FCC OET BULLETIN 65 SUPPLEMENT C
(Class II Permissive Change)
IC RSS-102 ISSUE 3

SAR EVALUATION REPORT

For

Ruggedized Handheld PDA-type Device w/WCDMA/HSDPA/HSUPA, GSM/GPRS/EDGE, CDMA/EV-DO, 802.11b/g & BT (CDMA Portion)

MODEL: CN50

FCC ID: EHA-01CN50
IC: 1223A-01CN50

REPORT NUMBER: 09U12673-2

ISSUE DATE: August 17, 2009

Prepared for

INTERMEC TECHNOLOGIES CORPORATION
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Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	August 17, 2009	Initial Issue	--

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	INTERMEC TECHNOLOGIES CORPORATION 6001 – 36TH AVENUE WEST EVERETT, WA 98203, USA
EUT DESCRIPTION:	Ruggedized Handheld PDA-type Device w/WCDMA/HSDPA/HSUPA, GSM/GPRS/EDGE, CDMA/EV-DO, 802.11b/g & BT
MODEL NUMBER:	CN50
DEVICE CATEGORY:	Portable
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure
DATE TESTED:	April 15 – May 6 (WiFi), July 30 - August 13 (CDMA), 2009

THE HIGHEST SAR VALUES:

FCC / IC Rule Parts	Frequency Range [MHz]	The Highest SAR Values (1g_mW/g)	Limit (mW/g)
22H / RSS-132	824 - 849	Head: 0.195; Body: 0.297	1.6
24E / RSS-133	1850 - 1910	Head: 0.330; Body: 0.290	
15.247 / RSS-210	2412 - 2462	Head: 0.0057; Body: 0.026	

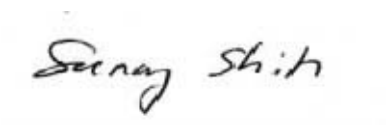
APPLICABLE STANDARDS AND TEST PROCEDURES:

STANDARDS AND TEST PROCEDURES	TEST RESULTS
• FCC OET Bulletin 65 Supplement C and the following specific Test Procedure: o KDB 941225 SAR test for 3G devices o KDB 248227 D01 SAR measurement procedures for 802.11 a/b/g transmitters o KDB 648474 D01 SAR evaluation considerations for handsets with multiple transmitters and antennas	Pass
• RSS-102 ISSUE 3	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:



SUNNY SHIH
ENGINEERING SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

CHAO YEN LIN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C, IC RSS 102 Issue 3, and the following specific FCC Test Procedure.

- KDB 941225 SAR test for 3G devices
- KDB 248227 D01 SAR measurement procedures for 802.11 a/b/g transmitters
- KDB 648474 D01 SAR evaluation considerations for handsets with multiple transmitters and antennas

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
Robot - Six Axes	Stäubli	RX90BL	N/A	N/A		
Robot Remote Control	Stäubli	CS7MB	3403-91535	N/A		
DASY4 Measurement Server	SPEAG	SEUMS001BA	1041	N/A		
Probe Alignment Unit	SPEAG	LB (V2)	261	N/A		
SAM Phantom (SAM1)	SPEAG	QD000P40CA	1185	N/A		
SAM Phantom (SAM2)	SPEAG	QD000P40CA	1050	N/A		
Oval Flat Phantom (ELI 4.0)	SPEAG	QD OVA001 B	1003	N/A		
Electronic Probe kit	HP	85070C	N/A	N/A		
S-Parameter Network Analyzer	Agilent	8753ES-6	MY40001647	11	14	2009
Signal Generator	Agilent	8753ES-6	MY40001647	11	14	2009
E-Field Probe	SPEAG	EX3DV4	3686	3	23	2010
Thermometer	ERTCO	639-1S	1718	5	1	2010
Data Acquisition Electronics	SPEAG	DAE3 V1	427	10	20	2009
System Validation Dipole	SPEAG	D835V2	4d002	4	23	2011
System Validation Dipole	SPEAG	D900V2	108	1	21	2010
System Validation Dipole	SPEAG	D1800V2	294	1	29	2010
System Validation Dipole	SPEAG	D1900V2	5d043	1	29	2010
System Validation Dipole	SPEAG	D2450V2	748	4	14	2010
System Validation Dipole	SPEAG	D5GHzV2	1003	11	21	2009
MXA Signal Analyzer	Agilent	N9020A	US48350984	10	23	2009
ESG Vector Signal Generator	Agilent	E4438C	US44271090	9	17	2010
Power Meter	Giga-tronics	8651A	8651404	1	11	2010
Power Sensor	Giga-tronics	80701A	1834588	1	11	2010
Amplifier	Mini-Circuits	ZVE-8G	90606	N/A		
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
Simulating Liquid	CCS	H1900	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M1900	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	H1800	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M1800	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	H1700	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M1700	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	H835	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M835	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	H900	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M900	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	H2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	M2450	N/A	Within 24 hrs of first test		

4.2. MEASUREMENT UNCERTAINTY

Measurement uncertainty for 300 MHz – 3000 MHz

Uncertainty component	Tol. (±%)	Probe Dist.	Div.	Ci (1g)	Ci (10g)	Std. Unc.(±%)	
						Ui (1g)	Ui(10g)
Measurement System							
Probe Calibration	4.80	N	1	1	1	4.80	4.80
Axial Isotropy	4.70	R	1.732	0.707	0.707	1.92	1.92
Hemispherical Isotropy	9.60	R	1.732	0.707	0.707	3.92	3.92
Boundary Effects	1.00	R	1.732	1	1	0.58	0.58
Linearity	4.70	R	1.732	1	1	2.71	2.71
System Detection Limits	1.00	R	1.732	1	1	0.58	0.58
Readout Electronics	1.00	N	1	1	1	1.00	1.00
Response Time	0.80	R	1.732	1	1	0.46	0.46
Integration Time	2.60	R	1.732	1	1	1.50	1.50
RF Ambient Conditions - Noise	1.59	R	1.732	1	1	0.92	0.92
RF Ambient Conditions - Reflections	0.00	R	1.732	1	1	0.00	0.00
Probe Positioner Mechnical Tolerance	0.40	R	1.732	1	1	0.23	0.23
Probe Positioning With Respect to Phantom Shell	2.90	R	1.732	1	1	1.67	1.67
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	3.90	R	1.732	1	1	2.25	2.25
Test sample Related							
Test Sample Positioning	1.10	N	1	1	1	1.10	1.10
Device Holder Uncertainty	3.60	N	1	1	1	3.60	3.60
Power and SAR Drift Measurement	5.00	R	1.732	1	1	2.89	2.89
Phantom and Tissue Parameters							
Phantom Uncertainty	4.00	R	1.732	1	1	2.31	2.31
Liquid Conductivity - Target	5.00	R	1.732	0.64	0.43	1.85	1.24
Liquid Conductivity - Meas.	8.60	N	1	0.64	0.43	5.50	3.70
Liquid Permittivity - Target	5.00	R	1.732	0.6	0.49	1.73	1.41
Liquid Permittivity - Meas.	3.30	N	1	0.6	0.49	1.98	1.62
Combined Standard Uncertainty	RSS					11.44	10.49
Expanded Uncertainty (95% Confidence Interval)	K=2					22.87	20.98

Notesfor table
1. Tol. - tolerance in influence quaitity
2. N - Nomal
3. R - Rectangular
4. Div. - Divisor used to obtain standard uncertainty
5. Ci - is te sensitivity coefficient

5. EQUIPMENT UNDER TEST

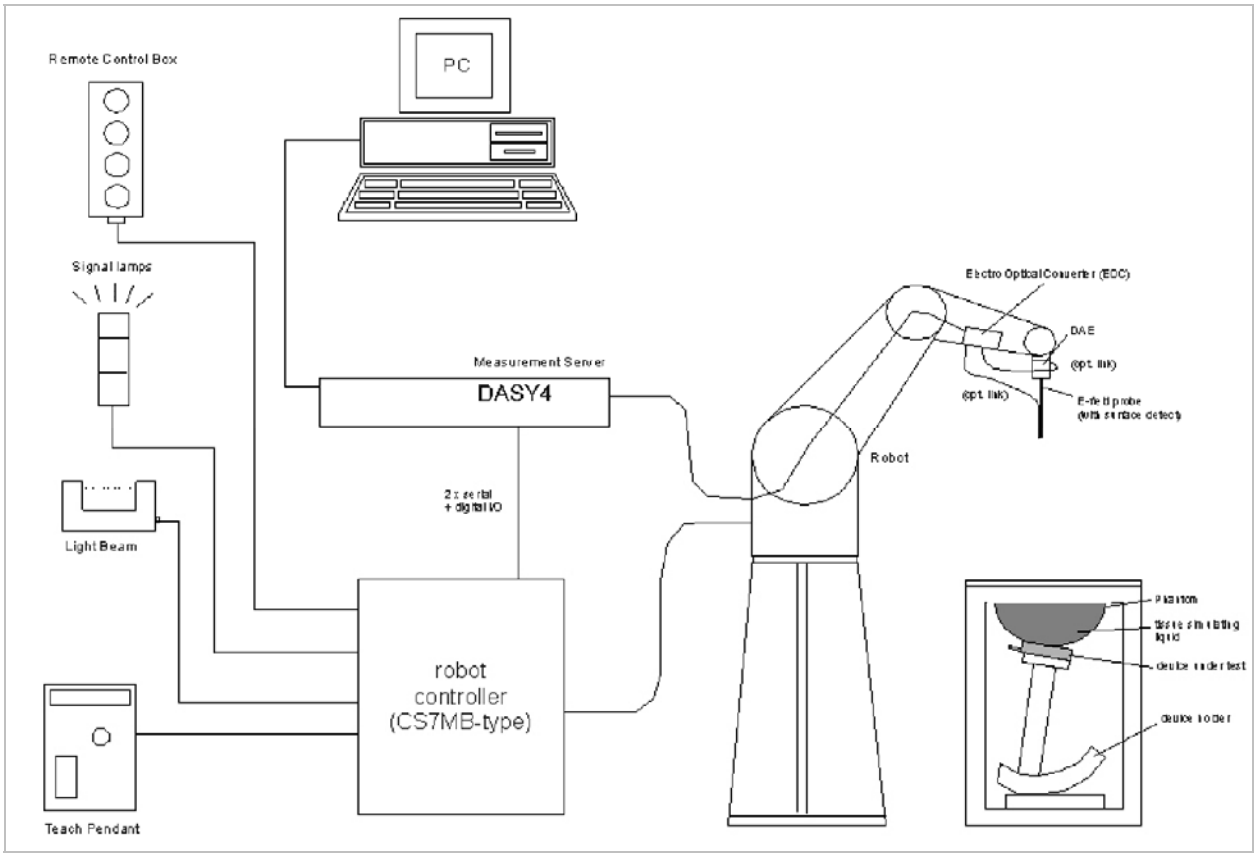
Ruggedized Handheld PDA-type Device w/WCDMA/HSDPA/HSUPA,

GSM/GPRS/EDGE, CDMA/EV-DO, 802.11b/g & BT

Model: CN50 with qwerty and numeric keypad models available

Normal operation:	• Held to head • Worn on body (LCD facing-up; LCD facing-down) with 2.0 cm separation distance (air-gap)
Antenna(s):	Internal
Other radio modules in host:	• 802.11bg • Bluetooth
Co-located Tx:	• WWAN can transmit simultaneously with 802.11g • WWAN can transmit simultaneously with Bluetooth • 802.11g can transmit simultaneously with Bluetooth
Antenna Separation distances:	• 0.49 cm - WWAM antenna-to-WiFi (802.11g) • 1.40 cm - WWAN antenna-to-Bluetooth antenna • 0.96 cm - WiFi (802.11g)-to-Bluetooth antenna
Battery Pack:	• AB24 - Standard battery (3.7V, 1.95 A/h) and • AB25 - extended battery (3.7V, 3.9Ah) Extended battery AB25 was chosen for the testing. Additional SAR testing with AB24 is performed at worst-case configurations.

6. SYSTEM SPECIFICATIONS



The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000 or Windows XP.
- DASY4 software.
- Remote controls with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validate the proper functioning of the system.

7. COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS

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 MΩ+ 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

8. LIQUID PARAMETERS CHECK

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the dielectric parameters are within the tolerances of the specified target values. The relative permittivity and conductivity of the tissue material should be within ± 5% of the values given in the table below.

Reference Values of Tissue Dielectric Parameters for Head and Body Phantom (for 150 – 3000 MHz and 5800 MHz)

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in IEEE Standard 1528 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 IEEE Standard 1528.

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.8
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.9	55.2	0.97
900	41.5	0.97	55	1.05
915	41.5	0.98	55	1.06
1450	40.5	1.2	54	1.3
1610	40.3	1.29	53.8	1.4
1800 – 2000	40	1.4	53.3	1.52
2450	39.2	1.8	52.7	1.95
3000	38.5	2.4	52	2.73
5800	35.3	5.27	48.2	6

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

8.1. LIQUID CHECK RESULTS FOR 835 MHZ

Simulating Liquid Dielectric Parameters for Head 835 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Chaoyen Lin

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	42.05	Relative Permittivity (ϵ_r):	42.053	41.5	1.33	± 5
	e"	19.32	Conductivity (σ):	0.898	0.90	-0.26	± 5
900	e'	41.44	Relative Permittivity (ϵ_r):	41.439	41.5	-0.15	± 5
	e"	18.90	Conductivity (σ):	0.946	0.97	-2.44	± 5

Liquid temperature: 23 deg. C
July 31, 2009 9:21 AM

Frequency	e'	e"
800000000	42.3777	19.3147
805000000	42.3684	19.3254
810000000	42.3295	19.3065
815000000	42.2944	19.3351
820000000	42.2466	19.335
825000000	42.2168	19.3565
830000000	42.1533	19.3504
835000000	**42.053**	**19.3238**
840000000	41.9763	19.3012
845000000	41.8988	19.2375
850000000	41.8626	19.2039
855000000	41.7557	19.1402
860000000	41.687	19.0968
865000000	41.641	19.0574
870000000	41.5592	18.9988
875000000	41.5083	18.9721
880000000	41.4583	18.9456
885000000	41.4303	18.9226
890000000	41.4298	18.9214
895000000	41.4631	18.8994
900000000	**41.4391**	**18.9003**
905000000	41.3993	18.8962
910000000	41.3566	18.9425
915000000	41.275	18.9714
920000000	41.1979	18.9646
925000000	41.1159	18.9695
930000000	41.0412	18.9335
935000000	40.9472	18.8946
940000000	40.895	18.8332
945000000	40.855	18.7781
950000000	40.8526	18.7493
955000000	40.802	18.7174
960000000	40.772	18.6887

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target f * 10^6

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters for Muscle 835 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Chaoyen Lin

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	55.34	Relative Permittivity (ϵ_r):	55.341	55.2	0.25	± 5
	e"	21.24	Conductivity (σ):	0.987	0.97	1.71	± 5
900	e'	54.77	Relative Permittivity (ϵ_r):	54.766	55.0	-0.42	± 5
	e"	20.72	Conductivity (σ):	1.037	1.05	-1.21	± 5

Liquid temperature: 23 deg. C
July 31, 2009 01:52 PM

Frequency	e'	e"
800000000	55.6379	21.2949
805000000	55.6005	21.2882
810000000	55.5573	21.2779
815000000	55.5298	21.3072
820000000	55.5183	21.2852
825000000	55.4767	21.2856
830000000	55.4051	21.247
835000000	**55.3407**	**21.2395**
840000000	55.2896	21.2051
845000000	55.2515	21.1443
850000000	55.2118	21.1064
855000000	55.1372	21.0604
860000000	55.0958	21.0132
865000000	55.0646	20.9625
870000000	54.9858	20.8983
875000000	54.906	20.8568
880000000	54.8846	20.825
885000000	54.8418	20.7912
890000000	54.7907	20.761
895000000	54.7896	20.7218
900000000	**54.7663**	**20.7178**
905000000	54.7014	20.7252
910000000	54.6485	20.7592
915000000	54.56	20.766
920000000	54.4995	20.7616
925000000	54.4045	20.7459
930000000	54.3485	20.7095
935000000	54.2739	20.6506
940000000	54.2372	20.6073
945000000	54.2134	20.5692
950000000	54.2181	20.5496
955000000	54.199	20.5198
960000000	54.184	20.4984

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target f * 10^6

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters for Muscle 835 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Chaoyen Lin

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	55.14	Relative Permittivity (ϵ_r):	55.141	55.2	-0.11	± 5
	e"	21.04	Conductivity (σ):	0.977	0.97	0.76	± 5
900	e'	54.57	Relative Permittivity (ϵ_r):	54.566	55.0	-0.79	± 5
	e"	20.52	Conductivity (σ):	1.027	1.05	-2.16	± 5

Liquid temperature: 23 deg. C
August 13, 2009 9:57 AM

Frequency	e'	e"
800000000	55.4379	21.0949
805000000	55.4005	21.0882
810000000	55.3573	21.0779
815000000	55.3298	21.1072
820000000	55.3183	21.0852
825000000	55.2767	21.0856
830000000	55.2051	21.047
835000000	**55.1407**	**21.0395**
840000000	55.0896	21.0051
845000000	55.0515	20.9443
850000000	55.0118	20.9064
855000000	54.9372	20.8604
860000000	54.8958	20.8132
865000000	54.8646	20.7625
870000000	54.7858	20.6983
875000000	54.706	20.6568
880000000	54.6846	20.625
885000000	54.6418	20.5912
890000000	54.5907	20.561
895000000	54.5896	20.5218
900000000	**54.5663**	**20.5178**
905000000	54.5014	20.5252
910000000	54.4485	20.5592
915000000	54.36	20.566
920000000	54.2995	20.5616
925000000	54.2045	20.5459
930000000	54.1485	20.5095
935000000	54.0739	20.4506
940000000	54.0372	20.4073
945000000	54.0134	20.3692
950000000	54.0181	20.3496
955000000	53.999	20.3198
960000000	53.984	20.2984

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target f * 10^6

$\varepsilon_0 = 8.854 * 10^{-12}$

8.2. LIQUID CHECK RESULTS FOR 1900 MHZ

Simulating Liquid Dielectric Parameters for Head 1900 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Chaoyen Lin

f MHz	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	40.083	Relative Permittivity (ε_r):	40.0832	40.0	0.21	± 5
	e"	13.080	Conductivity (σ):	1.38252	1.40	-1.25	± 5

Liquid temperature: 23 deg. C
July 30, 2009 10:12 AM

Frequency	e'	e"
1710000000	40.8788	12.5841
1720000000	40.8237	12.6831
1730000000	40.7995	12.7788
1740000000	40.7697	12.8311
1750000000	40.7613	12.8548
1760000000	40.7245	12.8401
1770000000	40.6979	12.8255
1780000000	40.6347	12.7847
1790000000	40.5656	12.7724
1800000000	40.4945	12.7894
1810000000	40.4168	12.8472
1820000000	40.3503	12.9346
1830000000	40.2373	13.051
1840000000	40.1863	13.1137
1850000000	40.1459	13.1336
1860000000	40.1536	13.1231
1870000000	40.1743	13.1131
1880000000	40.1717	13.0939
1890000000	40.1346	13.094
1900000000	**40.0832**	**13.0797**
1910000000	40.0005	13.1752

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target f * 10^6

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters for Muscle 1900 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Chaoyen Lin

f (MHz)	Muscle Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	53.605	Relative Permittivity (ϵ_r):	53.6045	53.3	0.57	± 5
	e"	14.385	Conductivity (σ):	1.52052	1.52	0.03	± 5

Liquid temperature: 23 deg. C
July 31, 2009 3:34 PM

Frequency	e'	e"
1710000000	54.2064	13.8544
1720000000	54.1957	13.9199
1730000000	54.1945	14.0068
1740000000	54.1912	14.0879
1750000000	54.1908	14.1217
1760000000	54.1343	14.1225
1770000000	54.099	14.0904
1780000000	54.0377	14.0521
1790000000	53.9789	14.0528
1800000000	53.9154	14.0877
1810000000	53.8425	14.1425
1820000000	53.7749	14.2007
1830000000	53.7224	14.2973
1840000000	53.7181	14.3873
1850000000	53.6941	14.4366
1860000000	53.6666	14.4635
1870000000	53.6515	14.4497
1880000000	53.6518	14.4034
1890000000	53.6253	14.3785
1900000000	**53.6045**	**14.3853**
1910000000	53.5253	14.4218

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target f * 10^6

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters for Head 1900 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Chaoyen Lin

f MHz	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	40.283	Relative Permittivity (ϵ_r):	40.2832	40.0	0.71	± 5
	e"	12.880	Conductivity (σ):	1.36138	1.40	-2.76	± 5

Liquid temperature: 23 deg. C
August 13, 2009 8:22 AM

Frequency	e'	e"
1710000000	41.0788	12.3841
1720000000	41.0237	12.4831
1730000000	40.9995	12.5788
1740000000	40.9697	12.6311
1750000000	40.9613	12.6548
1760000000	40.9245	12.6401
1770000000	40.8979	12.6255
1780000000	40.8347	12.5847
1790000000	40.7656	12.5724
1800000000	40.6945	12.5894
1810000000	40.6168	12.6472
1820000000	40.5503	12.7346
1830000000	40.4373	12.851
1840000000	40.3863	12.9137
1850000000	40.3459	12.9336
1860000000	40.3536	12.9231
1870000000	40.3743	12.9131
1880000000	40.3717	12.8939
1890000000	40.3346	12.894
1900000000	**40.2832**	**12.8797**
1910000000	40.2005	12.9752

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target f * 10^6

$\varepsilon_0 = 8.854 * 10^{-12}$

8.3. LIQUID CHECK RESULTS FOR 2450 MHZ

Simulating Liquid Dielectric Parameters for Head 2450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	40.2	Relative Permittivity (ε_r):	40.152	39.2	2.43	± 5
	e"	13.8	Conductivity (σ):	1.878	1.80	4.32	± 5

Liquid Temperature: 23 deg. C
May 05, 2009 09:34 AM

Frequency	e'	e"
2400000000.	40.2764	13.5731
2405000000.	40.2595	13.6421
2410000000.	40.2542	13.6811
2415000000.	40.2718	13.7262
2420000000.	40.2682	13.7466
2425000000.	40.2580	13.7755
2430000000.	40.2552	13.7895
2435000000.	40.2507	13.7850
2440000000.	40.2409	13.7938
2445000000.	40.2059	13.7932
2450000000.	**40.1523**	**13.7776**
2455000000.	40.0857	13.7795
2460000000.	40.0457	13.7466
2465000000.	39.9943	13.7071
2470000000.	39.9375	13.6613
2475000000.	39.9119	13.6508
2480000000.	39.8864	13.6402
2485000000.	39.8807	13.6549
2490000000.	39.8746	13.6755
2495000000.	39.8618	13.7392
2500000000.	39.8474	13.8071

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target f * 10^6

$\varepsilon_0 = 8.854 * 10^{-12}$

Simulating Liquid Dielectric Parameters for Muscle 2450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	53.42	Relative Permittivity (ε_r):	53.421	52.7	1.37	± 5
	e"	14.23	Conductivity (σ):	1.939	1.95	-0.54	± 5

Liquid Temperature: 23 deg. C
May 05, 2009 09:40 AM

Frequency	e'	e"
2400000000.	53.5248	14.0100
2405000000.	53.5218	14.0869
2410000000.	53.5315	14.1316
2415000000.	53.5359	14.1836
2420000000.	53.5290	14.1999
2425000000.	53.5284	14.2236
2430000000.	53.5239	14.2292
2435000000.	53.5286	14.2384
2440000000.	53.5104	14.2390
2445000000.	53.4632	14.2353
2450000000.	**53.4210**	**14.2292**
2455000000.	53.3533	14.2184
2460000000.	53.3026	14.1851
2465000000.	53.2372	14.1408
2470000000.	53.1945	14.1132
2475000000.	53.1727	14.1126
2480000000.	53.1705	14.1089
2485000000.	53.1679	14.1335
2490000000.	53.1636	14.1998
2495000000.	53.1582	14.2677
2500000000.	53.1503	14.3593

The conductivity (σ) can be given as:

$$\sigma = \omega \varepsilon_0 e'' = 2 \pi f \varepsilon_0 e''$$

where f = target f * 10^6

$\varepsilon_0 = 8.854 * 10^{-12}$

9. SYSTEM CHECK

The system performance check is performed prior to any usage of the system in order to guarantee reproducible results. The system performance check verifies that the system operates within its specifications of ±10%.

System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Head or Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV4 was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 fine cube was chosen for cube
- Distance between probe sensors and phantom surface was set to 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 250 mW±3%.
- The results are normalized to 1 W input power.

IEEE Standard 1528-2003 Numerical reference SAR values (W/kg) for reference dipole and flat phantom

Frequency (MHz)	Distance (mm)	1g SAR [W/kg]	10g SAR [W/kg]	Local SAR at surface (above feed-point)
300	15	3	2	4.4
450	15	4.9	3.3	7.2
835	15	9.5	6.2	4.1
900	15	10.8	6.9	16.4
1450	10	29	16	5.02
1800	10	38.1	19.8	69.5
1900	10	39.7	20.5	72.1
2000	10	41.1	21.1	74.6
2450	10	52.4	24	104.2
3000	10	63.8	25.7	104.2

Reference SAR Values for Body-tissue (From SPEAG)

Dipole Type	Distance	Frequency	SAR (1g)	SAR (10g)	SAR (peak)
	(mm)	(MHz)	[W/kg]	[W/kg]	[W/kg]
D835V2	15	835	9.71	6.38	14.1
D1900V2	10	1900	39.8	20.8	69.6

9.1. SYSTEM CHECK RESULTS FOR D1900V2

System Validation Dipole: D1900V2 SN: 5d043

Date: July 30, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Chaoyen Lin

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	1900	250	1g SAR:	37.5	39.7	-5.54	±10
			10g SAR:	19.2	20.5	-6.34	

Date: July 31, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Chaoyen Lin

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	1900	250	1g SAR:	38.6	39.8	-3.02	±10
			10g SAR:	20.3	20.8	-2.40	

Date: August 13, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Chaoyen Lin

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	1900	250	1g SAR:	36.9	39.7	-7.05	±10
			10g SAR:	18.9	20.5	-7.80	

9.2. SYSTEM CHECK RESULTS FOR D835V2

System Validation Dipole: D835V2 SN:4d002

Date: July 31 2009

Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Chaoyen Lin

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	835	250	1g SAR:	9.27	9.5	-2.42	±10
			10g SAR:	6.04	6.2	-2.58	

Date: August 13, 2009

Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Chaoyen Lin

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	835	250	1g SAR:	10.2	9.71	5.05	±10
			10g SAR:	6.68	6.38	4.70	

9.3. SYSTEM CHECK RESULTS FOR D2450V2

System Validation Dipole: D2450V2 SN: 748

Date: May 5, 2009

Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	2450	250	1g SAR:	53.4	52.4	1.91	±10
			10g SAR:	24.3	24	1.25	

10. OUTPUT POWER VERIFICATION

10.1. RF Output Power for WWAN

Maximum output power is verified on the Low, Middle and High channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E for 1xRTT, section 3.1.2.3.4 of 3GPP2 C.S0033-0/TIA-866 for Rel. 0 and section 4.3.4 of 3GPP2 C.S0033-A for Rev. A

10.2. RF Output Power for 1XRTT

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
CDMA2000 Mobile Test	B.13.08, L

- Call Setup > Shift & Preset
- Cell Info > Cell Parameters > System ID (SID) > 4 for cell band
- Cell Info > Cell Parameters > System ID (SID) > 4106 for cell band
  > Network ID (NID) > 65535 for cell and PCS bands.
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > Please see following table or details
- FCH Service Option (SO) Setup > Please see following table or details
- Traffic Data Rate > Full
- 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
  - Rvs Power Ctrl > All Up bits (Maximum TxPout)

RF Power Output for 1xRTT - Cell Band				
Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 1013/824.7MHz	Ch. 384/836.52MHz	Ch. 777/848.31MHz
		Average	Average	Average
RC3 (Fwd3, Rvs3)	1 (Voice)			
	2 (Loopback)	25.35	25.30	24.70
	3 (Voice)			
	55 (Loopback)	25.30	25.31	24.70
	32 (+ F-SCH)	25.40	25.30	24.65
	32 (+ SCH)	25.32	25.25	24.72
	68 (Voice)			

RF Power Output for 1xRTT - PCS Band				
Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 25/1851.25MHz	Ch. 600/1880MHz	Ch. 1175/1908.75 MHz
		Average	Average	Average
RC3 (Fwd3, Rvs3)	1 (Voice)			
	2 (Loopback)	24.65	24.66	23.90
	3 (Voice)			
	55 (Loopback)	24.60	24.70	24.00
	32 (+ F-SCH)	24.62	24.69	23.80
	32 (+ SCH)	24.58	24.65	23.78
	68 (Voice)			
	32768 (Voice)			

10.3. RF Output Power for EVDO Release 0

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
1xEV-DO Terminal Test	A.09.13

EVDO Release 0 - RTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Parms:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > RTAP
  - RTAP Rate > 153.6 kbps
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press “Start Data Connection” when “Session Open” appear in “Active Cell”
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

EVDO Release 0 - FTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Parms:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > FTAP (default)
  - FTAP Rate > 307.2 kbps (2 Slot, QPSK)
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press “Start Data Connection” when “Session Open” appear in “Active Cell”
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

RF Power Output for EV-DO Rel 0

Cell Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm) Average
307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	24.95
		384	836.52	24.82
		777	848.31	24.33

PCS Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm) Average
307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	24.02
		600	1880.00	24.15
		1175	1908.75	23.62

10.4. RF Output Power for EVDO Release A

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
1xEV-DO Terminal Test	A.09.13

EVDO Release A – RETAP
- Call Setup > Shift & Preset
- Cell Power > -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
> PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

EVDO Release A - FETAP
- Call Setup > Shift & Preset
- Cell Power > -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
> PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

RF Power Output Results for EV-DO Rev A

Cell Band

FETAP-Traffic Format	RETAP-Data Payload Size	Channel	f (MHz)	Conducted power (dBm) Average
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	1013	824.70	24.15
		384	836.52	24.70
		777	848.31	24.32

PCS Band

FETAP-Traffic Format	RETAP-Data Payload Size	Channel	f (MHz)	Conducted power (dBm) Average
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	23.90
		600	1880.00	23.95
		1175	1908.75	23.70

10.5. WIFI

The cable assembly insertion loss of 21.4 dB (including 20 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

802.11b

Ch. No.	f (MHz)	Average Conducted power (dBm)
1	2412	14.67
6	2437	14.61
11	2462	13.42

802.11g

Ch. No.	f (MHz)	Average Conducted power (dBm)
1	2412	14.60
6	2437	14.32
11	2462	13.24

10.6. KDB 941225 TEST REDUCTION CONSIDERATION

Head SAR Measurement
Based upon the power measurement in section 10.3 and 10.4 for 1xEVDO, Rev.0 and Rev. A power measurement is not ¼ dB higher than RC3. Thus, RC3/SO55 is used for head SAR measurement.

Body SAR Measurement
Based upon the power measurement in section 10.3 and 10.4, SAR for 1xEVDO Rev.0 and Rev. A power measurement is not ¼ dB higher than RC3. Thus, RC3/SO32 is used for body SAR measurement.

11. SUMMARY OF TEST RESULTS

WORST-CASE CONFIGURATIONS

Extended battery AB25 is used for all SAR testing. Additional SAR testing with standard battery (AB24) is performed at worst-case test configurations.

A preliminary testing for both QWERTY and Numeric models was performed. The result shows the **Qwerty** model is the representative models as worst case for CN50.

11.1. PCS Band

11.1.1. LEFT HAND SIDE

Test position	Mode	UL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	SO55, RC3	25	1851.25		1.6
		600	1880.00	0.302	
		1175	1908.75		
Tilt (15°)	SO55, RC3	25	1851.25		1.6
		600	1880.00	0.135	
		1175	1908.75		

11.1.2. RIGHT HAND SIDE

Test position	Mode	UL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	SO55, RC3	25	1851.25		1.6
		600	1880.00	0.330	
		1175	1908.75		
	w/ standard battery pack (AB24)	600	1880.00	0.325	
Tilt (15°)	SO55, RC3	25	1851.25		1.6
		600	1880.00	0.262	
		1175	1908.75		

11.1.3. BODY WORN – CN4

Test position	Mode	Sep. dist. (cm)	UL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
LCD down	SO32, RC3	With Holster	25	1851.25		1.6
			600	1880.00	0.290	
			1175	1908.75		
LCD up	SO32, RC3	With Holster	25	1851.25		1.6
			600	1880.00	0.066	
			1175	1908.75		

11.2. Cell Band

11.2.1. LEFT HAND SIDE

Test position	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	SO55, RC3	1013	824.70		1.6
		384	836.52	0.162	
		777	848.31		
Tilt (15°)	SO55, RC3	1013	824.70		1.6
		384	836.52	0.139	
		777	848.31		

11.2.2. RIGHT HAND SIDE

Test position	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	SO55, RC3	1013	824.70		1.6
		384	836.52	0.195	
		777	848.31		
Tilt (15°)	SO55, RC3	1013	824.70		1.6
		384	836.52	0.190	
		777	848.31		

11.2.3. BODY WORN

Test position	Mode	Sep. dist. (cm)	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
LCD down	SO32, RC3	With Holster	1013	824.70		1.6
			384	836.52	0.297	
			777	848.31		
	w/ standard battery pack (AB24)		384	836.52	0.294	
LCD up	SO32, RC3	With Holster	1013	824.70		1.6
			384	836.52	0.067	
			777	848.31		

11.3. WIFI

11.3.1. LEFT HAND SIDE

Test position	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	802.11b	1	2412		1.6
		6	2437	0.0056	
		11	2462		
Tilt (15°)	802.11b	1	2412		1.6
		6	2437	0.0042	
		11	2462		

11.3.2. RIGHT HAND SIDE

Test position	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	802.11b	1	2412		1.6
		6	2437	0.0048	
		11	2462		
Tilt (15°)	802.11b	1	2412		1.6
		6	2437	0.0057	
		11	2462		

11.3.3. BODY WORN

Test position	Mode	Sep. dist. (cm)	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
LCD down	802.11b	2	1	2412		1.6
			6	2437	0.026	
			11	2462		
LCD up	802.11b	2	1	2412		1.6
			6	2437	0.0002	
			11	2462		

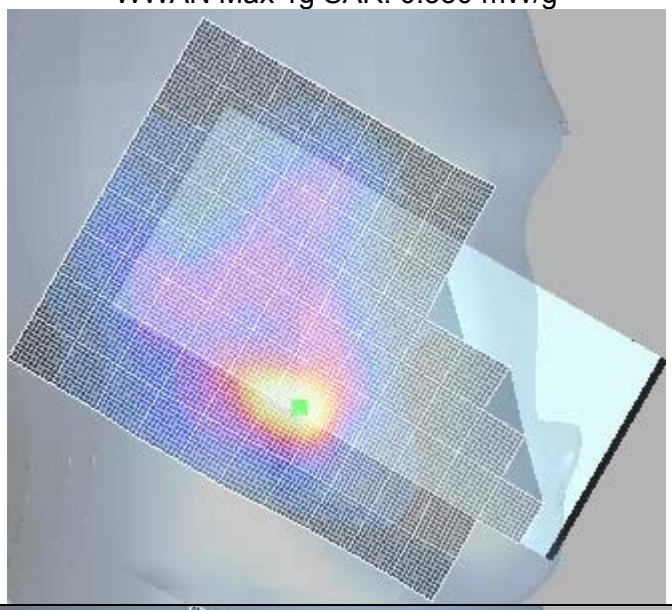
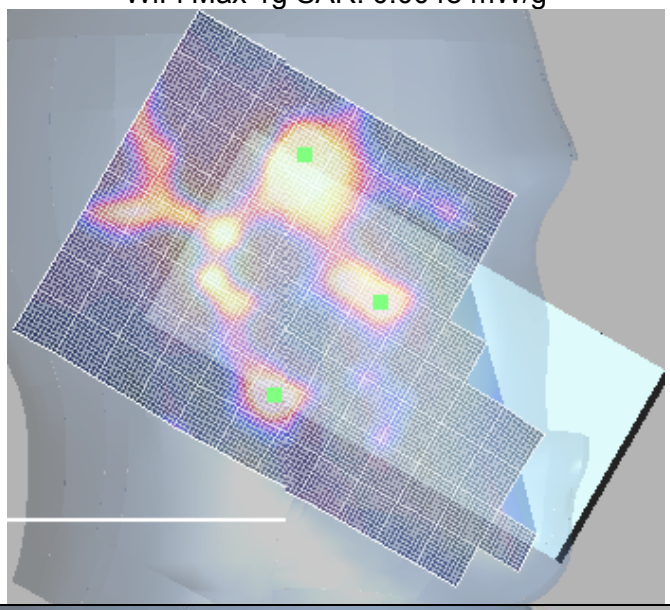
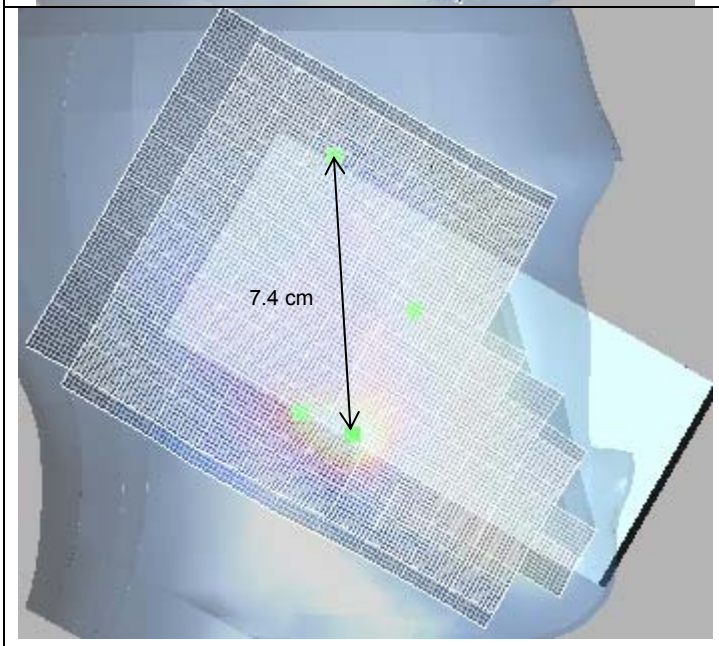
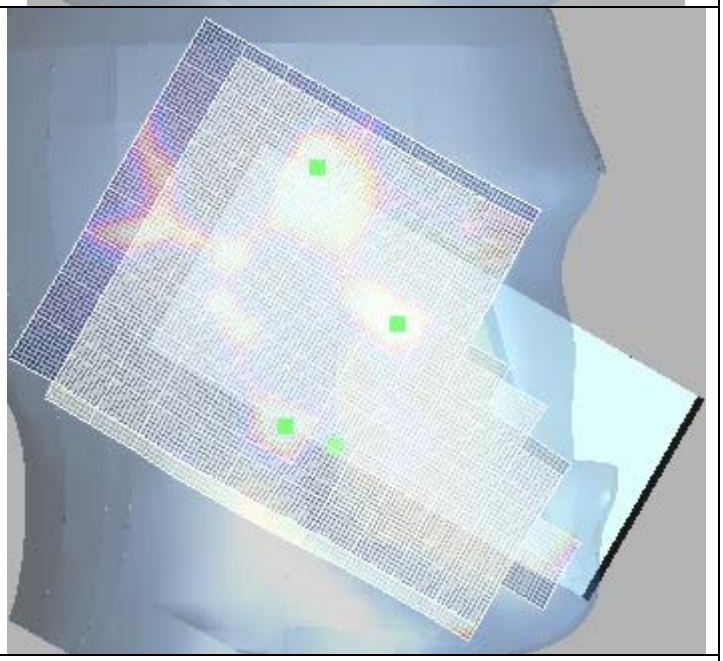
12. KDB 648474 SAR HANDSETS MULTI XMITER ASSESSMENT

EUT Description:	Heavy-Duty Handheld PDA-Type Device W/ Dual Band GSM/WCDMA/HSDPA/HSUPA, with WiFi and Bluetooth embedded.
Co-located Tx:	• WWAN can transmit simultaneously with 802.11g • WWAN can transmit simultaneously with Bluetooth • 802.11g can transmit simultaneously with Bluetooth
Antenna Separation distances:	• 0.49 cm - WWAM antenna-to-WiFi (802.11g) • 1.40 cm - WWAN antenna-to-Bluetooth antenna • 0.96 cm - WiFi (802.11g)-to-Bluetooth antenna
Separation distances between peaks SAR in area scans:	WWAM antenna-to-WiFi (802.11g) Head - Right hand side (RHS) touch position: 7.4 cm (see page 29) Body worn with 2 cm separation distance: 4.1 cm (see page 30)
Highest 1-g SAR:	Test position / Mode / Highest SAR / Sum of the 1-g SAR Head (RHS Touch) / WWAN / 0.330 mW/g / 0.3348 mW/g 802.11b / 0.0048 mW/g Body (LCD down) / WWAN / 0.297 mW/g / 0.323 mW/g 802.11b / 0.026 mW/g Note: Stand-alone SAR testing was performed but there was no data but noise due to large distance between the BT's antenna and the phantom.
SAR to Peak Location Separation Ratio:	WWAM antenna-to-WiFi (802.11g) Head - Right hand side (RHS) touch position: 0.045 (0.3348/7.4) Body worn with 2 cm separation distance: 0.079 (0.323/4.1)
Simultaneous TX SAR:	☒ No ☐ Yes (Measure Simultaneous Transmission SAR with Volume Scans for All Required Antennas)

CONCLUSION:

- Since the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas, and SAR to peak location separation ratio is less than 0.3, therefore, simultaneously SAR evaluation is not required.
- Based upon KDB 628591 TCB exclusion list, smart phone with embedded 802.11 b/g radio and BT radios is not subject to TCB exclusion list.

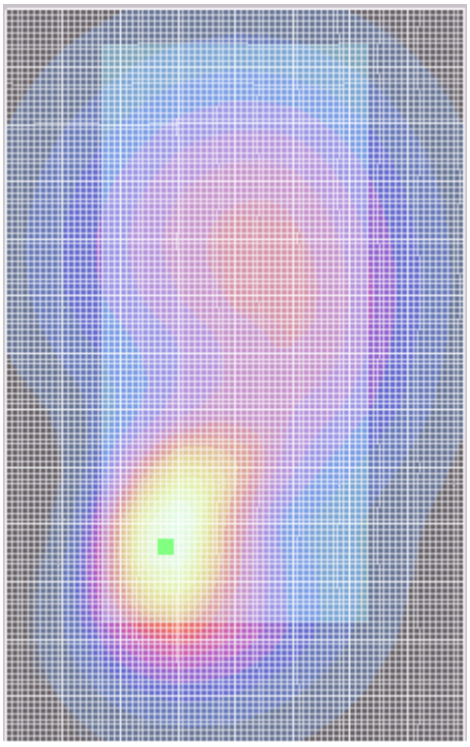
Separation distances between Peaks SAR in area scans for Head (Right hand side) position

WWAN Max 1g SAR: 0.330 mW/g	WiFi Max 1g SAR: 0.0048 mW/g
	
	

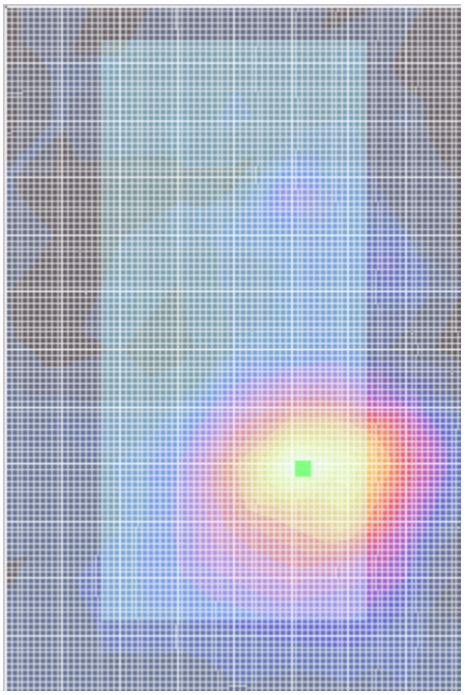
The sum of the 1g SAR = 0.3348
Separation distances between peaks SAR in area scans = 7.4cm
SAR to Peak location separation ratio: 0.045 (0.3348 / 7.4)

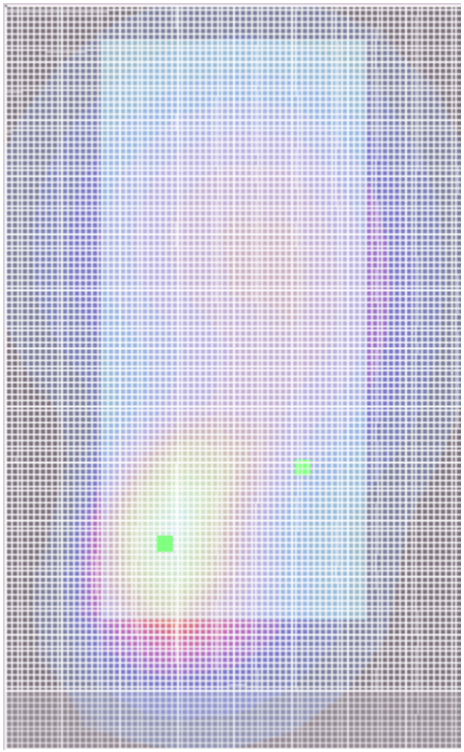
Separation distances between Peaks SAR in area scans for Body position)

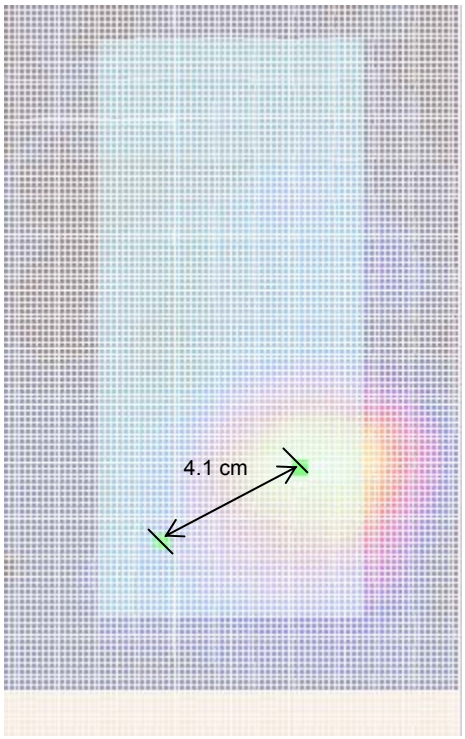
WWAN Max 1g SAR: 0.297 mW/g



WiFi Max 1g SAR: 0.026 mW/g







The sum of the 1g SAR = 0.323
Separation distances between peaks SAR in area scans = 4.1 cm
SAR to Peak location separation ratio: 0.079 (0.323 / 4.1)

13. WORST-CASE SAR TEST PLOTS

WORST-CASE SAR PLOT for CDMA1900 **HEAD** POSITION

Date/Time: 7/30/2009 6:33:29 PM

Test Laboratory: Compliance Certification Services

CDMA1900 Right Hand Side

DUT: Intermec; Type: CN50; Serial: 189V0900141

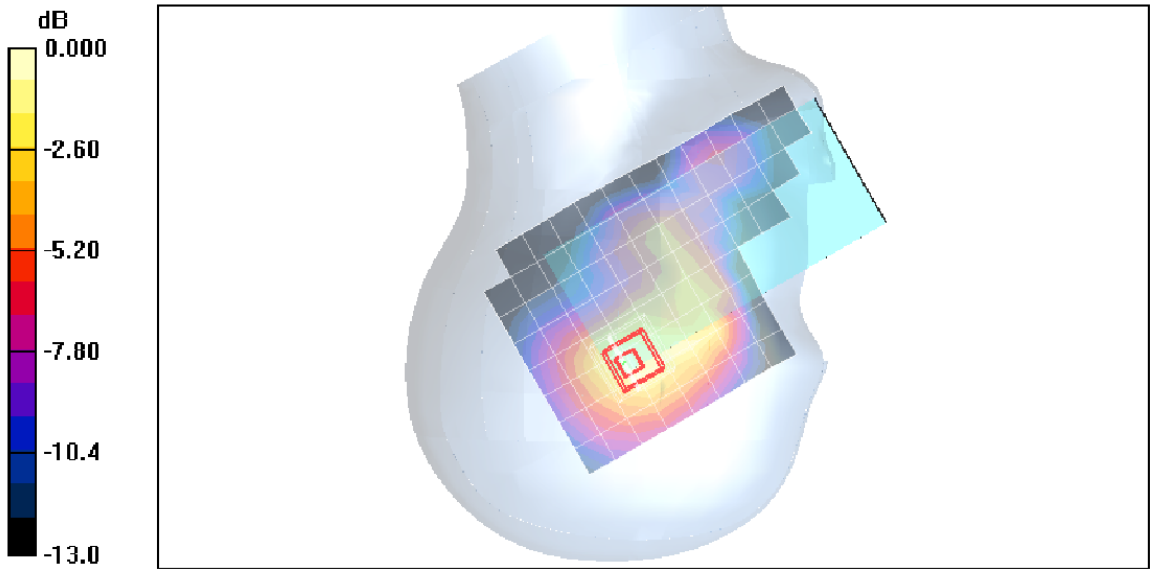
Communication System: CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Right Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(7.51, 7.51, 7.51); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

R-Touch - M-ch/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.339 mW/g

R-Touch - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 6.87 V/m; Power Drift = 0.056 dB
Peak SAR (extrapolated) = 0.552 W/kg
SAR(1 g) = 0.330 mW/g; SAR(10 g) = 0.186 mW/g
Maximum value of SAR (measured) = 0.400 mW/g



0 dB = 0.400mW/g

WORST-CASE SAR PLOT for CDMA1900 **BODY** POSITION

Date/Time: 7/31/2009 4:49:25 PM

Test Laboratory: Compliance Certification Services

CDMA1900 Body

DUT: Intermec; Type: CN50; Serial: 189V0900141

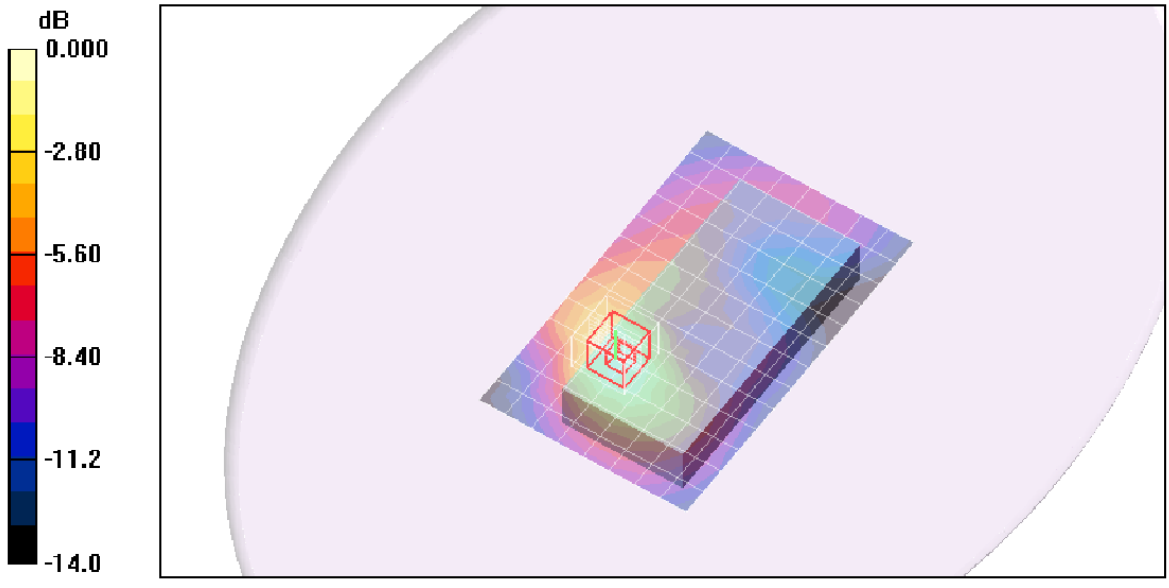
Communication System: CDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.51 mho/m; ε_r = 53.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(6.85, 6.85, 6.85); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

LCD Face down, 2.0 cm, M-Ch/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.357 mW/g

LCD Face down, 2.0 cm, M-Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 7.33 V/m; Power Drift = -0.537 dB
Peak SAR (extrapolated) = 0.470 W/kg
SAR(1 g) = 0.290 mW/g; SAR(10 g) = 0.174 mW/g
Maximum value of SAR (measured) = 0.343 mW/g



0 dB = 0.343mW/g

WORST-CASE SAR PLOT for CDMA850 - **HEAD** POSITION

Date/Time: 7/31/2009 9:41:15 AM

Test Laboratory: Compliance Certification Services

CDMA850 Right Hand Side

DUT: Intermec; Type: CN50; Serial: 189V0900141

Communication System: CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.899 mho/m; ε_r = 42; ρ = 1000 kg/m^3
Phantom section: Right Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(8.72, 8.72, 8.72); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

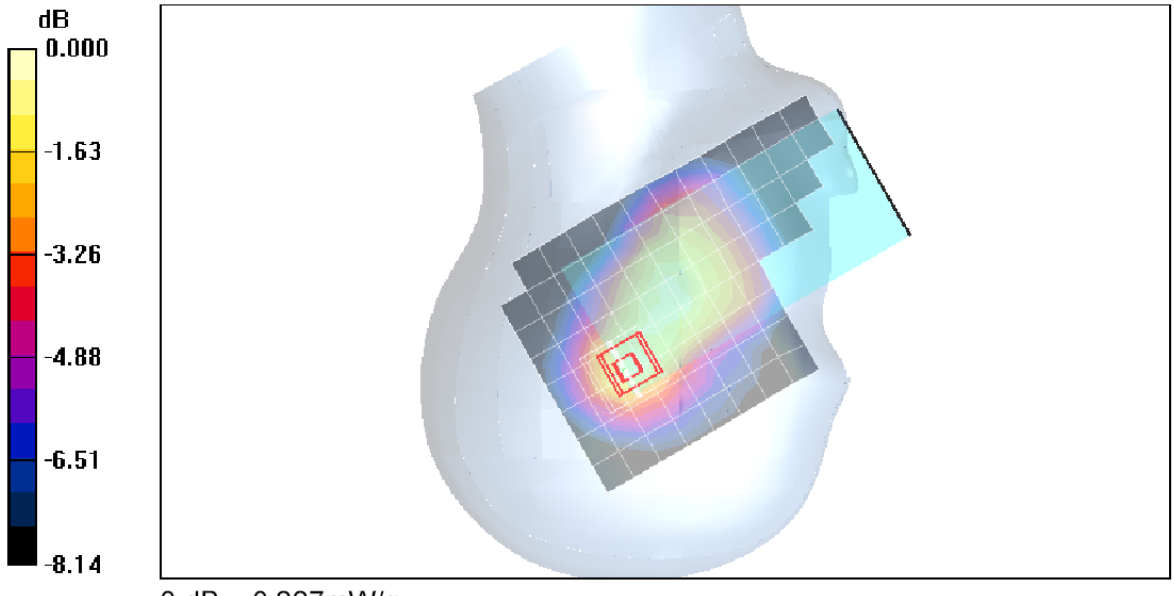
R-Touch - M-ch/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.199 mW/g

R-Touch - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 11.8 V/m; Power Drift = -0.129 dB
Peak SAR (extrapolated) = 0.298 W/kg
SAR(1 g) = 0.195 mW/g; SAR(10 g) = 0.135 mW/g

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



0 dB = 0.227mW/g

WORST-CASE SAR PLOT for CDMA850 - **BODY** POSITION

Date/Time: 7/31/2009 2:31:40 PM

Test Laboratory: Compliance Certification Services

CDMA850 Body

DUT: Intermec; Type: CN50; Serial: 189V0900141

Communication System: CDMA; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.988 mho/m; ε_r = 55.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(8.7, 8.7, 8.7); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

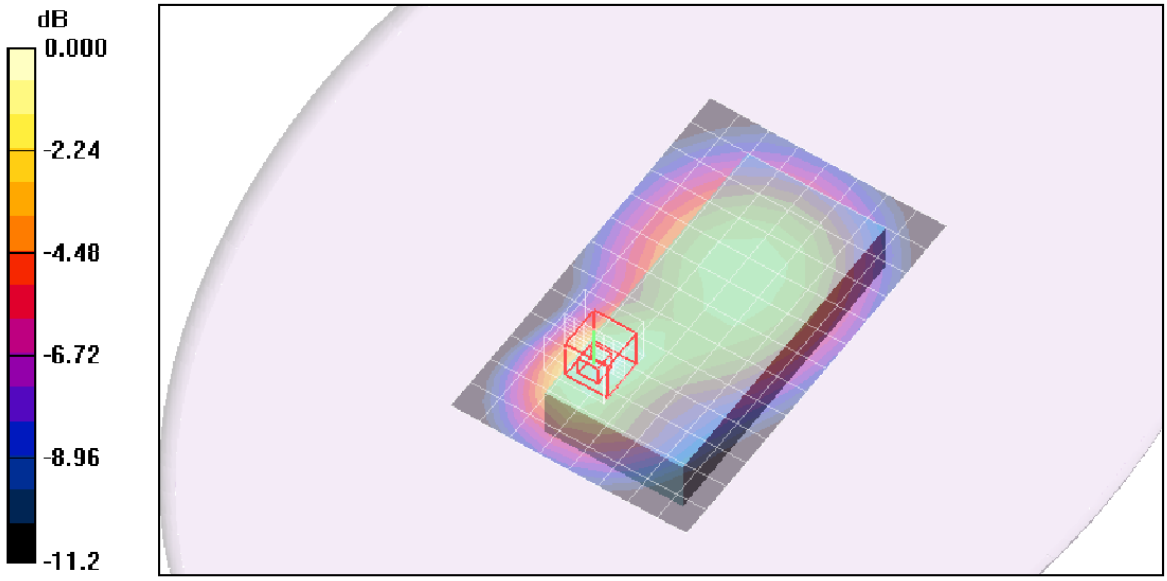
LCD Face down, 2.0 cm, M-Ch/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.319 mW/g

LCD Face down, 2.0 cm, M-Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm

Reference Value = 15.2 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 0.454 W/kg
SAR(1 g) = 0.297 mW/g; SAR(10 g) = 0.190 mW/g

Maximum value of SAR (measured) = 0.350 mW/g



0 dB = 0.350mW/g

WORST-CASE SAR PLOT for WIFI - **HEAD** POSITION

Date/Time: 5/5/2009 3:46:34 PM

Test Laboratory: Compliance Certification Services

WiFi Right Hand Side

DUT: Intermec; Type: CN50; Serial: 328V0800138

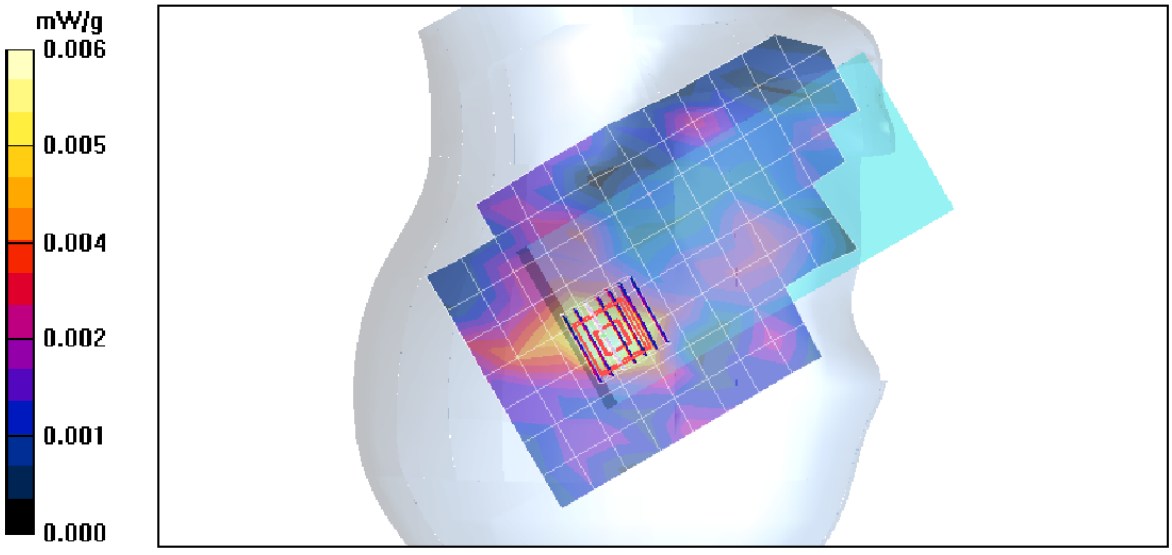
Communication System: 802.11bg; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.87 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Right Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(6.81, 6.81, 6.81); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

R-Tilt - M-ch/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.006 mW/g

R-Tilt - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 1.49 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 0.015 W/kg
SAR(1 g) = 0.00571 mW/g; SAR(10 g) = 0.00254 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.007 mW/g



WORST-CASE SAR PLOT for WIFI - **BODY** POSITION

Date/Time: 5/5/2009 5:20:07 PM

Test Laboratory: Compliance Certification Services

WiFi Body

DUT: Intermec; Type: CN50; Serial: 328V0800138

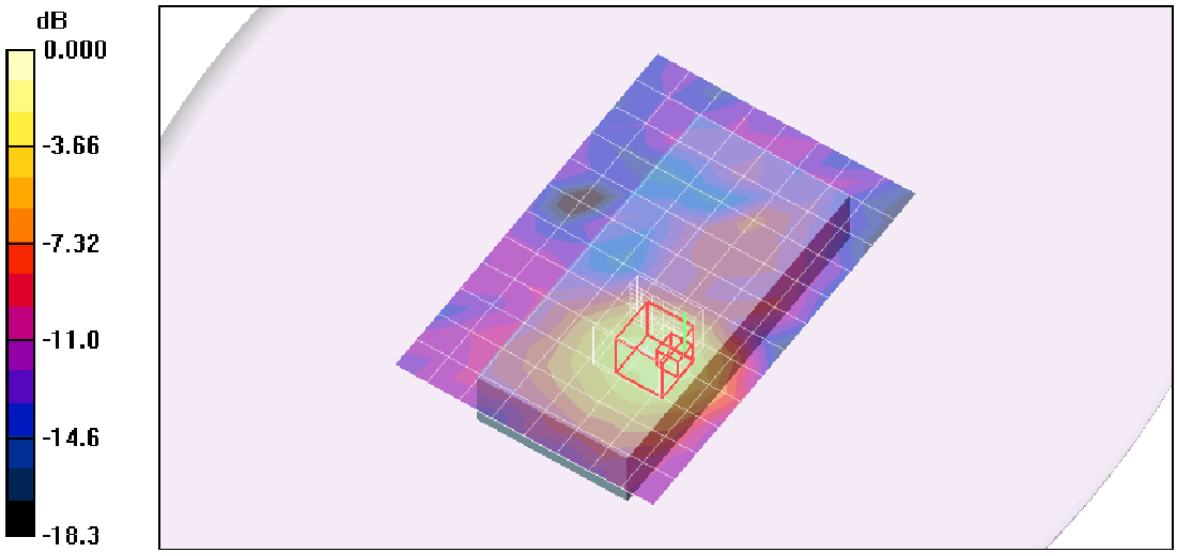
Communication System: 802.11bg; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.93 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(6.48, 6.48, 6.48); Calibrated: 3/23/2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 10/20/2008
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

LCD Face down, 2.0 cm - M-ch/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.023 mW/g

LCD Face down, 2.0 cm - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 0.577 V/m; Power Drift = 6.23 dB
Peak SAR (extrapolated) = 0.062 W/kg
SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.014 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.038 mW/g



0 dB = 0.038mW/g

14. ATTACHMENTS

No.	Contents	No. of page (s)
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