FCC OET BULLETIN 65 SUPPLEMENT C
IC RSS-102 ISSUE 2

SAR EVALUATION REPORT

For

Heavy-Duty Handheld PDA-Type Device W/ Dual Band GSM/WCDMA/HSDPA/HSUPA
MODEL: CN50
FCC ID: EHA-01CN50
IC: 1223A-01CN50

REPORT NUMBER: 09U12487-5B

ISSUE DATE: June 5, 2009

Prepared for

INTERMEC TECHNOLOGIES CORPORATION
6001 – 36TH AVENUE WEST
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Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	May 7, 2009	Initial Issue	--
A	June 4, 2009	Added battery information in section 5	Sunny Shih
B	June 5, 2009	Revised data on page 41, section 12	A. Zaffar

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	INTERMEC TECHNOLOGIES CORPORATION 6001 – 36TH AVENUE WEST EVERETT, WA 98203, USA
EUT DESCRIPTION:	Heavy-Duty Handheld PDA-Type Device W/ Dual Band GSM/WCDMA/HSDPA/HSUPA
MODEL NUMBER:	CN50
DEVICE CATEGORY:	Portable
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure
DATE TESTED:	April 15 – May 6, 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: 0.171 mW/g; Body: 1.21 mW/g	1.6
24E / RSS-133	1850 - 1910	Head: 0.341 mW/g; Body: 0.657 mW/g	
27 / RSS-133	1710 - 1755	Head: 0.088 mW/g; Body: 0.164 mW/g	
15.247 / RSS-210	2412 – 2462	Head: 0.0057 mW/g; Body: 0.026 mW/g	

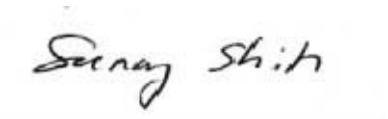
APPLICABLE STANDARDS AND TEST PROCEDURES:

STANDARDS AND TEST PROCEDURES	TEST RESULTS
• FCC OET Bulletin 65 Supplement C and the following specific Test Procedures: o KDB 941225 D01 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 2	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

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C, IC RSS 102 Issue 2 and the following specific FCC Test Procedures.

- KDB 941225 D01 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://ts.nist.gov/Standards/scopes/2000650.htm.

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	1010
Thermometer	ERTCO	639-1S	1718	5	28	2009
Data Acquisition Electronics	SPEAG	DAE3 V1	427	10	20	2009
System Validation Dipole	SPEAG	D835V2	4d002	6	22	2009
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
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

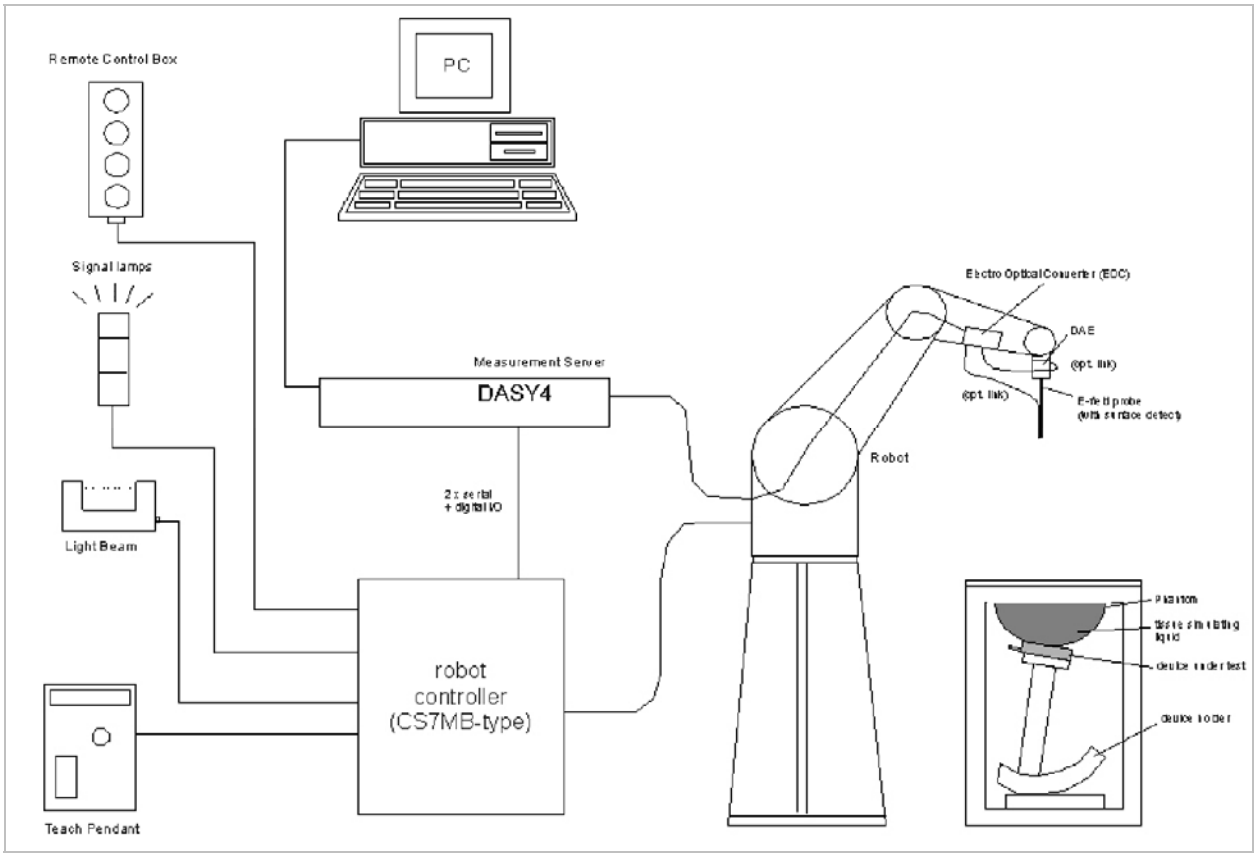
Notesfor table
1. Tol. - tolerance in influence quaitity
2. N - Nomal
3. R - Rectangular
4. Div. - Divisor used to obtain standard uncertainty
5. Ci - is te sensitivity coefficient

5. EQUIPMENT UNDER TEST

Heavy-Duty Handheld PDA-Type Device W/ Dual Band GSM/WCDMA/HSDPA/HSUPA, with WiFi and Bluetooth radio.

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 and • AB25 - extended battery Extended battery AB25 was chosen for the testing.

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 1900 MHZ

Simulating Liquid Dielectric Parameters for Head 1900 MHz

Room Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Sunny Shih

f MHz	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	40.197	Relative Permittivity (ϵ_r):	40.1967	40.0	0.49	± 5
	e"	13.815	Conductivity (σ):	1.46021	1.40	4.30	± 5

Liquid temperature: 23 deg. C
April 15, 2009 09:39 AM

Frequency	e'	e"
1710000000.	41.2077	13.1075
1720000000.	41.1707	13.1296
1730000000.	41.1591	13.1707
1740000000.	41.1523	13.2430
1750000000.	41.1357	13.3428
1760000000.	41.0238	13.4569
1770000000.	40.9191	13.5232
1780000000.	40.8033	13.5130
1790000000.	40.7426	13.4944
1800000000.	40.6834	13.5062
1810000000.	40.6106	13.4991
1820000000.	40.5626	13.4710
1830000000.	40.5481	13.4802
1840000000.	40.5848	13.5635
1850000000.	40.5400	13.6983
1860000000.	40.4167	13.8070
1870000000.	40.2815	13.8415
1880000000.	40.2126	13.8070
1890000000.	40.2036	13.7889
1900000000.	**40.1967**	**13.8147**
1910000000.	40.1329	13.8805

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 = 35% Measured by: Sunny Shih

f MHz	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	40.702	Relative Permittivity (ε_r):	40.7021	40.0	1.76	± 5
	e"	13.514	Conductivity (σ):	1.42838	1.40	2.03	± 5

Liquid temperature: 23 deg. C
April 29, 2009 02:31 PM

Frequency	e'	e"
1710000000.	41.5219	12.9062
1720000000.	41.4894	12.9749
1730000000.	41.4963	13.0538
1740000000.	41.4891	13.1376
1750000000.	41.4726	13.1985
1760000000.	41.4066	13.2273
1770000000.	41.3357	13.2158
1780000000.	41.2609	13.1762
1790000000.	41.1928	13.1704
1800000000.	**41.0977**	**13.1883**
1810000000.	40.9937	13.2186
1820000000.	40.8960	13.2515
1830000000.	40.8467	13.3337
1840000000.	40.8392	13.4258
1850000000.	40.8170	13.5209
1860000000.	40.7679	13.5904
1870000000.	40.7364	13.5907
1880000000.	40.7350	13.5381
1890000000.	40.7156	13.5036
1900000000.	**40.7021**	**13.5136**
1910000000.	40.6128	13.5168

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 = 35% Measured by: Sunny Shih

f (MHz)	Muscle Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	53.422	Relative Permittivity (ε_r):	53.4216	53.3	0.23	± 5
	e"	14.405	Conductivity (σ):	1.52261	1.52	0.17	± 5

Liquid temperature: 23 deg. C
April 29, 2009 02:55 PM

Frequency	e'	e"
1710000000.	54.0508	13.7556
1720000000.	54.0396	13.8232
1730000000.	54.0630	13.9244
1740000000.	54.0665	14.0161
1750000000.	54.0733	14.0824
1760000000.	54.0071	14.0780
1770000000.	53.9384	14.0726
1780000000.	53.8690	14.0390
1790000000.	53.7938	14.0224
1800000000.	53.7026	14.0610
1810000000.	53.6216	14.0878
1820000000.	53.5308	14.1424
1830000000.	53.5153	14.2297
1840000000.	53.4997	14.3466
1850000000.	53.4947	14.4395
1860000000.	53.4626	14.4834
1870000000.	53.4386	14.4652
1880000000.	53.4568	14.4194
1890000000.	53.4486	14.3797
1900000000.	**53.4216**	**14.4051**
1910000000.	53.3470	14.4167

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 1730 MHZ

Simulating Liquid Dielectric Parameters for Head 1800 MHz

Room Ambient Temperature = 24°C; Relative humidity = 38% Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1800	e'	39.3	Relative Permittivity (ϵ_r):	39.295	40.0	-1.76	± 5
	e"	14.3	Conductivity (σ):	1.433	1.40	2.35	± 5
1730	e'	39.8	Relative Permittivity (ϵ_r):	39.768	40.1	-0.88	± 5
	e"	14.0	Conductivity (σ):	1.350	1.36	-0.76	± 5

Liquid temperature: 23 deg. C
April 16, 2009 09:55 AM

Frequency	e'	e"
1710000000.	39.8382	13.9644
1720000000.	39.7919	13.9896
1730000000.	**39.7678**	**14.0238**
1740000000.	39.7761	14.0794
1750000000.	39.7616	14.1946
1760000000.	39.6558	14.2884
1770000000.	39.5356	14.3382
1780000000.	39.4249	14.3276
1790000000.	39.3624	14.3077
1800000000.	**39.2954**	**14.3094**
1810000000.	39.2223	14.3092
1820000000.	39.1620	14.2622
1830000000.	39.1441	14.2844
1840000000.	39.1690	14.3504
1850000000.	39.1320	14.4717
1860000000.	39.0184	14.5881
1870000000.	38.8738	14.6060
1880000000.	38.8160	14.5568
1890000000.	38.8044	14.5426
1900000000.	38.7957	14.5656
1910000000.	38.7237	14.6339

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 1800 MHz

Room Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1800	e'	40.19	Relative Permittivity (ε_r):	40.186	40.0	0.46	± 5
	e"	14.14	Conductivity (σ):	1.416	1.40	1.13	± 5
1730	e'	40.63	Relative Permittivity (ε_r):	40.630	40.1	1.27	± 5
	e"	13.96	Conductivity (σ):	1.344	1.36	-1.20	± 5

Liquid temperature: 23 deg. C
April 30, 2009 04:11 PM

Frequency	e'	e"
1710000000.	40.6428	13.8485
1720000000.	40.6394	13.8923
1730000000.	**40.6302**	**13.9612**
1740000000.	40.6076	14.0471
1750000000.	40.5714	14.1282
1760000000.	40.4758	14.1699
1770000000.	40.3921	14.1767
1780000000.	40.3073	14.1382
1790000000.	40.2461	14.1264
1800000000.	**40.1856**	**14.1395**
1810000000.	40.0942	14.1502
1820000000.	40.0143	14.1423
1830000000.	39.9742	14.1868
1840000000.	39.9567	14.2754
1850000000.	39.9364	14.3960
1860000000.	39.8587	14.4851
1870000000.	39.7790	14.4906
1880000000.	39.7646	14.4342
1890000000.	39.7651	14.3958
1900000000.	39.7570	14.4143
1910000000.	39.6754	14.4197

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 1800 MHz

Room Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1800	e'	53.0	Relative Permittivity (ε_r):	52.962	53.3	-0.63	± 5
	e"	15.3	Conductivity (σ):	1.533	1.52	0.87	± 5
1730	e'	53.0	Relative Permittivity (ε_r):	52.962	53.5	-0.99	± 5
	e"	15.2	Conductivity (σ):	1.459	1.47	-0.73	± 5

Liquid temperature: 23 deg. C
April 30, 2009 04:01 PM

Frequency	e'	e"
1710000000.	52.9842	15.0360
1720000000.	52.9595	15.0866
1730000000.	**52.9619**	**15.1632**
1740000000.	52.9529	15.2453
1750000000.	52.9413	15.3256
1760000000.	52.8631	15.3578
1770000000.	52.7700	15.3517
1780000000.	52.6907	15.3203
1790000000.	52.6339	15.2965
1800000000.	**52.5632**	**15.3108**
1810000000.	52.4858	15.3279
1820000000.	52.3942	15.3432
1830000000.	52.4023	15.3832
1840000000.	52.4082	15.4944
1850000000.	52.3714	15.6205
1860000000.	52.3010	15.6923
1870000000.	52.2230	15.6694
1880000000.	52.2241	15.6107
1890000000.	52.2363	15.5676
1900000000.	52.2296	15.5958
1910000000.	52.1562	15.6004

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 835 MHZ

Simulating Liquid Dielectric Parameters for Head 835 MHz

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

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	41.81	Relative Permittivity (ε_r):	41.806	41.5	0.74	± 5
	e"	19.52	Conductivity (σ):	0.907	0.90	0.72	± 5
900	e'	41.08	Relative Permittivity (ε_r):	41.079	41.5	-1.02	± 5
	e"	19.47	Conductivity (σ):	0.975	0.97	0.48	± 5

Liquid temperature: 23 deg. C
April 24, 2009 11:19 PM

Frequency	e'	e"
770000000.	42.6137	19.8274
775000000.	42.5950	19.8213
780000000.	42.5296	19.8053
785000000.	42.4833	19.7734
790000000.	42.4359	19.7753
795000000.	42.3691	19.7826
800000000.	42.2978	19.7693
805000000.	42.2148	19.7487
810000000.	42.1248	19.6981
815000000.	42.0666	19.6610
820000000.	41.9839	19.6099
825000000.	41.9128	19.5776
830000000.	41.8554	19.5526
835000000.	**41.8059**	**19.5152**
840000000.	41.7488	19.5224
845000000.	41.6969	19.5073
850000000.	41.6266	19.4977
855000000.	41.5793	19.4922
860000000.	41.5260	19.4989
865000000.	41.4925	19.4999
870000000.	41.3709	19.4755
875000000.	41.3475	19.5044
880000000.	41.2913	19.5224
885000000.	41.2481	19.5467
890000000.	41.1921	19.5245
895000000.	41.1251	19.4960
900000000.	**41.0787**	**19.4668**
905000000.	41.0035	19.4218
910000000.	40.9365	19.3849
915000000.	40.9004	19.3343

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 835 MHz

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

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	43.24	Relative Permittivity (ε_r):	43.240	41.5	4.19	± 5
	e"	18.82	Conductivity (σ):	0.874	0.90	-2.86	± 5
900	e'	42.57	Relative Permittivity (ε_r):	42.567	41.5	2.57	± 5
	e"	19.05	Conductivity (σ):	0.954	0.97	-1.67	± 5

Liquid temperature: 23 deg. C
April 28, 2009 09:10 AM

Frequency	e'	e"
785000000.	44.0074	19.3004
790000000.	43.9643	19.3103
795000000.	43.8756	19.3110
800000000.	43.7898	19.2783
805000000.	43.6925	19.2387
810000000.	43.5850	19.1594
815000000.	43.4748	19.1037
820000000.	43.3970	19.0075
825000000.	43.3582	18.9332
830000000.	43.2684	18.8640
835000000.	**43.2396**	**18.8200**
840000000.	43.2006	18.8109
845000000.	43.1500	18.7949
850000000.	43.1334	18.8209
855000000.	43.0852	18.8768
860000000.	43.0474	18.9292
865000000.	43.0170	18.9686
870000000.	42.9229	18.9963
875000000.	42.8600	19.0553
880000000.	42.8317	19.1237
885000000.	42.7689	19.1415
890000000.	42.6895	19.1344
895000000.	42.6266	19.1125
900000000.	**42.5670**	**19.0502**
905000000.	42.4996	18.9762
910000000.	42.4820	18.9023
915000000.	42.4558	18.8317
920000000.	42.4364	18.7352
925000000.	42.4109	18.6657
930000000.	42.4318	18.6497
935000000.	42.3920	18.6241
940000000.	42.3147	18.6589
945000000.	42.2789	18.6706
950000000.	42.1718	18.7245

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: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	54.02	Relative Permittivity (ε_r):	54.021	55.2	-2.14	± 5
	e"	20.69	Conductivity (σ):	0.961	0.97	-0.93	± 5
900	e'	53.52	Relative Permittivity (ε_r):	53.516	55.0	-2.70	± 5
	e"	20.78	Conductivity (σ):	1.040	1.05	-0.93	± 5

Liquid temperature: 23 deg. C
April 28, 2009 09:20 AM

Frequency	e'	e"
785000000.	54.6784	21.2332
790000000.	54.6321	21.2344
795000000.	54.5659	21.2081
800000000.	54.5010	21.1819
805000000.	54.3992	21.1124
810000000.	54.3072	21.0350
815000000.	54.2236	20.9780
820000000.	54.1517	20.8729
825000000.	54.1201	20.8156
830000000.	54.0621	20.7296
835000000.	**54.0209**	**20.6879**
840000000.	53.9852	20.6884
845000000.	53.9923	20.6839
850000000.	53.9713	20.6896
855000000.	53.9167	20.7185
860000000.	53.9022	20.7645
865000000.	53.8945	20.7967
870000000.	53.8020	20.8286
875000000.	53.7611	20.8515
880000000.	53.7006	20.9031
885000000.	53.6527	20.9284
890000000.	53.6064	20.9003
895000000.	53.5594	20.8413
900000000.	**53.5160**	**20.7763**
905000000.	53.4536	20.6881
910000000.	53.4502	20.6034
915000000.	53.4122	20.5484
920000000.	53.4166	20.4564
925000000.	53.4026	20.4079
930000000.	53.4180	20.3682
935000000.	53.3850	20.3583
940000000.	53.3389	20.3639
945000000.	53.2730	20.3676
950000000.	53.2036	20.4332

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

8.4. 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

ε_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 EX3DV3 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

Note: All SAR values normalized to 1 W forward power.

9.1. SYSTEM CHECK RESULTS FOR D1900V2

System Validation Dipole: D1900V2 SN: 5d043

Date: April 15, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	1900	250	1g SAR:	39.1	39.8	-1.76	±10
			10g SAR:	20.0	20.8	-3.85	

Date: April 29, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	1900	250	1g SAR:	38.8	39.8	-2.51	±10
			10g SAR:	19.8	20.8	-4.81	

9.2. SYSTEM CHECK RESULTS FOR D1800V2

System Validation Dipole: D1800V2 SN: 294

Date: April 16, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	1800	250	1g SAR:	38.6	38.10	1.31	±10
			10g SAR:	20	19.80	1.01	

Date: April 30, 2009

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward power (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Head	1800	250	1g SAR:	38.6	38.10	1.31	±10
			10g SAR:	20.0	19.80	1.01	

9.3. SYSTEM CHECK RESULTS FOR D900V2

System Validation Dipole: D900V2 SN: 108

Date: April 24, 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	900	250	1g SAR:	11	10.8	1.85	±10
			10g SAR:	7.14	6.9	3.48	

Date: April 28, 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	900	250	1g SAR:	10.7	10.8	-0.93	±10
			10g SAR:	6.95	6.9	0.72	

9.4. 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. GSM

GSM (GMSK)

Band	Ch No.	Frequency	Conducted output power (dBm)	
			Average	Peak
GSM850	128	824.2	32.31	
	190	836.6	32.33	
	251	848.8	32.22	
GSM1900	512	1850.2	29.00	
	661	1880	29.37	
	810	1909.8	29.40	

GPRS (GMSK) - Coding Scheme: MCS4

Band	Ch No.	Frequency	Average Conducted output power (dBm)			
			1 slot	2 slot	3 slot	4 slot
GSM850	128	824.2	32.21	32.10	32.32	32.32
	190	836.6	32.33	32.20	32.33	32.32
	251	848.8	32.25	32.30	32.25	32.30
GSM1900	512	1850.2	28.96	28.80	28.98	28.97
	661	1880	28.82	28.80	29.20	28.80
	810	1909.8	28.90	28.85	29.30	29.30

EGPRS (8PSK) - Coding Scheme: MCS9

Band	Ch No.	Frequency	Conducted output power (dBm)			
			1 slot	2 slot	3 slot	4 slot
GSM850	128	824.2	27.00	27.00	26.85	28.60
	190	836.6	26.95	26.90	26.90	26.80
	251	848.8	26.95	26.90	27.20	27.15
GSM1900	512	1850.2	25.60	25.80	25.90	25.85
	661	1880	25.62	25.60	26.00	25.95
	810	1909.8	25.80	25.78	25.80	25.75

10.2. UMTS RELEASE 99

The following 4 Sub-tests were completed according to procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	βc	Not Applicable
	βd	Not Applicable
	βec	Not Applicable
	βc/βd	8/15
	βhs	Not Applicable
	βed	Not Applicable

Results

Rel 99 (12.2kps RMC)

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm)
UMTS850 (Band V)	Rel 99 12.2kps RMC	4132	4357	826.4	24.60
		4180	4405	836.0	24.50
		4230	4455	846.0	24.55
UMTS1900 (Band II)	Rel 99 12.2kps RMC	9262	9662	1852.4	24.80
		9400	9800	1880.0	24.56
		9538	9938	1907.6	24.50
UMTS1700 (Band IV)	Rel 99 12.2kps RMC	1312	1537	1712.4	23.85
		1412	1637	1732.4	24.10
		1513	1738	1754.0	24.20

10.3. UMTS HSDPA

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	HSUPA Test	Not Applicable			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	Bd (SF)	64			
	βec	-	-	-	-
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	βed	Not Applicable			
	CM (dB)	0	1	1.5	1.5
	MPR (dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs = βhs/βc	30/15			

Results

Rel 6 HSDPA

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm)
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	24.80
		4180	4405	836.0	24.30
		4230	4455	846.0	24.20
	Subtest 2	4132	4357	826.4	24.30
		4180	4405	836.0	24.50
		4230	4455	846.0	24.42
	Subtest 3	4132	4357	826.4	23.70
		4180	4405	836.0	23.60
		4230	4455	846.0	23.80
	Subtest 4	4132	4357	826.4	23.75
		4180	4405	836.0	23.68
		4230	4455	846.0	23.65
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	24.20
		9400	9800	1880.0	24.33
		9538	9938	1907.6	24.35
	Subtest 2	9262	9662	1852.4	24.40
		9400	9800	1880.0	24.30
		9538	9938	1907.6	24.56
	Subtest 3	9262	9662	1852.4	24.02
		9400	9800	1880.0	23.90
		9538	9938	1907.6	24.00
	Subtest 4	9262	9662	1852.4	24.20
		9400	9800	1880.0	24.30
		9538	9938	1907.6	24.30
UMTS1700 (Band IV)	Subtest 1	1312	1537	1712.4	24.40
		1412	1637	1732.4	24.20
		1513	1738	1754.0	24.25
	Subtest 2	1312	1537	1712.4	24.50
		1412	1637	1732.4	24.20
		1513	1738	1754.0	24.15
	Subtest 3	1312	1537	1712.4	24.18
		1412	1637	1732.4	24.25
		1513	1738	1754.0	24.30
	Subtest 4	1312	1537	1712.4	23.75
		1412	1637	1732.4	23.70
		1513	1738	1754.0	23.65

10.4. UMTS Rel 6 HDPA (HSDPA & HSUPA)

The following 4 Sub-tests were completed according to Release 5 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	15/15
	βec	209/225	12/15	30/15	2/15	24/15
	βc/βd	11/15	6/15	15/9	2/15	15/15
	βhs	22/15	12/15	30/15	4/15	30/15
	βed	1309/225	94/75	47/15 47/15	56/75	134/15
	CM (dB)	1.0	3.0	2.0	3.0	1.0
	MPR (dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

Results

Rel 6 HSDPA

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	O/P Power (dBm)
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	**23.90**
		4180	4405	836.0	**24.10**
		4230	4455	846.0	**24.20**
	Subtest 2	4132	4357	826.4	22.60
		4180	4405	836.0	22.60
		4230	4455	846.0	22.60
	Subtest 3	4132	4357	826.4	23.40
		4180	4405	836.0	23.25
		4230	4455	846.0	23.30
	Subtest 4	4132	4357	826.4	23.20
		4180	4405	836.0	23.30
		4230	4455	846.0	**23.70**
	Subtest 5	4132	4357	826.4	**24.00**
		4180	4405	836.0	**24.20**
		4230	4455	846.0	24.10
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	**24.15**
		9400	9800	1880.0	**24.20**
		9538	9938	1907.6	**23.90**
	Subtest 2	9262	9662	1852.4	22.65
		9400	9800	1880.0	22.40
		9538	9938	1907.6	22.30
	Subtest 3	9262	9662	1852.4	23.60
		9400	9800	1880.0	23.60
		9538	9938	1907.6	23.20
	Subtest 4	9262	9662	1852.4	23.30
		9400	9800	1880.0	23.00
		9538	9938	1907.6	22.80
	Subtest 5	9262	9662	1852.4	**24.10**
		9400	9800	1880.0	**23.90**
		9538	9938	1907.6	**24.00**
UMTS1700 (Band IV)	Subtest 1	1312	1537	1712.4	**24.15**
		1412	1637	1732.4	**23.95**
		1513	1738	1754.0	**24.00**
	Subtest 2	1312	1537	1712.4	22.75
		1412	1637	1732.4	22.70
		1513	1738	1754.0	22.65
	Subtest 3	1312	1537	1712.4	23.06
		1412	1637	1732.4	23.25
		1513	1738	1754.0	23.20
	Subtest 4	1312	1537	1712.4	22.80
		1412	1637	1732.4	22.45
		1513	1738	1754.0	22.55
	Subtest 5	1312	1537	1712.4	**23.80**
		1412	1637	1732.4	**23.85**
		1513	1738	1754.0	**23.82**

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

11. SUMMARY OF TEST RESULTS

If the SAR measured at the middle channel for each test configuration is at least 3.0 dB (0.8 mW/g) lower than the SAR limit (1.6 mW/g), testing at the high and low channels is optional for such test configuration(s).

11.1. UMTS BAND II (1900 MHZ)

11.1.1. LEFT HAND SIDE

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	Rel 99 12.2kps RMC	9262	9662	1852.4		1.6
		9400	9800	1880.0	0.341	
		9538	9938	1907.6		
Tilt (15°)	Rel 99 12.2kps RMC	9262	9662	1852.4		1.6
		9400	9800	1880.0	0.119	
		9538	9938	1907.6		

11.1.2. RIGHTHAND SIDE

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	Rel 99 12.2kps RMC	9262	9662	1852.4		1.6
		9400	9800	1880.0	0.272	
		9538	9938	1907.6		
Tilt (15°)	Rel 99 12.2kps RMC	9262	9662	1852.4		1.6
		9400	9800	1880.0	0.215	
		9538	9938	1907.6		

11.1.3. BODY WORN

Test position	Mode	Sep. dist. (cm)	UL Ch No.	DL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
LCD down	Rel 99 12.2kps RMC	2	9262	9662	1852.4		1.6
			9400	9800	1880.0	0.378	
			9538	9938	1907.6		
LCD up	Rel 99 12.2kps RMC	2	9262	9662	1852.4		1.6
			9400	9800	1880.0	0.050	
			9538	9938	1907.6		
LCD down	HSPA Sub-test 5	2	9262	9662	1852.4		1.6
			9400	9800	1880.0	0.377	
			9538	9938	1907.6		

11.2. UMTS BAND IV (1700 MHZ)

11.2.1. LEFT HAND SIDE

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	Rel 99 12.2kps RMC	1312	1537	1712.4		1.6
		1412	1637	1732.4	0.081	
		1513	1738	1754.0		
Tilt (15°)	Rel 99 12.2kps RMC	1312	1537	1712.4		1.6
		1412	1637	1732.4	0.038	
		1513	1738	1754.0		

11.2.2. RIGHTHAND SIDE

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	Rel 99 12.2kps RMC	1312	1537	1712.4		1.6
		1412	1637	1732.4	0.088	
		1513	1738	1754.0		
Tilt (15°)	Rel 99 12.2kps RMC	1312	1537	1712.4		1.6
		1412	1637	1732.4	0.062	
		1513	1738	1754.0		

11.2.3. BODY WORN

Test position	Mode	Sep. dist. (cm)	UL Ch No.	DL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
LCD down	Rel 99 12.2kps RMC	2	1312	1537	1712.4		1.6
			1412	1637	1732.4	0.159	
			1513	1738	1754.0		
LCD up	Rel 99 12.2kps RMC	2	1312	1537	1712.4		1.6
			1412	1637	1732.4	0.066	
			1513	1738	1754.0		
LCD down	HSDPA Sub-test 5	2	1312	1537	1712.4		1.6
			1412	1637	1732.4	0.164	
			1513	1738	1754.0		

11.3. GSM1900

11.3.1. LEFT HAND SIDE

Test position	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	GSM	512	1850.2		1.6
		661	1880.0	0.166	
		810	1909.8		
Tilt (15°)	GSM	512	1850.2		1.6
		661	1880.0	0.056	
		810	1909.8		

11.3.2. RIGHTHAND SIDE

Test position	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	GSM	512	1850.2		1.6
		661	1880.0	0.130	
		810	1909.8		
Tilt (15°)	GSM	512	1850.2		1.6
		661	1880.0	0.100	
		810	1909.8		

11.3.3. BODY WORN

Test position	Mode	Sep. dist. (cm)	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
LCD down	GPRS 4 slots	2	512	1850.2		1.6
			661	1880.0	0.657	
			810	1909.8		
LCD up	GPRS 4 slots	2	512	1850.2		1.6
			661	1880.0	0.111	
			810	1909.8		

11.4. UMTS BAMD V (850 MHZ)

11.4.1. LEFT HAND SIDE

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	Rel 99 12.2kps RMC	4132	4357	826.4		1.6
		4182	4407	836.4	0.089	
		4233	4458	846.6		
Tilt (15°)	Rel 99 12.2kps RMC	4132	4357	826.4		1.6
		4183	4408	836.6	0.059	
		4233	4458	846.6		

11.4.2. RIGHTHAND SIDE

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	Rel 99 12.2kps RMC	4132	4357	826.4		1.6
		4182	4407	836.4	0.099	
		4233	4458	846.6		
Tilt (15°)	Rel 99 12.2kps RMC	4132	4357	826.4		1.6
		4183	4408	836.6	0.091	
		4233	4458	846.6		

11.4.3. BODY WORN

Test position	Mode	Sep. dist. (cm)	UL Ch No.	DL Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
LCD down	Rel 99 12.2kps RMC	2	4132	4357	826.4		1.6
			4182	4407	836.6	0.259	
			4233	4458	846.6		
LCD up	Rel 99 12.2kps RMC	2	4132	4357	826.4		1.6
			4182	4407	836.6	0.071	
			4233	4458	846.6		
LCD down	HSPA Sub-test 5	2	4132	4357	826.4		1.6
			4182	4407	836.6	0.259	
			4233	4458	846.6		

11.5. GSM850

11.5.1. LEFT HAND SIDE

Test position	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	GSM	128	824.2		1.6
		190	836.6	0.171	
		251	848.8		
Tilt (15°)	GSM	128	824.2		1.6
		190	836.6	0.110	
		251	848.8		

11.5.2. RIGHTHAND SIDE

Test position	Mode	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
Touch	GSM	128	824.2		1.6
		190	836.6	0.165	
		251	848.8		
Tilt (15°)	GSM	128	824.2		1.6
		190	836.6	0.164	
		251	848.8		

11.5.3. BODY WORN

Test position	Mode	Sep. dist. (cm)	Ch No.	f (MHz)	1g SAR (mW/g)	Limit (mW/g)
LCD Face down	GPRS 2 slots	2	190 (Mid)	836.6	0.677	1.6
	GPRS 3 slots	2	190 (Mid)	836.6	0.949	
	GPRS 4 slots	2	190 (Mid)	836.6	1.210	
	GSPS 4 slots	2	128 (Low)	824.2	0.871	1.6
			251 (High)	848.8	1.190	
LCD Face up	GSPS 4 slots	2	128 (Low)	824.2		1.6
			190 (Mid)	836.6	0.099	
			251 (High)	848.8		

11.6. WIFI

11.6.1. 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		

11.6.2. 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		

11.6.3. 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		

11.7. BLUETOOTH

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.

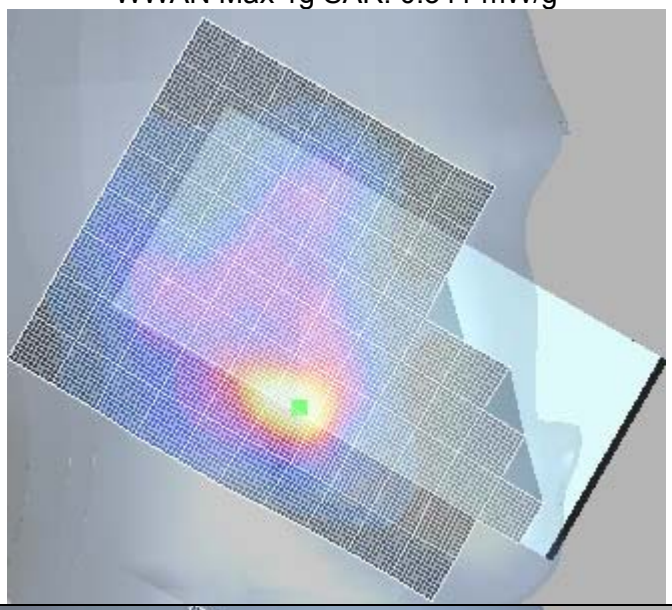
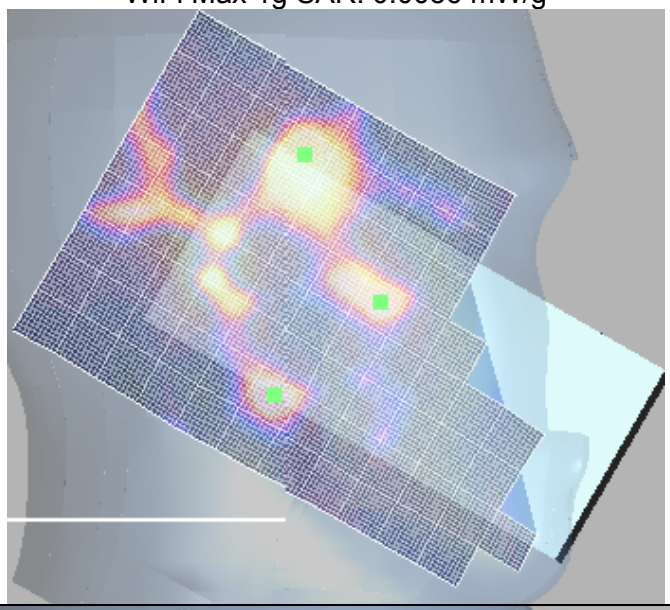
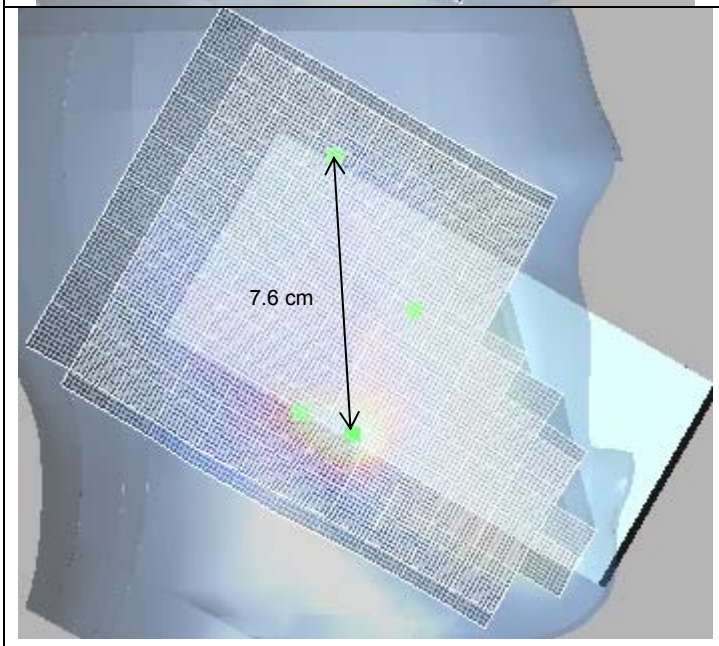
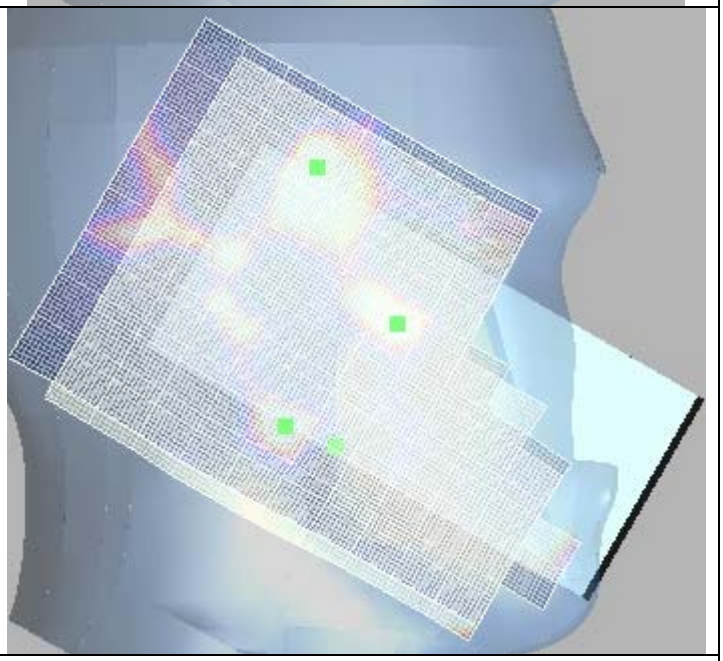
12. KDB 648474 SAR HANDSETS MULTI XMITER ASSESSMENT

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: 7.6 cm (see page 42) Body worn with 2 cm separation distance: 4.2 cm (see page 43)
Highest 1-g SAR:	Test position / Mode / Highest SAR / Sum of the 1-g SAR Head (LHS Touch) / WWAN / 0.341 mW/g / 0.3466 mW/g 802.11b / 0.0056 mW/g Body (LCD down) / WWAN / 1.21 mW/g / 1.236 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: 0.046 (0.3466/7.6) Body worn with 2 cm separation distance: 0.294 (1.236/4.2)
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.

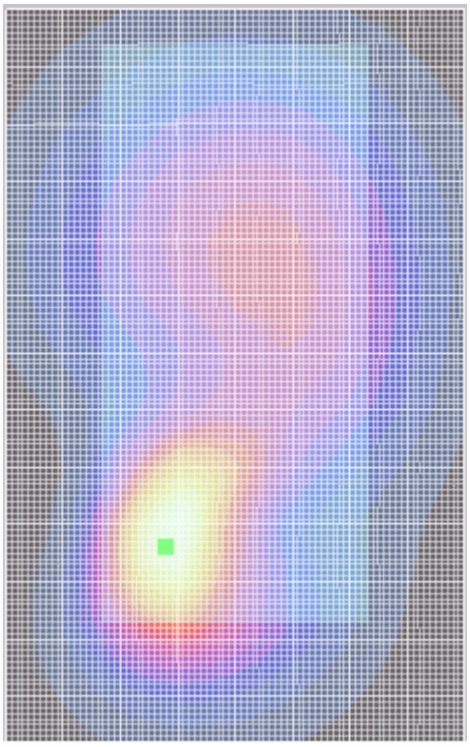
Separation distances between Peaks SAR in area scans for Head (Left hand side) position

WWAN Max 1g SAR: 0.341 mW/g	WiFi Max 1g SAR: 0.0056 mW/g
	
	

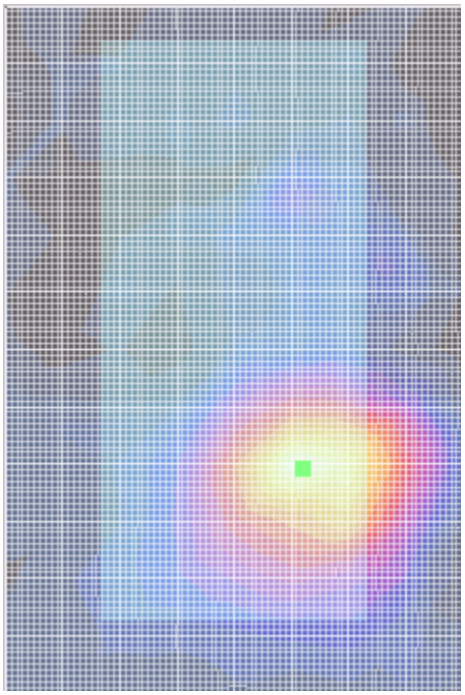
The sum of the 1g SAR = 0.3466
Separation distances between peaks SAR in area scans = 7.6 cm
SAR to Peak location separation ratio: 0.046 (0.3466 / 7.6)

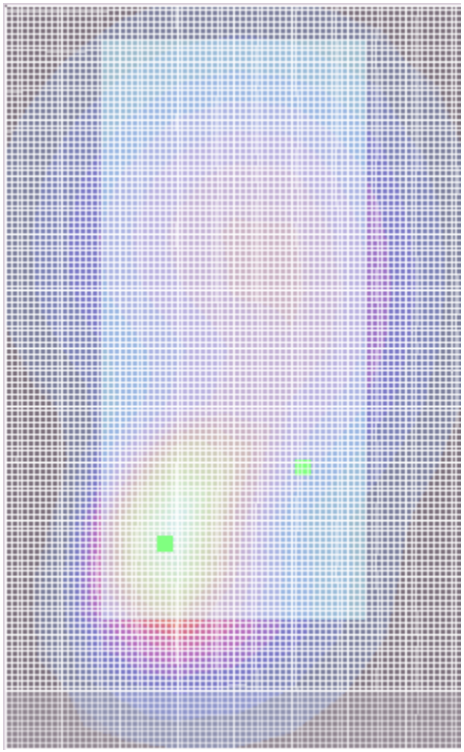
Separation distances between Peaks SAR in area scans for Body position)

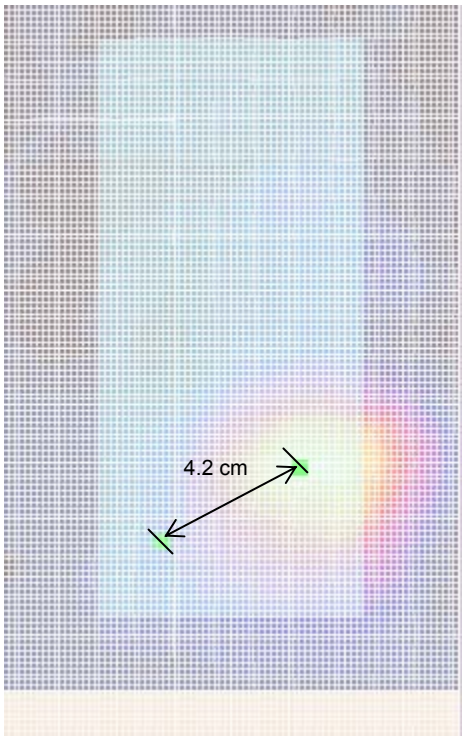
WWAN Max 1g SAR: 1.21 mW/g



WiFi Max 1g SAR: 0.026 mW/g







The sum of the 1g SAR = 1.236
Separation distances between peaks SAR in area scans = 4.2 cm
SAR to Peak location separation ratio: 0.294 (1.236 / 4.2)

13. WORST-CASE SAR TEST PLOTS

WORST-CASE SAR PLOT for GSM/UMTS1900 **HEAD** POSITION

Date/Time: 4/15/2009 2:48:52 PM

Test Laboratory: Compliance Certification Services

UMTS1900 Left Hand Side

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

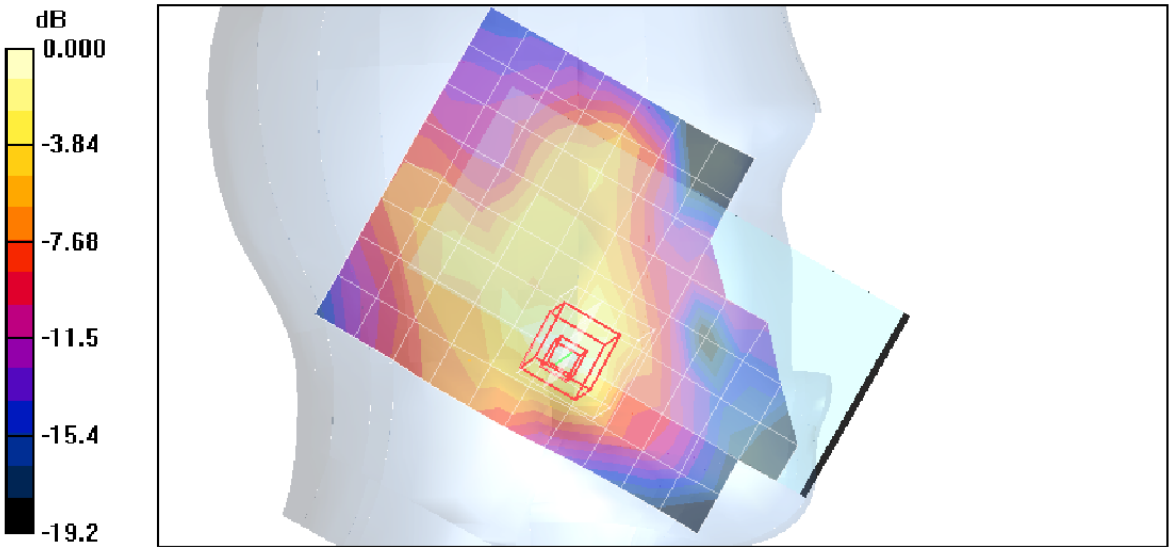
Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.44 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Left Section

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

L-Touch - M-ch/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.412 mW/g

L-Touch - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 5.10 V/m; Power Drift = 0.174 dB
Peak SAR (extrapolated) = 0.625 W/kg
SAR(1 g) = 0.341 mW/g; SAR(10 g) = 0.186 mW/g
Maximum value of SAR (measured) = 0.414 mW/g



0 dB = 0.414mW/g

WORST-CASE SAR PLOT for GSM/UMTS1900 **BODY** POSITION

Date/Time: 4/29/2009 4:09:46 PM

Test Laboratory: Compliance Certification Services

GSM1900 Body

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

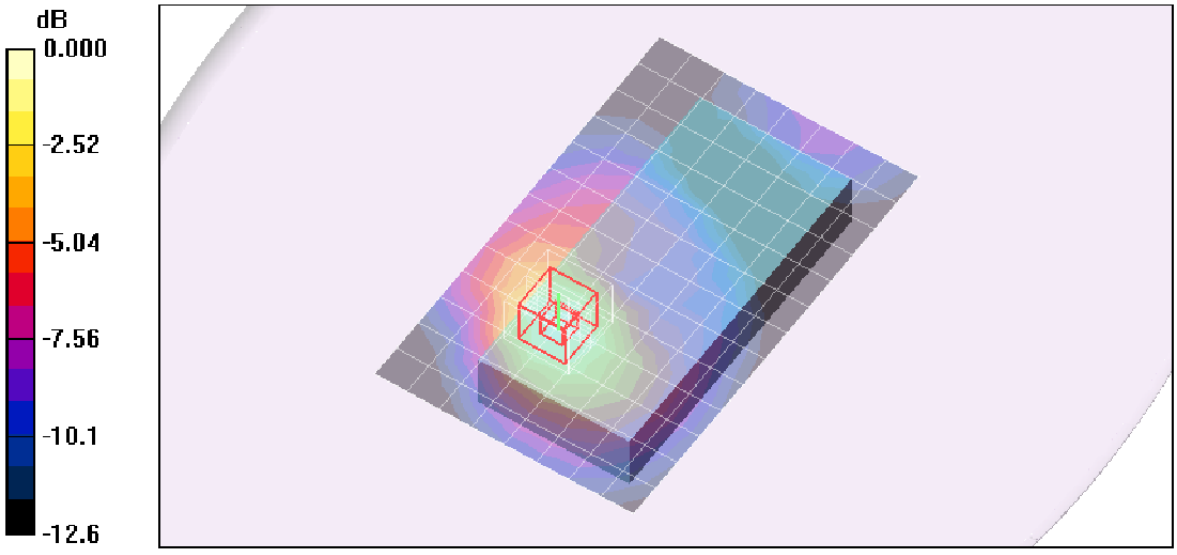
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2
Medium parameters used: f = 1880 MHz; σ = 1.51 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

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(6.85, 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 - GPRS 4 Slots M-ch/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.787 mW/g

LCD Face down, 2.0 cm - GPRS 4 Slots M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 10.1 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.657 mW/g; SAR(10 g) = 0.408 mW/g
Maximum value of SAR (measured) = 0.772 mW/g



0 dB = 0.772mW/g

WORST-CASE SAR PLOT for GSM/UMTS850 - **HEAD** POSITION

Date/Time: 4/24/2009 2:39:02 PM

Test Laboratory: Compliance Certification Services

GSM850 Left Hand Side

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

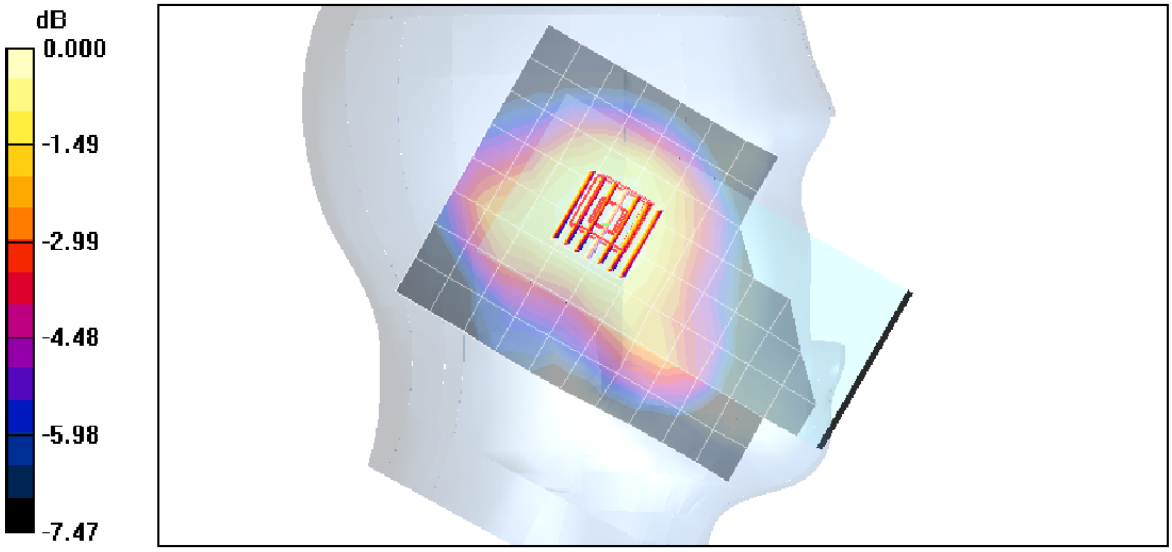
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.908 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Left Section

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

L-Touch - M-ch/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.186 mW/g

L-Touch - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 11.3 V/m; Power Drift = -0.135 dB
Peak SAR (extrapolated) = 0.213 W/kg
SAR(1 g) = 0.171 mW/g; SAR(10 g) = 0.135 mW/g
Info: Interpolated medium parameters used for SAR evaluation.



0 dB = 0.186mW/g

WORST-CASE SAR PLOT for GSM/UMTS850 - **BODY** POSITION

Date/Time: 4/28/2009 10:39:30 AM

Test Laboratory: Compliance Certification Services

GSM850 Body - LCD Face Down

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

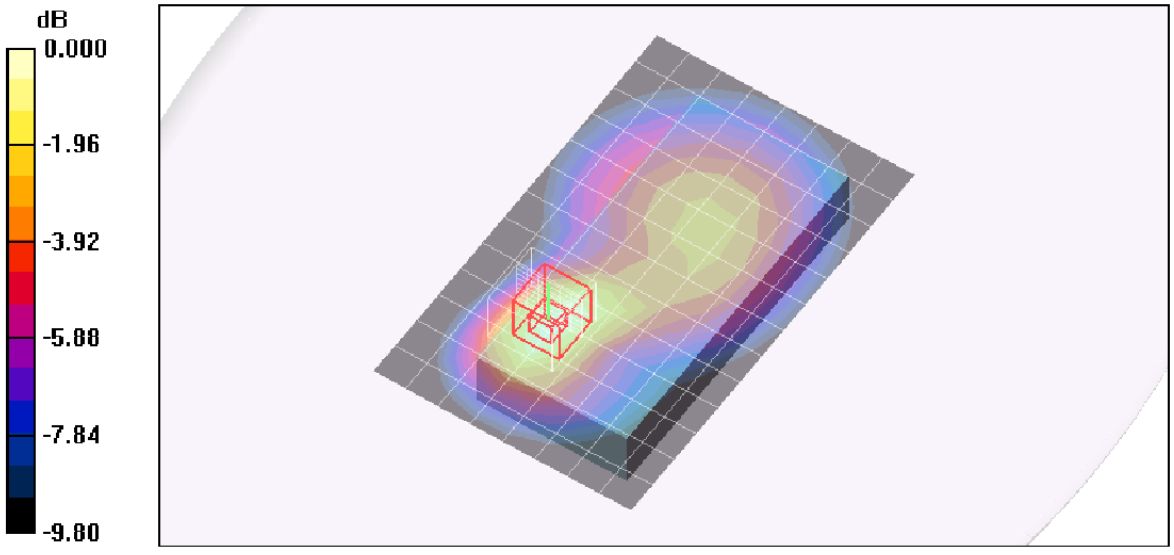
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:2
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.963 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 - GPRS 4 Slots M-ch/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.41 mW/g

LCD Face down, 2.0 cm - GPRS 4 Slots M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 26.5 V/m; Power Drift = -0.466 dB
Peak SAR (extrapolated) = 1.77 W/kg
SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.797 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.42 mW/g



0 dB = 1.42mW/g

WORST-CASE SAR PLOT for UMTS1700- **HEAD** POSITION

Date/Time: 4/16/2009 7:47:43 PM

Test Laboratory: Compliance Certification Services

UMTS Band IV - Right Hand Side

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

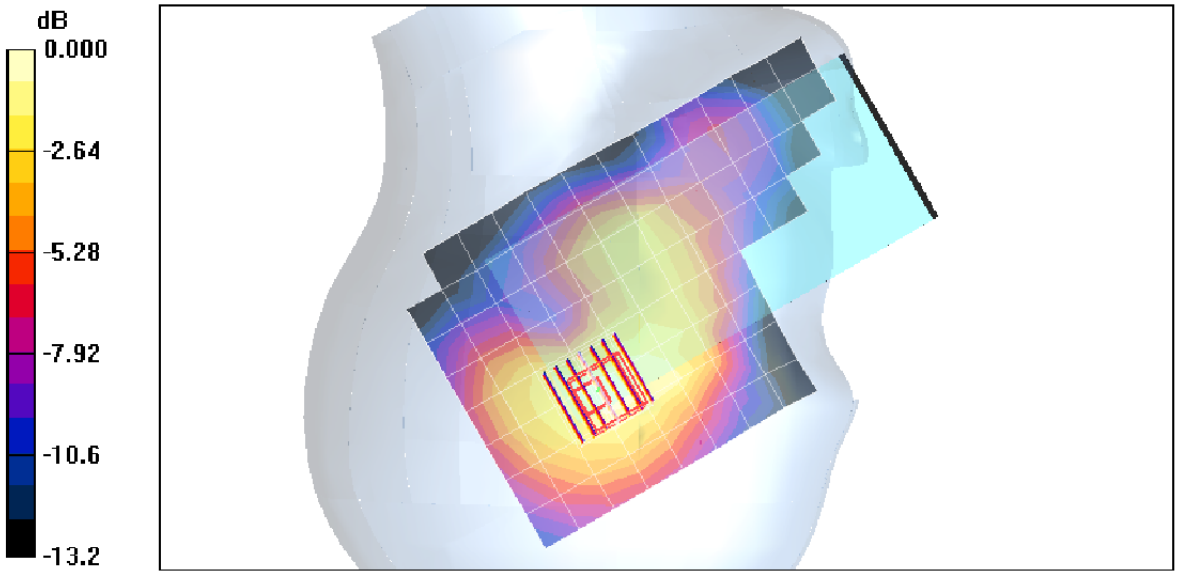
Communication System: UMTS Band IV; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.35 mho/m; ε_r = 39.8; ρ = 1000 kg/m^3
Phantom section: Right Section

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(7.69, 7.69, 7.69); 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
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.103 mW/g

R-Touch - M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.83 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 0.139 W/kg
SAR(1 g) = 0.088 mW/g; SAR(10 g) = 0.053 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.105 mW/g



0 dB = 0.105mW/g

WORST-CASE SAR PLOT for UMTS1700- **BODY** POSITION

Date/Time: 4/30/2009 5:51:32 PM

Test Laboratory: Compliance Certification Services

UMTS1700 Body

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

Communication System: UMTS Band IV; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.4 MHz; σ = 1.46 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section

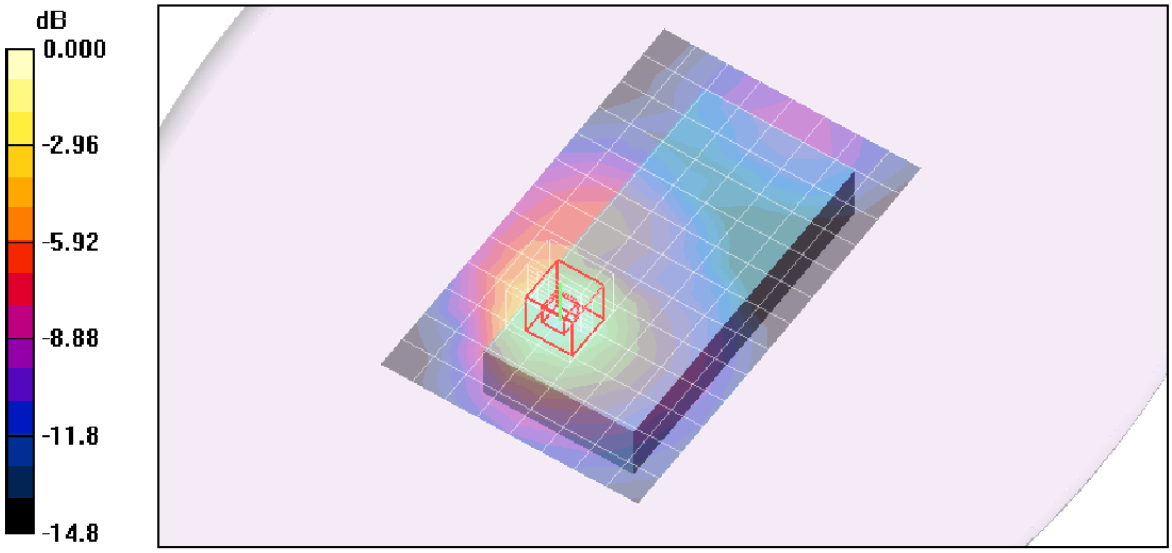
Room Ambient Temperature: 24.0 deg. C; Liquid Temperature: 23.0 deg. C

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(7.16, 7.16, 7.16); 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 - HSPA Sub-test 5 M-ch/Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.194 mW/g

LCD Face down, 2.0 cm - HSPA Sub-test 5 M-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.32 V/m; Power Drift = 0.426 dB
Peak SAR (extrapolated) = 0.254 W/kg
SAR(1 g) = 0.164 mW/g; SAR(10 g) = 0.099 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.193 mW/g



0 dB = 0.193mW/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

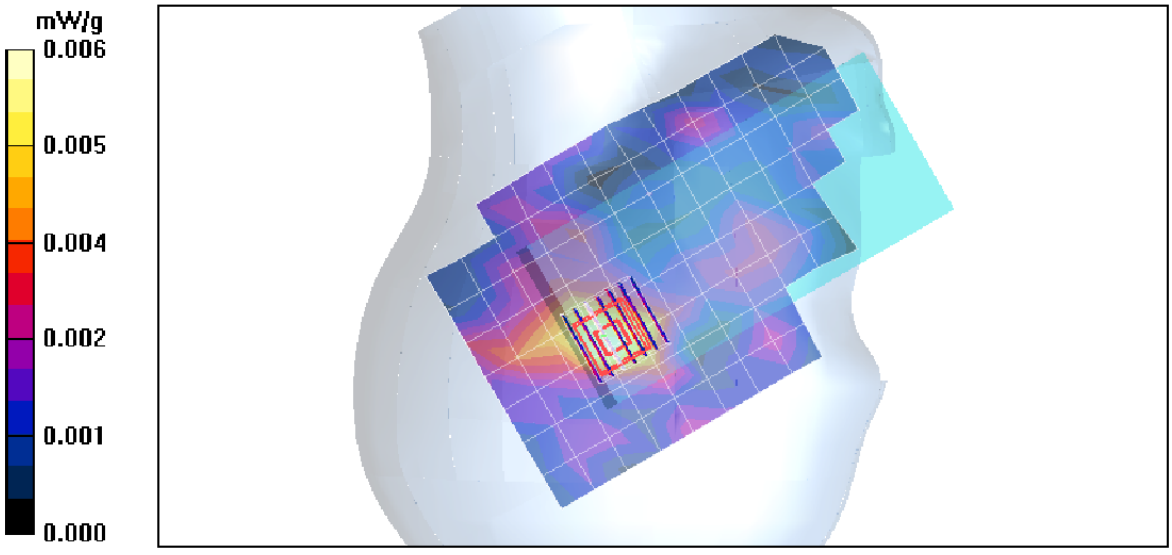
Communication System: 802.11bg; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.87 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Right Section

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

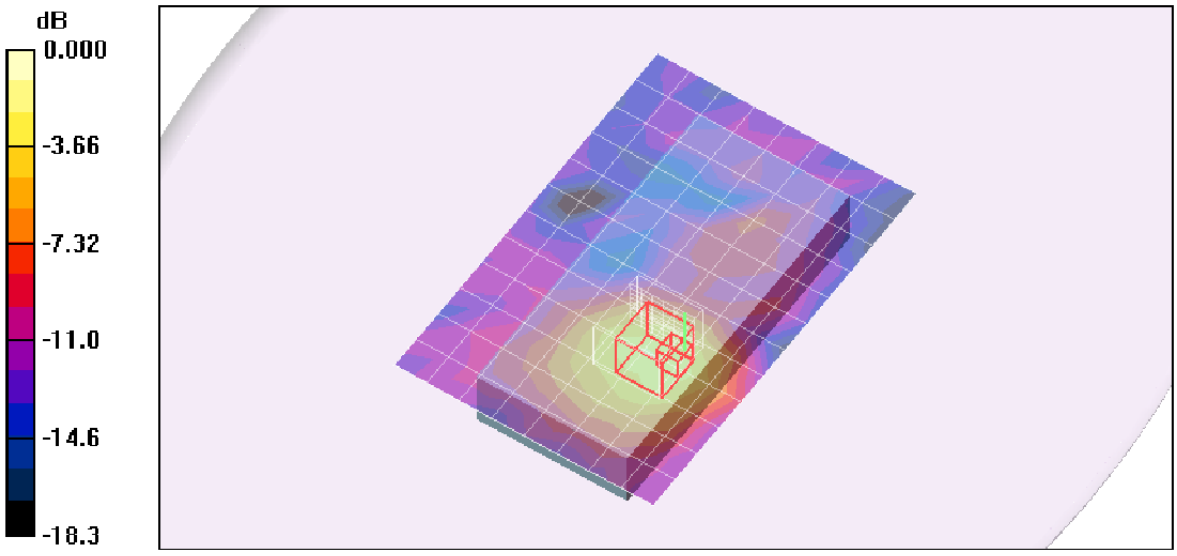
Communication System: 802.11bg; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.93 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

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

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