole 835MHz SAR	SPEAG	D835V2	ADK	12/2/2011	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	NCR	0 mo
DAE	SPEAG	SD 000 D04 EJ	SAH	11/8/2011	12 mo
SAR Probe	SPEAG	ES3DV3	SAF	9/20/2011	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
Measurement System								
Probe calibration (k=1)	5.5	normal	1	1	1	5.5	5.5	∞
Axial isotropy	4.7	rectangular	1.732	0.707	0.707	1.9	1.9	∞
Hemispherical isotropy	9.6	rectangular	1.732	0.707	0.707	3.9	3.9	∞
Boundary effect	1.0	rectangular	1.732	1	1	0.6	0.6	∞
Linearity	4.7	rectangular	1.732	1	1	2.7	2.7	∞
System detection limits	1.0	rectangular	1.732	1	1	0.6	0.6	∞
Readout electronics	0.3	normal	1	1	1	0.3	0.3	∞
Response time	0.8	rectangular	1.732	1	1	0.5	0.5	∞
Integration time	2.6	rectangular	1.732	1	1	1.5	1.5	∞
RF ambient conditions - noise	1.7	rectangular	1.732	1	1	1.0	1.0	∞
RF Ambient Reflections	0.0	rectangular	1.732	1	1	0.0	0.0	∞
Probe positioner mechanical tolerance	0.4	rectangular	1.732	1	1	0.2	0.2	∞
Probe positioner with respect to phantom shell	2.9	rectangular	1.732	1	1	1.7	1.7	∞
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	1.0	rectangular	1.732	1	1	0.6	0.6	∞
Test Sample Related								
Device Positioning	2.9	normal	1	1	1	2.9	2.9	145
Device Holder	3.6	normal	1	1	1	3.6	3.6	5
Power Drift	5.0	rectangular	1.732	1	1	2.9	2.9	∞
Phantom and tissue parameters								
Phantom Uncertainty - shell thickness tolerances	4.0	rectangular	1.732	1	1	2.3	2.3	∞
Liquid conductivity - deviation from target values	5.0	rectangular	1.732	0.64	0.43	1.8	1.2	∞
Liquid conductivity - measurement uncertainty	6.5	normal	1	0.64	0.43	4.2	2.8	∞
Liquid permittivity - deviation from target values	5.0	rectangular	1.732	0.6	0.49	1.7	1.4	∞
Liquid permittivity - measurement uncertainty	3.2	normal	1	0.6	0.49	1.9	1.6	∞
Combined Standard Uncertainty	RSS					11.2	10.6	387
Expanded Measurement Uncertainty (95% Confidence/	normal (k=2)					22.5	21.2	

Probe 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

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 **Northwest EMC**

Certificate No: **ES3-3246_Sep11**

CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3246**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes**

Calibration date: **September 20, 2011**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Jeton Kastrali	Laboratory Technician	
Approved by:	Kalja Pokovic	Technical Manager	
			Issued: September 20, 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 _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,y,z}**: A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3246

Manufactured: May 5, 2009
Calibrated: September 20, 2011

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3246

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$) ^A	1.40	1.22	1.17	± 10.1 %
DCP (mV) ^B	99.4	101.1	101.0	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	120.2	±2.2 %
			Y	0.00	0.00	1.00	110.0	
			Z	0.00	0.00	1.00	107.5	
10021	GSM-FDD (TDMA, GMSK)	9.20	X	28.97	99.5	29.1	139.8	±1.4 %
			Y	25.81	99.5	28.0	146.6	
			Z	27.59	99.9	28.9	105.6	

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

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

^E Uncertainty is determined using the 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:3246

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	41.5	0.90	6.08	6.08	6.08	0.80	1.31	± 12.0 %
900	41.5	0.97	5.95	5.95	5.95	0.80	1.20	± 12.0 %
1750	40.1	1.37	5.25	5.25	5.25	0.80	1.26	± 12.0 %
1900	40.0	1.40	5.04	5.04	5.04	0.80	1.20	± 12.0 %

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

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

DASY/EASY - Parameters of Probe: ES3DV3- SN:3246

Calibration Parameter Determined in Body Tissue Simulating Media

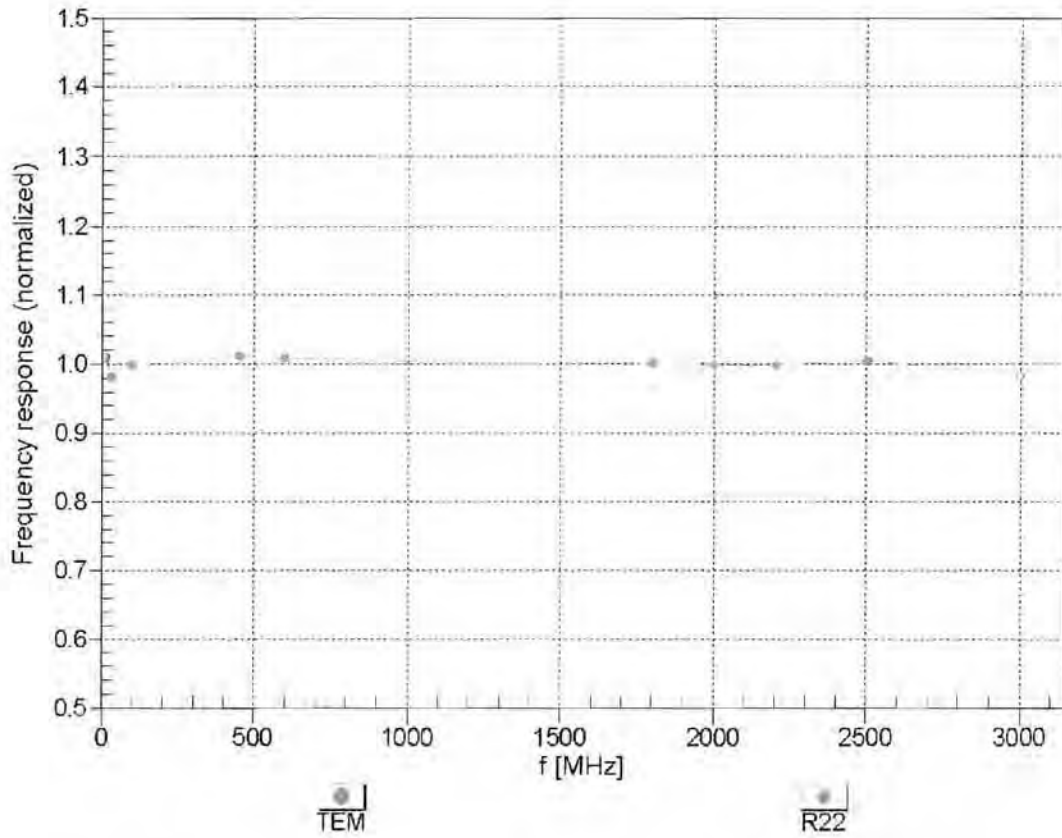
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.01	7.01	7.01	0.08	1.00	± 13.4 %
835	55.2	0.97	6.16	6.16	6.16	0.80	1.37	± 12.0 %
900	55.0	1.05	6.06	6.06	6.06	0.80	1.00	± 12.0 %
1750	53.4	1.49	4.82	4.82	4.82	0.80	1.31	± 12.0 %
1900	53.3	1.52	4.61	4.61	4.61	0.80	1.29	± 12.0 %

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

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

Frequency Response of E-Field

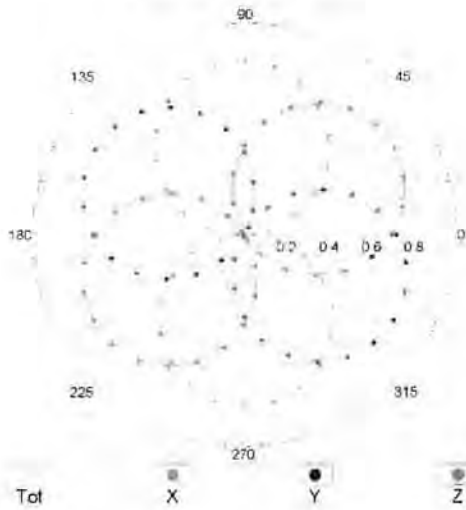
(TEM-Cell:ifi110 EXX, Waveguide: R22)



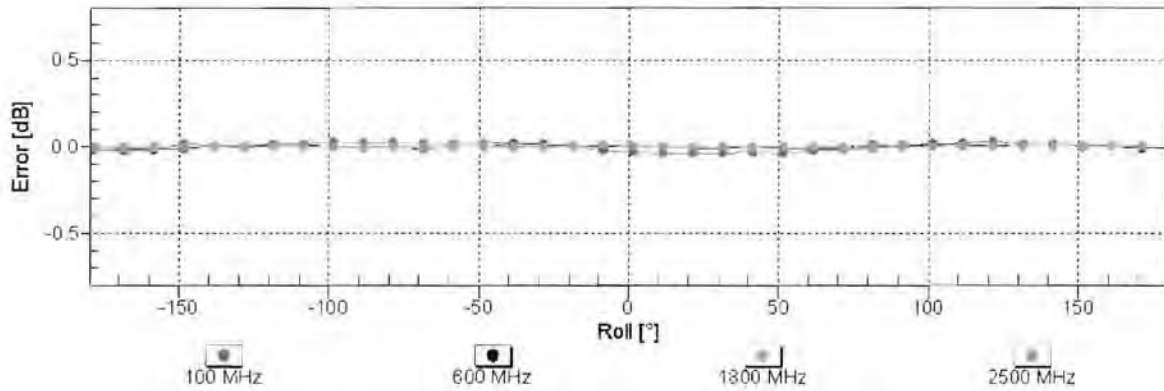
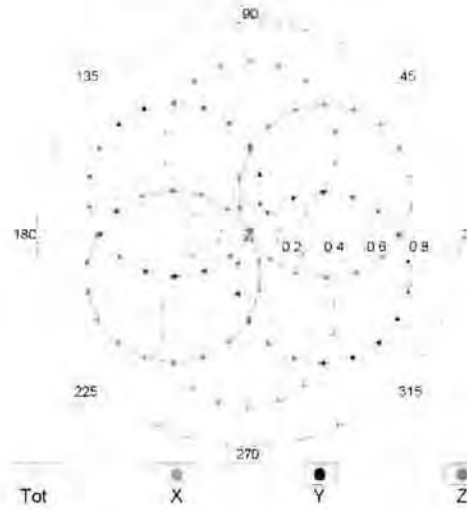
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

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

f=600 MHz, TEM

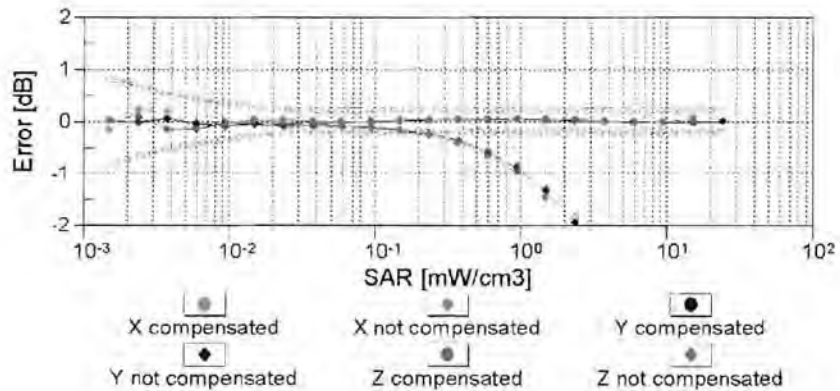
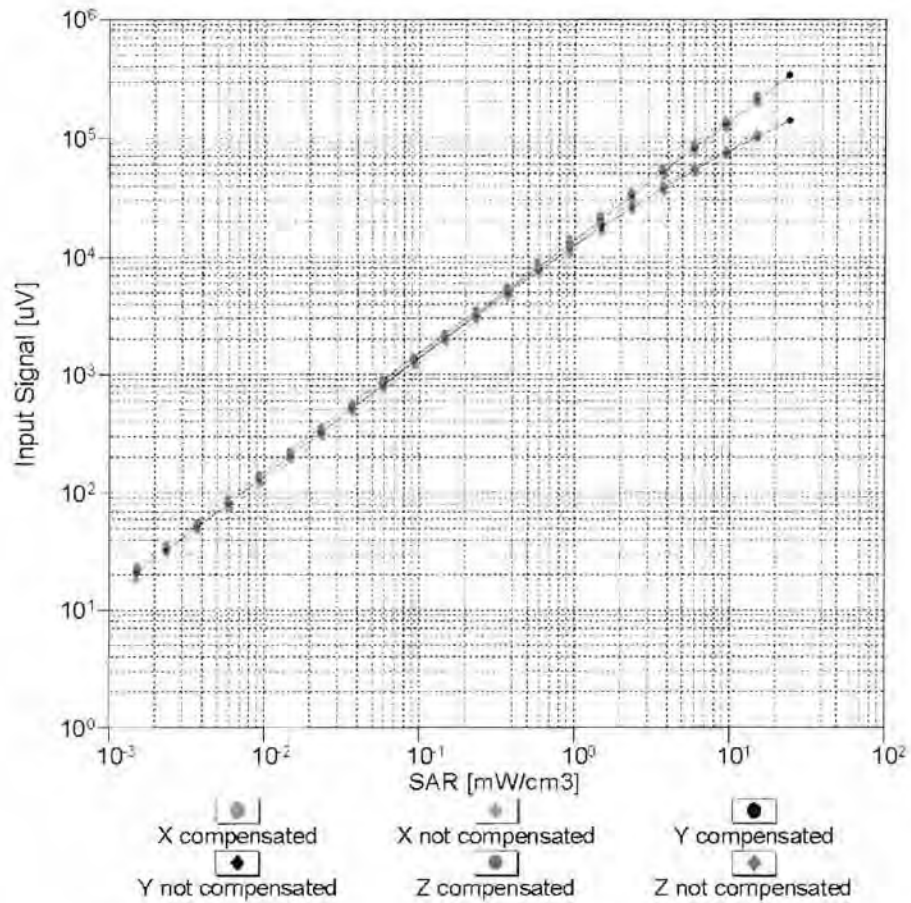


f=1800 MHz, R22



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

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

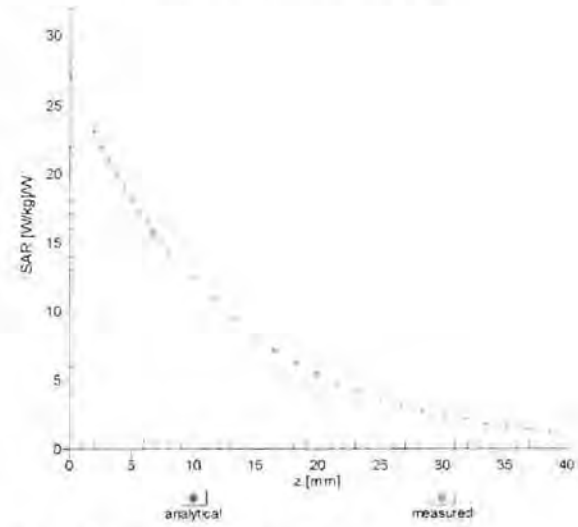
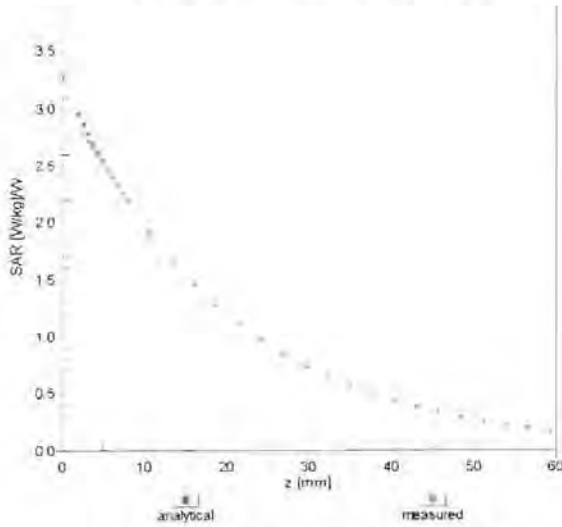


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

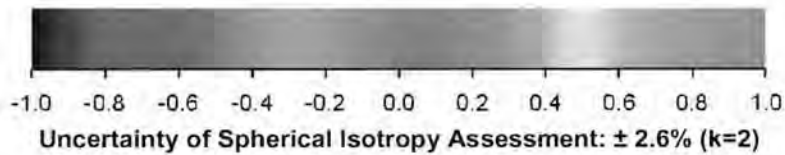
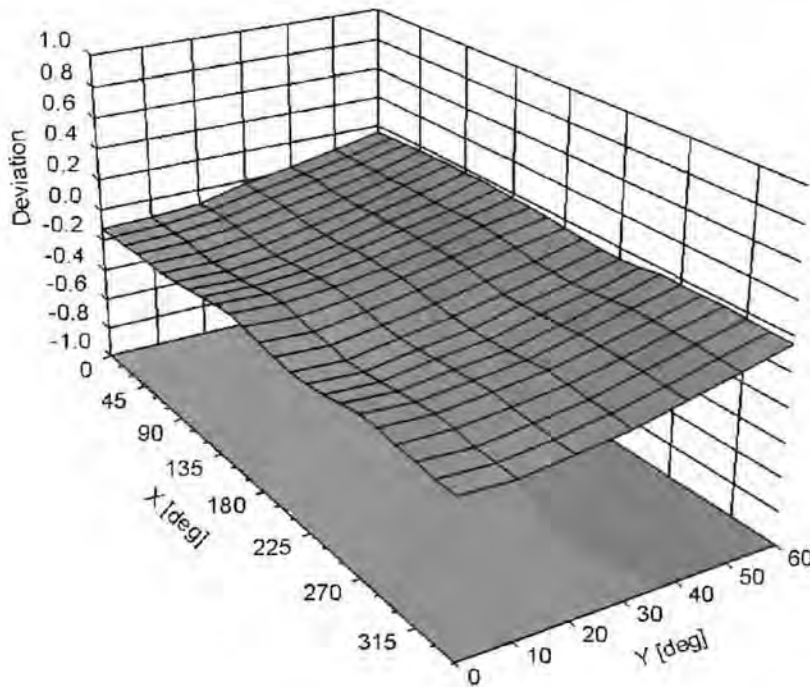
f = 835 MHz, WGLS R9 (M_convF)

f = 1900 MHz, WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



DASY/EASY - Parameters of Probe: ES3DV3 - SN:3246

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

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Northwest EMC**

Certificate No: **D1900V2-5d131_Dec11**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d131**

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

Calibration date: **December 06, 2011**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

Calibrated by:	Name Claudio Leubler	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Technical Manager	

Issued: December 7, 2011

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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	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.5 ± 6 %	1.44 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.3 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	40.4 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.36 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	21.2 mW / g ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.5 ± 6 %	1.54 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	40.5 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.38 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.4 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.8 Ω + 6.0 j Ω
Return Loss	- 23.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.1 Ω + 6.3 j Ω
Return Loss	- 23.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 ns
----------------------------------	----------

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 14, 2010

DASY5 Validation Report for Head TSL

Date: 06.12.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

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

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

Reference Value = 98.238 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 18.9380

SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.36 mW/g

Maximum value of SAR (measured) = 12.840 mW/g



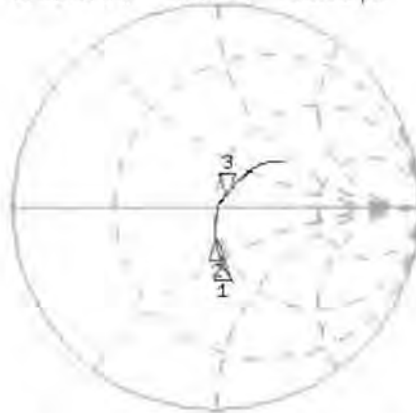
0 dB = 12.840mW/g = 22.17 dB mW/g

Impedance Measurement Plot for Head TSL

6 Dec 2011 13:10:34

CH1 S11 1 U FS 3: 53.840 Ω 5.9824 Ω 501.12 pH 1 900.000 000 MHz

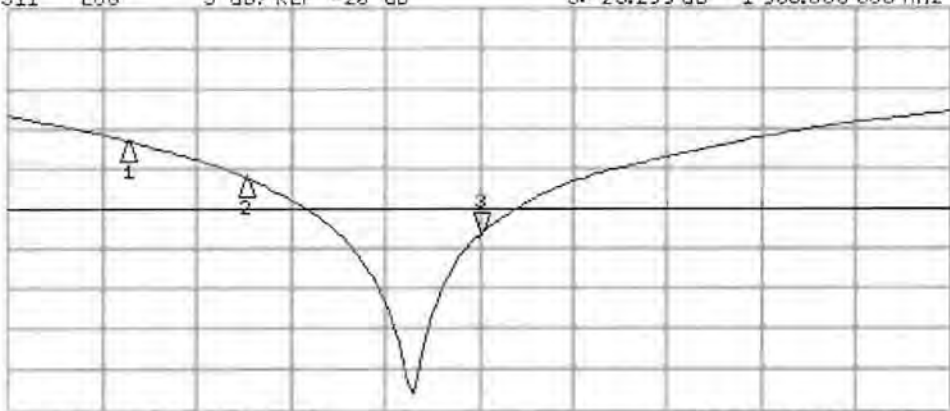
*
Dei
CA
Avg
16
H1d



CH1 Markers
1: 45.617 Ω
-25.854 Ω
1.75000 GHz
2: 47.090 Ω
-15.193 Ω
1.80000 GHz

CH2 S11 LOG 5 dB/REF -20 dB 3:-23.299 dB 1 900.000 000 MHz

CA
Avg
16
H1d



CH2 Markers
1:-11.543 dB
1.75000 GHz
2:-16.058 dB
1.80000 GHz

DASY5 Validation Report for Body TSL

Date: 05.12.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 53.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

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

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

Reference Value = 95.899 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 17.7320

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.38 mW/g

Maximum value of SAR (measured) = 12.867 mW/g



0 dB = 12.870mW/g = 22.19 dB mW/g

Impedance Measurement Plot for Body TSL

5 Dec 2011 10:40:18

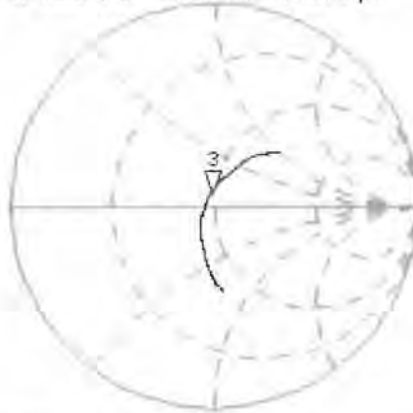
CHI S11 1 U FS 3: 48.051 ω 6.3477 ω 531.72 μ H 1 900.000 000 MHz

*
De1

CA

avg
16

H1 d

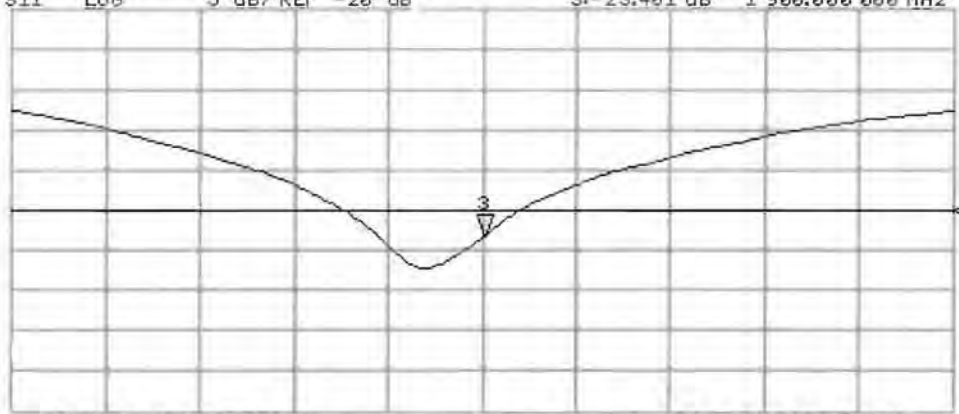


CH2 S11 LOG 5 dB/REF -20 dB 3:-23.401 dB 1 900.000 000 MHz

CA

avg
16

H1 d



START 1 700.000 000 MHz

STOP 2 100.000 000 MHz

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



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Accreditation No.: **SCS 108**

Client **Northwest EMC**

Certificate No: **D835V2-4d108_Dec11**

CALIBRATION CERTIFICATE

Object: **D835V2 - SN: 4d108**

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

Calibration date: **December 02, 2011**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

Calibrated by:	Name Claudio Leubler	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

Issued: December 5, 2011

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	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	41.5 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.28 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.08 mW / g ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.3 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.41 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	9.42 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	6.25 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.0 Ω - 1.8 j Ω
Return Loss	- 29.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.3 Ω - 4.5 j Ω
Return Loss	- 26.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.392 ns
----------------------------------	----------

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 26, 2010

DASY5 Validation Report for Head TSL

Date: 02.12.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.9$ mho/m; $\epsilon_r = 41.5$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (8x7x7)/Cube 0:

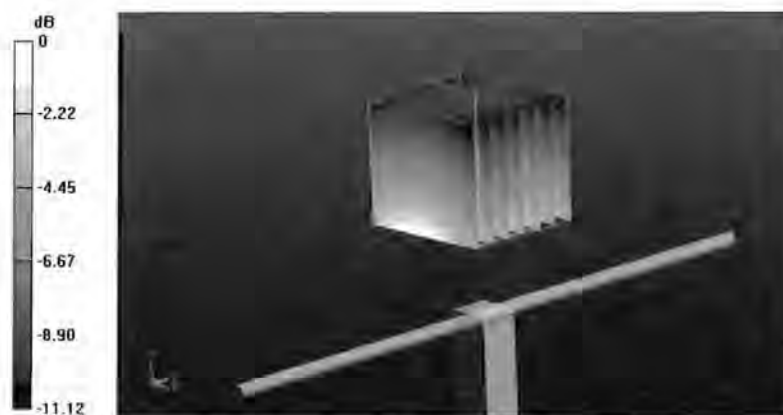
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.226 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 3.4020

SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.52 mW/g

Maximum value of SAR (measured) = 2.709 mW/g

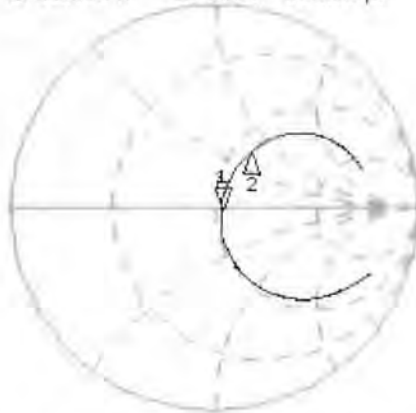


0 dB = 2.710mW/g = 8.66 dB mW/g

Impedance Measurement Plot for Head TSL

2 Dec 2011 15:07:56
 [CH1] S11 1 U FS 1: 52.996 Ω -1.7520 Ω 108.80 pF 835.000 000 MHz

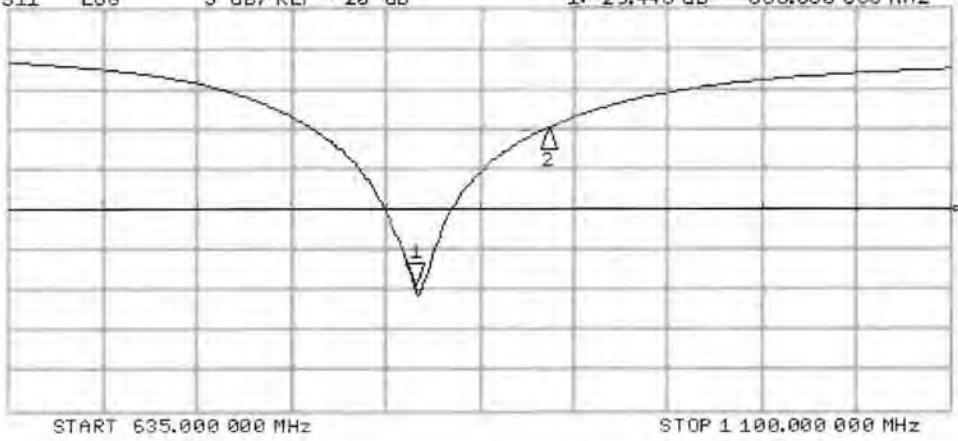
*
 Del
 Ca
 Avg
 5
 H1d



CH1 Markers
 1: 52.996 Ω
 2: 59.650 Ω
 300.046 MHz

CH2 S11 LOG 5 dB/REF -20 dB 1: -29.445 dB 835.000 000 MHz

Ca
 Avg
 5
 H1d



CH2 Markers
 1: -10.050 dB
 2: -29.445 dB
 900.046 MHz

DASY5 Validation Report for Body TSL

Date: 02.12.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.99$ mho/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

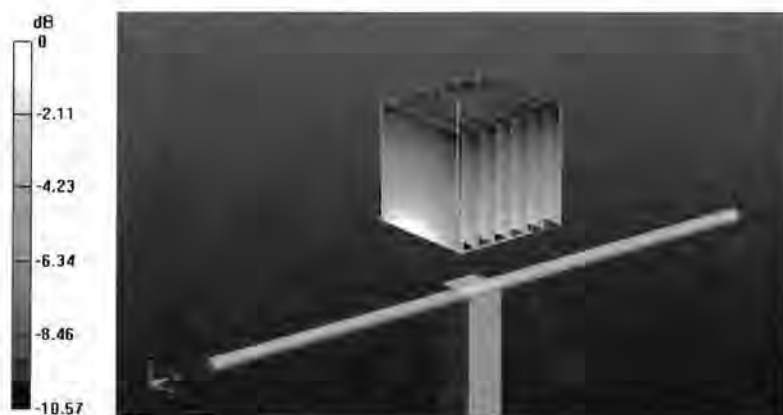
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.468 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.4850

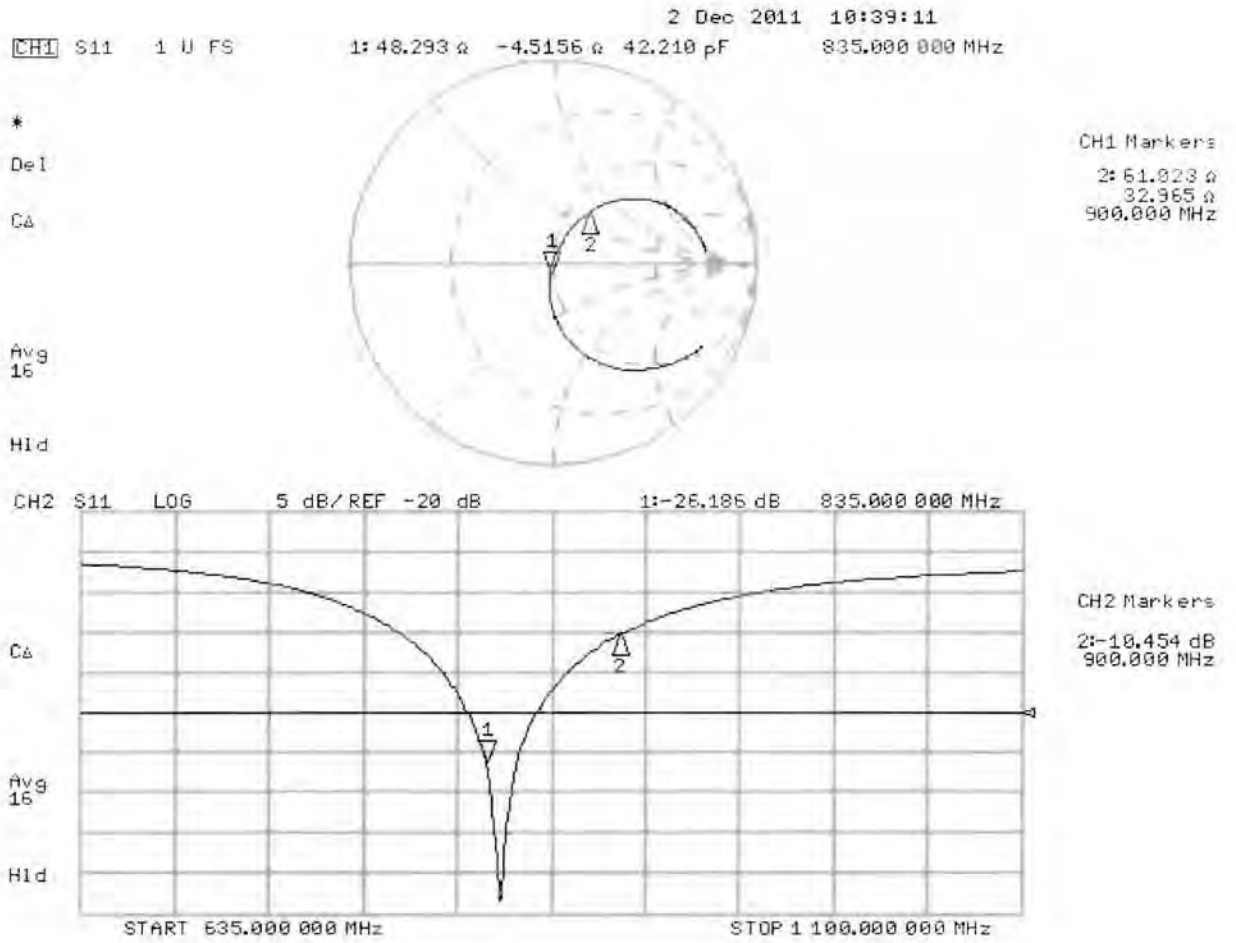
SAR(1 g) = 2.41 mW/g; SAR(10 g) = 1.59 mW/g

Maximum value of SAR (measured) = 2.790 mW/g



0 dB = 2.790mW/g = 8.91 dB mW/g

Impedance Measurement Plot for Body TSL



EUT Photos



Keypad Side



Right Side



Left Side



Top-end



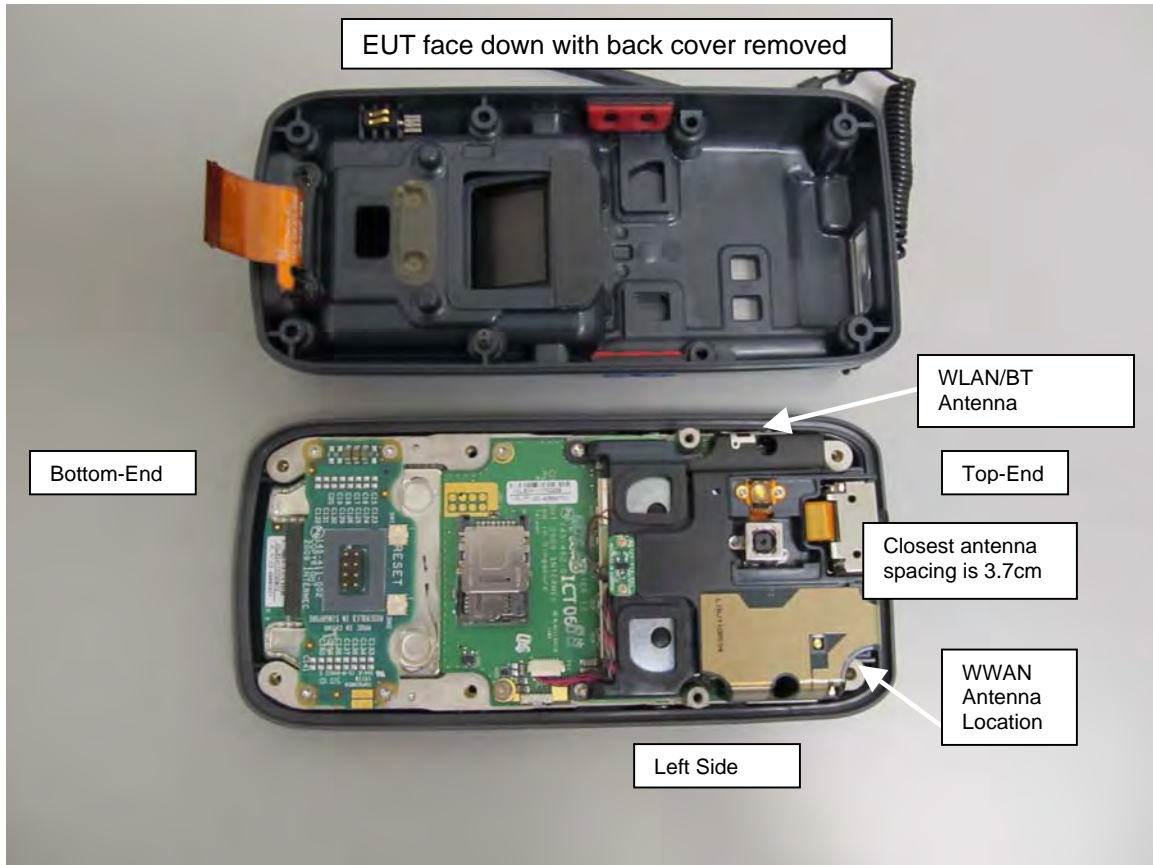
Bottom-end

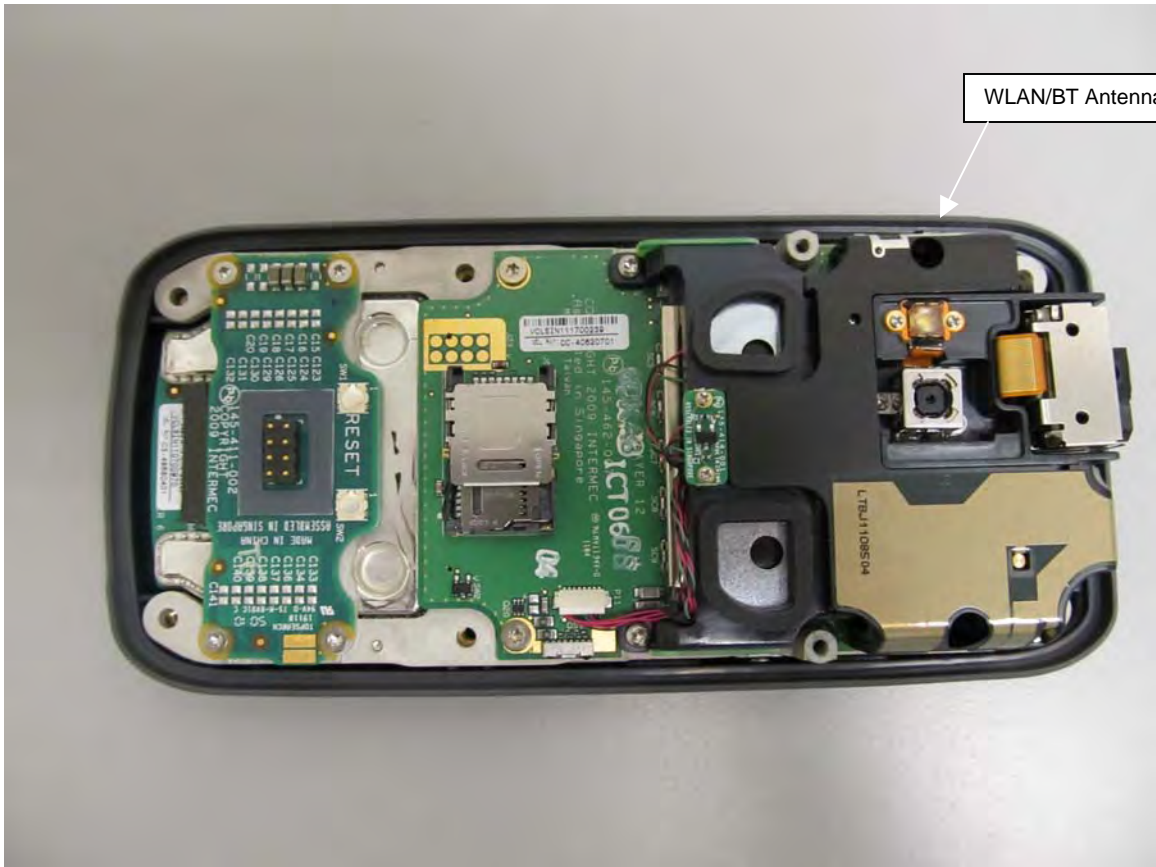


Back Side



Back side – battery cover removed





WLAN/BT Antenna



Wrist Holster – Right Side



Wrist Holster – Left Side

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



Wrist Holster



Wrist Holster



Wrist Holster



Wrist Holster



Battery 1000AB01

SAR TEST SETUP PHOTOS - HEAD

EMC

Left Cheek

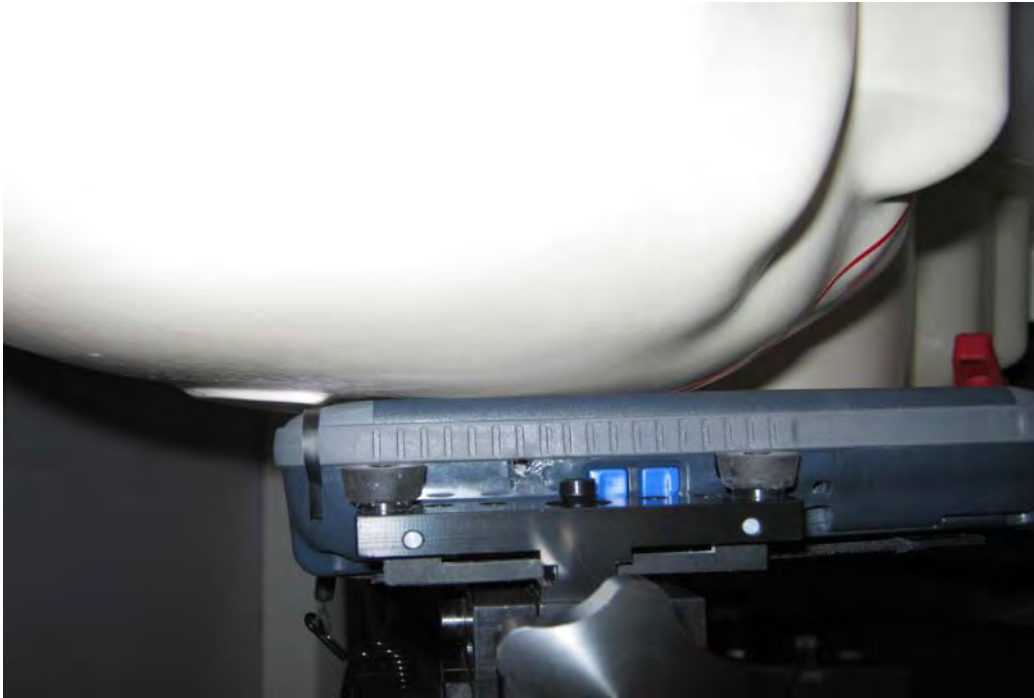


Left Tilt



SAR TEST SETUP PHOTOS - HEAD

Right Cheek



Right Tilt



SAR TEST SETUP PHOTOS - BODY

Back - Wrist Holster



Back - Wrist Holster



SAR TEST SETUP PHOTOS - BODY

Left Side of Wrist Holster with 12mm Spacer



Left Side of Wrist Holster with 12mm Spacer



SAR TEST SETUP PHOTOS - BODY

Right Side of Wrist Holster



Right Side of Wrist Holster

