FCC OET BULLETIN 65 SUPPLEMENT C
IC RSS-102 ISSUE 4

SAR EVALUATION REPORT

For

Handheld Terminal

MODEL: IT-800G

FCC ID: N7NMC8795
IC: 2417C-MC8795

REPORT NUMBER: 09J12067-2A

ISSUE DATE: April 26, 2010

Prepared for

SIERRA WIRELESS INC.
13811 WIRELESS WAY
RICHMOND, BC, V6V 3A4
CANADA

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	April 19, 2010	Initial Issue	--
A	April 26, 2010	Fixed typos on page 24	Sunny Shih

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Sierra Wireless Inc. 13811 Wireless Way Richmond, BC, V6V 3A4 Canada
EUT DESCRIPTION:	Handheld Terminal
MODEL NUMBER:	IT-800G
DEVICE CATEGORY:	Portable
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure
DATE TESTED:	March 23 - 28, 2010

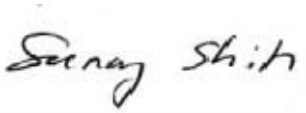
FCC / IC Rule Parts	Frequency Range [MHz]	Highest 1-g SAR (mW/g)	Limit (mW/g)
22H / RSS-132	824 - 849	Head: 0.026 (LHS Touch); Body: 0.406 (Face Down)	1.6
24E / RSS-133	1850 - 1910	Head: 0.081 (LHS Touch); Body: 1.09 (Face Down)	

Applicable Standards	Test Results
FCC OET Bulletin 65 Supplement C 01-01 IC RSS 102 Issue 4	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.

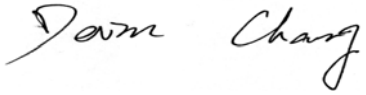
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this 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 (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released For CCS By:



SUNNY SHIH
ENGINEERING SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



DEVIN CHANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C 01-01, IC RSS 102 Issue 4 and the following specific FCC Test Procedures.

- KDB 941225 D01 SAR test for 3G devices v02
- KDB 941225 D03 SAR Test Reduction GSM/GPRS/EDGE vo1
- KDB 648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05

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.

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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	22	2010
Signal Generator	Agilent	8753ES-6	MY40001647	11	22	2010
E-Field Probe	SPEAG	EX3DV4	3686	3	23	2010
Thermometer	ERTCO	639-1S	1718	5	1	2010
Data Acquisition Electronics	SPEAG	DAE3 V1	500	9	15	2010
System Validation Dipole	SPEAG	D835V2	4d002	4	23	2011
System Validation Dipole	SPEAG	D1900V2	5d043	11	24	2011
System Validation Dipole	SPEAG	D2450V2	748	4	14	2010
ESG Vector Signal Generator	Agilent	E4438C	US44271090	9	17	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	H835	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M835	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	H2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPEAG	M2450	N/A	Within 24 hrs of first test		

Note: Per KDB 450824 D02 requirements for dipole calibration, CCS has adopted three years calibration intervals. On annual basis, each measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole
2. System validation with specific dipole is within 10% of calibrated value.
3. Return-loss is within 20% of calibrated measurement (test data on file in CCS)
4. Impedance is within 5Ω of calibrated measurement (test data on file in CCS)

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4.2. MEASUREMENT UNCERTAINTY

Measurement uncertainty for 300 MHz to 3 GHz averaged over 10 gram

Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1) @ 2450 MHz	5.50	Normal	1	1	5.50
Axial Isotropy	1.15	Rectangular	1.732	0.7071	0.47
Hemispherical Isotropy	2.30	Rectangular	1.732	0.7071	0.94
Boundary Effect	0.90	Rectangular	1.732	1	0.52
Probe Linearity	3.45	Rectangular	1.732	1	1.99
System Detection Limits	1.00	Rectangular	1.732	1	0.58
Readout Electronics	0.30	Normal	1	1	0.30
Response Time	0.80	Rectangular	1.732	1	0.46
Integration Time	2.60	Rectangular	1.732	1	1.50
RF Ambient Conditions - Noise	3.00	Rectangular	1.732	1	1.73
RF Ambient Conditions - Reflections	3.00	Rectangular	1.732	1	1.73
Probe Positioner Mechanical Tolerance	0.40	Rectangular	1.732	1	0.23
Probe Positioning with respect to Phantom	2.90	Rectangular	1.732	1	1.67
Extrapolation, Interpolation and Integration	1.00	Rectangular	1.732	1	0.58
Test Sample Related					
Test Sample Positioning	2.90	Normal	1	1	2.90
Device Holder Uncertainty	3.60	Normal	1	1	3.60
Output Power Variation - SAR Drift	5.00	Rectangular	1.732	1	2.89
Phantom and Tissue Parameters					
Phantom Uncertainty (shape and thickness)	4.00	Rectangular	1.732	1	2.31
Liquid Conductivity - deviation from target	5.00	Rectangular	1.732	0.43	1.24
Liquid Conductivity - measurement	1.50	Normal	1	0.43	0.65
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.49	1.41
Liquid Permittivity - measurement uncertainty	4.74	Normal	1	0.49	2.32
Combined Standard Uncertainty Uc(y), % =					9.59
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				19.19	%
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =				1.52	dB

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5. EQUIPMENT UNDER TEST

Handheld Terminal with GSM-EDGE-UMTS-HSPA)GSM/UMTS and Bluetooth Model: IT-800G	
Mobile phone capability:	Class B
GPRS Multi-slot class:	Class 12 (4 up slots)
Normal operation:	Held to head and worn on body
Battery Pack:	Standard - HA-D20BAT, Li-ion 3.7V 1850 mAh Extended - HA-D21LBAT, Li-ion 3.7V 3700 mAh
Other radio modules in host:	Bluetooth
Antenna-to-antenna separation distances:	7.0 cm from WWAN main antenna-to-BT antenna
Simultaneous transmission:	WWAN can transmit simultaneously with Bluetooth
Assessment for SAR evaluation for Simultaneous transmission:	3G and BT KDB 648474 table 2 - Stand-alone SAR not required when output ≤ $2 \cdot P_{Ref}$ and antenna is ≥ 5.0 cm from other antennas. Therefore, SAR is not required when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antenna.

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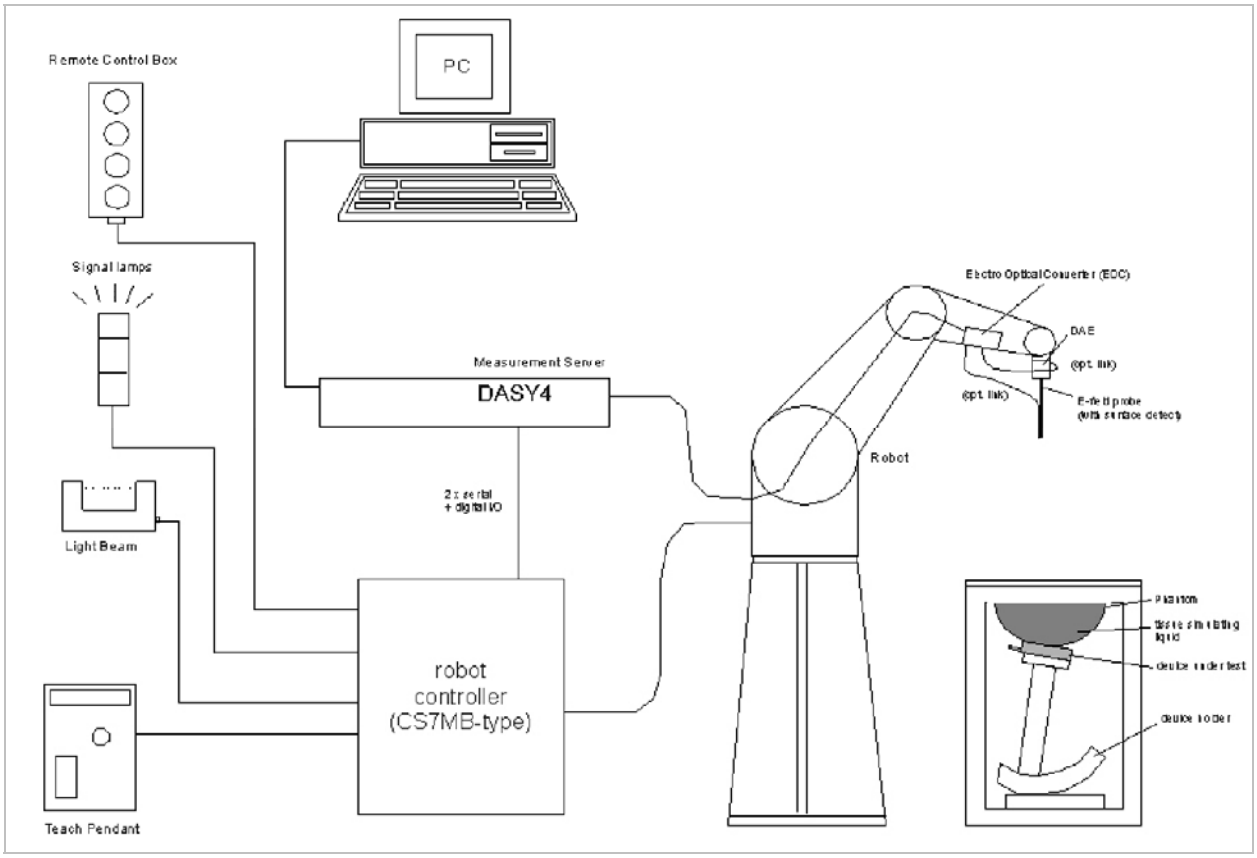
6. SYSTEM SPECIFICATIONS



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.

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7. 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. For frequencies in 300 MHz to just under 2 GHz, the measured conductivity and relative permittivity should be within ± 5% of the target values. For frequencies in the range of 2–3 GHz and above the measured conductivity should be within ± 5% of the target values. The measured relative permittivity tolerance can be relaxed to no more than ± 10%.

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 1528 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)

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7.1. LIQUID CHECK RESULTS FOR 835 MHZ

Simulating Liquid Dielectric Parameters for Head 835 MHz
Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	43.47	Relative Permittivity (ε_r):	43.467	41.5	4.74	± 5
	e"	19.10	Conductivity (σ):	0.887	0.90	-1.43	± 5
900	e'	42.72	Relative Permittivity (ε_r):	42.718	41.5	2.94	± 5
	e"	19.01	Conductivity (σ):	0.952	0.97	-1.89	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
March 25, 2010 02:00 PM

Frequency	e'	e"
800000000.	43.8741	19.1776
805000000.	43.8367	19.1607
810000000.	43.8094	19.1147
815000000.	43.7560	19.1260
820000000.	43.7187	19.1224
825000000.	43.6274	19.1164
830000000.	43.5399	19.0763
835000000.	**43.4667**	**19.0969**
840000000.	43.4407	19.0898
845000000.	43.3375	19.0622
850000000.	43.2494	19.0574
855000000.	43.1971	19.0381
860000000.	43.1252	19.0275
865000000.	43.0604	19.0304
870000000.	42.9788	19.0008
875000000.	42.9273	19.0108
880000000.	42.8869	19.0161
885000000.	42.8317	19.0122
890000000.	42.7599	19.0041
895000000.	42.7283	18.9865
900000000.	**42.7182**	**19.0068**
905000000.	42.6772	18.9820
910000000.	42.6317	18.9713
915000000.	42.6208	18.9493
920000000.	42.5235	18.9315
925000000.	42.5102	18.9264
930000000.	42.4299	18.8905
935000000.	42.3444	18.8577
940000000.	42.2973	18.8651

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

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Simulating Liquid Dielectric Parameters for Body 835 MHz
Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	56.16	Relative Permittivity (ε_r):	56.160	55.2	1.74	± 5
	e"	21.07	Conductivity (σ):	0.979	0.97	0.90	± 5
900	e'	55.52	Relative Permittivity (ε_r):	55.521	55.0	0.95	± 5
	e"	21.24	Conductivity (σ):	1.064	1.05	1.29	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
March 26, 2010 10:31 AM

Frequency	e'	e"
800000000.	56.5277	21.6555
805000000.	56.4748	21.5971
810000000.	56.3953	21.4523
815000000.	56.3491	21.3601
820000000.	56.3270	21.2604
825000000.	56.2467	21.1703
830000000.	56.1848	21.1120
835000000.	**56.1602**	**21.0702**
840000000.	56.1433	21.0245
845000000.	56.0724	21.0090
850000000.	56.0136	21.0365
855000000.	55.9804	21.0588
860000000.	55.9358	21.1054
865000000.	55.8762	21.1692
870000000.	55.8289	21.2041
875000000.	55.7877	21.2620
880000000.	55.7493	21.3138
885000000.	55.6651	21.3438
890000000.	55.6123	21.3340
895000000.	55.5507	21.2993
900000000.	**55.5209**	**21.2422**
905000000.	55.4723	21.1447
910000000.	55.4929	21.0243
915000000.	55.5504	20.9082
920000000.	55.5177	20.8289
925000000.	55.5505	20.7364
930000000.	55.5756	20.7085
935000000.	55.5383	20.7100
940000000.	55.4951	20.7067

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

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Simulating Liquid Dielectric Parameters for Body 835 MHz
Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
835	e'	56.24	Relative Permittivity (ε_r):	56.244	55.2	1.89	± 5
	e"	21.13	Conductivity (σ):	0.982	0.97	1.20	± 5
900	e'	55.62	Relative Permittivity (ε_r):	55.616	55.0	1.12	± 5
	e"	21.29	Conductivity (σ):	1.066	1.05	1.50	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
March 28, 2010 11:33 AM

Frequency	e'	e"
800000000.	56.6076	21.7016
805000000.	56.5708	21.6387
810000000.	56.5021	21.5059
815000000.	56.4645	21.4129
820000000.	56.4277	21.3203
825000000.	56.3506	21.2277
830000000.	56.2902	21.1724
835000000.	**56.2441**	**21.1327**
840000000.	56.2170	21.1009
845000000.	56.1493	21.0831
850000000.	56.1002	21.0957
855000000.	56.0714	21.1417
860000000.	56.0190	21.1742
865000000.	55.9757	21.2195
870000000.	55.9280	21.2540
875000000.	55.8814	21.3101
880000000.	55.8418	21.3445
885000000.	55.7574	21.4048
890000000.	55.6924	21.3665
895000000.	55.6173	21.3610
900000000.	**55.6164**	**21.2865**
905000000.	55.5751	21.2014
910000000.	55.5890	21.0842
915000000.	55.6386	20.9764
920000000.	55.6253	20.8934
925000000.	55.6339	20.8105
930000000.	55.6682	20.7763
935000000.	55.6326	20.7804
940000000.	55.5607	20.7858
945000000.	55.5100	20.7955

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

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7.2. LIQUID CHECK RESULTS FOR 1900 MHZ

Simulating Liquid Dielectric Parameters for Head 1900 MHz
Room Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Devin Chang

f (MHz)	Liquid Parameters		Measured Results		Target	Delta (%)	Limit (%)
1900	e'	39.946	Relative Permittivity (ε_r):	39.9457	40.0	-0.14	± 5
	e"	13.405	Conductivity (σ):	1.41693	1.40	1.21	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
March 23, 2010 9:23 AM

Frequency	e'	e"
1710000000.	40.6831	12.8922
1720000000.	40.6453	12.9329
1730000000.	40.6178	12.9704
1740000000.	40.5392	13.0313
1750000000.	40.5072	13.0341
1760000000.	40.4556	13.0323
1770000000.	40.4550	13.0475
1780000000.	40.4376	13.0582
1790000000.	40.3803	13.0947
1800000000.	40.3628	13.1233
1810000000.	40.3122	13.1662
1820000000.	40.2476	13.2256
1830000000.	40.1765	13.2578
1840000000.	40.0981	13.2864
1850000000.	40.0520	13.3024
1860000000.	40.0538	13.3076
1870000000.	40.0456	13.3394
1880000000.	40.0370	13.3720
1890000000.	39.9836	13.3916
1900000000.	**39.9457**	**13.4053**
1910000000.	39.9024	13.3513

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}

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Simulating Liquid Dielectric Parameters for Body 1900 MHz
Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Devin Chang

f (MHz)	Muscle Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	53.884	Relative Permittivity (ϵ_r):	53.8838	53.3	1.10	± 5
	e"	14.542	Conductivity (σ):	1.53712	1.52	1.13	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
March 23, 2010 9:29 AM

Frequency	e'	e"
1710000000.	54.4475	13.9918
1720000000.	54.4326	14.0336
1730000000.	54.3911	14.0769
1740000000.	54.3445	14.1286
1750000000.	54.3033	14.1382
1760000000.	54.2890	14.1362
1770000000.	54.2855	14.1484
1780000000.	54.2862	14.1759
1790000000.	54.2462	14.2096
1800000000.	54.2178	14.2322
1810000000.	54.1705	14.2961
1820000000.	54.1185	14.3602
1830000000.	54.0334	14.4051
1840000000.	53.9773	14.4257
1850000000.	53.9460	14.4361
1860000000.	53.9699	14.4484
1870000000.	53.9920	14.4767
1880000000.	53.9812	14.5143
1890000000.	53.9305	14.5348
1900000000.	**53.8838**	**14.5424**
1910000000.	53.8618	14.5047

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

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Simulating Liquid Dielectric Parameters for Head 1900 MHz
Room Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Devin Chang

f (MHz)	Liquid Parameters		Measured Results		Target	Delta (%)	Limit (%)
1900	e'	40.067	Relative Permittivity (ϵ_r):	40.0665	40.0	0.17	± 5
	e"	13.381	Conductivity (σ):	1.41436	1.40	1.03	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
March 24, 2010 10:16 AM

Frequency	e'	e"
1710000000.	40.7938	12.8688
1720000000.	40.7556	12.9093
1730000000.	40.7094	12.9516
1740000000.	40.6463	12.9982
1750000000.	40.6016	13.0061
1760000000.	40.5765	13.0025
1770000000.	40.5576	13.0166
1780000000.	40.5262	13.0339
1790000000.	40.4891	13.0740
1800000000.	40.4595	13.1019
1810000000.	40.4114	13.1477
1820000000.	40.3450	13.2084
1830000000.	40.2764	13.2434
1840000000.	40.1978	13.2719
1850000000.	40.1673	13.2895
1860000000.	40.1586	13.2898
1870000000.	40.1618	13.3187
1880000000.	40.1542	13.3553
1890000000.	40.1047	13.3762
1900000000.	**40.0665**	**13.3810**
1910000000.	40.0398	13.3383

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

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Simulating Liquid Dielectric Parameters for Body 1900 MHz
Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Devin Chang

f (MHz)	Muscle Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
1900	e'	53.951	Relative Permittivity (ϵ_r):	53.9513	53.3	1.22	± 5
	e"	14.564	Conductivity (σ):	1.53945	1.52	1.28	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
March 24, 2010 10:21 AM

Frequency	e'	e"
1710000000.	54.5102	14.0031
1720000000.	54.4806	14.0485
1730000000.	54.4579	14.0937
1740000000.	54.4003	14.1402
1750000000.	54.3771	14.1568
1760000000.	54.3605	14.1413
1770000000.	54.3522	14.1557
1780000000.	54.3591	14.1902
1790000000.	54.3087	14.2221
1800000000.	54.2877	14.2581
1810000000.	54.2455	14.3225
1820000000.	54.1802	14.3688
1830000000.	54.1039	14.4252
1840000000.	54.0412	14.4468
1850000000.	54.0131	14.4480
1860000000.	54.0459	14.4631
1870000000.	54.0642	14.4969
1880000000.	54.0566	14.5418
1890000000.	54.0013	14.5564
1900000000.	**53.9513**	**14.5644**
1910000000.	53.9268	14.5302

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

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8. SYSTEM CHECK

The system performance check is performed prior to any usage of the system in order to verify SAR system measurement accuracy. 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 100 mW
- The results are normalized to 1 W input power.

Reference SAR Values for HEAD & BODY-tissue from calibration certificate of SPEAG.

System validation dipole	Cal. certificate #	Cal. due date	SAR Avg (mW/g)		
			Tissue:	Head	Body
D835V2	D835V2-5d043_Nov09	Nov-12	SAR_{1g}:	9.64	9.96
			SAR_{10g}:	6.28	6.56
D1900V2	D1900V2-4d002_Apr09	Apr-12	SAR_{1g}:	39.8	40.4
			SAR_{10g}:	20.7	21.4

8.1. SYSTEM CHECK RESULTS FOR D835V2

Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Devin Chang

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Head			
D835V2	03/25/10	SAR_{1g}:	9.79	9.64	1.56	±10
		SAR_{10g}:	6.43	6.28	2.39	

8.2. SYSTEM CHECK RESULTS FOR D1900V2

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Devin Chang

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Head			
D1900V2	03/23/10	SAR_{1g}:	36.9	39.8	-7.29	±10
		SAR_{10g}:	19.2	20.7	-7.25	

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9. OUTPUT POWER VERIFICATION

9.1.GSM

GSM (GMSK)

Band	Ch No.	Frequency	Tx Conducted Power (dBm) (Avg burst Pwr)	
			Average	Peak
GSM850	128	824.2	31.90	
	190	836.6	31.90	
	251	848.8	31.90	
GSM1900	512	1850.2	29.20	
	661	1880	29.10	
	810	1909.8	29.00	

GPRS (GMSK) - Coding Scheme: MCS4

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)							
			1 slot	Frame Avg Pwr	2 slot	Frame Avg Pwr	3 slot	Frame Avg Pwr	4 slot	Frame Avg Pwr
GSM850	128	824.2	31.70	22.70	31.60	**25.60**	28.70	24.44	25.80	22.80
	190	836.6	31.80	22.80	31.70	**25.70**	28.80	24.54	25.90	22.90
	251	848.8	31.80	22.80	31.70	**25.70**	28.80	24.54	25.80	22.80
GSM1900	512	1850.2	29.10	20.10	29.00	23.00	29.00	24.74	29.00	**26.00**
	661	1880	29.00	20.00	28.90	22.90	28.90	24.64	28.90	**25.90**
	810	1909.8	28.90	19.90	28.80	22.80	28.70	24.44	28.70	**25.70**

EGPRS (8PSK) - Coding Scheme: MCS9

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)							
			1 slot	Frame Avg Pwr	2 slot	Frame Avg Pwr	3 slot	Frame Avg Pwr	4 slot	Frame Avg Pwr
GSM850	128	824.2	26.90	17.90	26.90	20.90	26.90	22.64	26.80	23.80
	190	836.6	27.00	18.00	27.00	21.00	27.00	22.74	26.90	23.90
	251	848.8	27.00	18.00	27.00	21.00	27.00	22.74	26.90	23.90
GSM1900	512	1850.2	26.50	17.50	26.50	20.50	26.50	22.24	26.40	23.40
	661	1880	26.40	17.40	26.40	20.40	26.40	22.14	26.30	23.30
	810	1909.8	26.20	17.20	26.20	20.20	26.10	21.84	26.10	23.10

Note: Based on above, the worst-case modes for GSM850 GPRS 2 slots and GSM1900 GPRS 4 slots.

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9.2. UMTS RELEASE 99

The following tests were completed according to the test requirements outlined in section 5.2 of the 3GPP TS34.121-1 specification. The EUT supports power Class 3, which has a nominal maximum output power of 24 dBm (+1.7/-3.7).

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc/βd	8/15

Results

Rel 99 (12.2kps RMC)

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	Avg Tx Pwr (dBm)
UMTS850 (Band V)	Rel 99 12.2kps RMC	4132	4357	826.4	23.00
		4175	4400	835.0	22.90
		4233	4458	846.6	22.80
UMTS1900 (Band II)	Rel 99 12.2kps RMC	9262	9662	1852.4	22.30
		9400	9800	1880.0	22.50
		9538	9938	1907.6	22.80

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9.3.UMTS HSDPA

The following 4 Sub-tests were completed according to Release 6 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			
	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			
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	CM (dB)	0	1	1.5	1.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	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)	Avg Tx Pwr (dBm)
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	22.00
		4175	4400	835.0	21.90
		4233	4458	846.6	21.80
	Subtest 2	4132	4357	826.4	21.40
		4182	4407	835.0	21.20
		4233	4458	846.6	21.10
	Subtest 3	4132	4357	826.4	20.60
		4175	4400	835.0	20.70
		4233	4458	846.6	20.60
	Subtest 4	4132	4357	826.4	20.60
		4175	4400	835.0	20.60
		4233	4458	846.6	20.40
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	21.40
		9400	9800	1880.0	22.10
		9538	9938	1907.6	22.16
	Subtest 2	9262	9662	1852.4	21.40
		9400	9800	1880.0	21.70
		9538	9938	1907.6	21.90
	Subtest 3	9262	9662	1852.4	20.61
		9400	9800	1880.0	21.00
		9538	9938	1907.6	20.80
	Subtest 4	9262	9662	1852.4	20.50
		9400	9800	1880.0	21.00
		9538	9938	1907.6	20.80

Note: KDB941225 D01 – Body SAR is not required when HSDPA max. Average power is not ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC. Based on above test results, body SAR is not required.

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9.4.UMTS Rel 6 HSPA (HSDPA & HSUPA)

The following 5 Sub-tests were completed according to Release 6 procedures in section 5.2 of 3GPP TS34.121. A summary of these settings are illustrated below:

	Mode	Rel6 HSPA	Rel6 HSPA	Rel6 HSPA	Rel6 HSPA	Rel6 HSPA
	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	

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Results

Rel 6 HSPA

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	Avg Tx Pwr (dBm)
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	21.10
		4175	4400	835.0	20.70
		4233	4458	846.6	20.90
	Subtest 2	4132	4357	826.4	19.70
		4175	4400	835.0	19.90
		4233	4458	846.6	19.80
	Subtest 3	4132	4357	826.4	20.40
		4175	4400	835.0	20.20
		4233	4458	846.6	20.20
	Subtest 4	4132	4357	826.4	19.80
		4175	4400	835.0	19.50
		4233	4458	846.6	19.50
	Subtest 5	4132	4357	826.4	21.10
		4175	4400	835.0	21.10
		4233	4458	846.6	21.40
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	21.70
		9400	9800	1880.0	21.00
		9538	9938	1907.6	20.60
	Subtest 2	9262	9662	1852.4	19.90
		9400	9800	1880.0	19.50
		9538	9938	1907.6	19.50
	Subtest 3	9262	9662	1852.4	20.40
		9400	9800	1880.0	20.10
		9538	9938	1907.6	20.20
	Subtest 4	9262	9662	1852.4	20.00
		9400	9800	1880.0	20.00
		9538	9938	1907.6	20.00
	Subtest 5	9262	9662	1852.4	19.60
		9400	9800	1880.0	20.50
		9538	9938	1907.6	20.30

Note: KDB 941225 D01 – Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2kbps RMC is ≤ 75% of the SAR limit.

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10. SAR TEST RESULTS

10.1. GSM850

Left Hand Side

Test position	Mode	Ch No.	f (MHz)	SAR (mW/g)	
				1-g	10-g
Touch	GSM	128	824.2		
		190	836.6	**0.026**	**0.019**
		251	848.8		
Tilt (15°)	GSM	128	824.2		
		190	836.6	0.014	0.0098
		251	848.8		

Right Hand Side

Test position	Mode	Ch No.	f (MHz)	SAR (mW/g)	
				1-g	10-g
Touch	GSM	128	824.2		
		190	836.6	0.021	0.015
		251	848.8		
Tilt (15°)	GSM	128	824.2		
		190	836.6	0.011	0.00863
		251	848.8		

Left Hand Side with extended battery pack

Test position	Mode	Ch No.	f (MHz)	SAR (mW/g)	
				1-g	10-g
Touch	GSM	128	824.2		
		190	836.6	0.018	0.014
		251	848.8		

BODY with 1.5 cm separation distance

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM835	GPRS 2 slots	Face up	128	824.2		
			190	836.6	0.014	0.010
			251	848.8		
		Face down	128	824.2		
			190	836.6	**0.406**	**0.251**
			251	848.8		
		Face down w/ extended battery	190	836.6	0.272	0.172

Note: GPRS 2 slots was chosen due to max frame average power. See section 9.1

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10.2. UMTS850 (Band V)

Left Hand Side

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Touch	Rel 99 12.2kps RMC	4132	4357	826.4		
		4175	4400	835.0	0.012	0.00938
		4233	4458	846.6		
Tilt (15◦)	Rel 99 12.2kps RMC	4132	4357	826.4		
		4175	4400	835.0	0.010	0.00707
		4233	4458	846.6		

Right hand Side

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Touch	Rel 99 12.2kps RMC	4132	4357	826.4		
		4175	4400	835.0	0.013	0.010
		4233	4458	846.6		
Tilt (15◦)	Rel 99 12.2kps RMC	4132	4357	826.4		
		4175	4400	835.0	0.00919	0.00624
		4233	4458	846.6		

Right Hand Side with extended battery pack

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Touch	Rel 99 12.2kps RMC	4132	4357	826.4		
		4175	4400	835.0	0.018	0.014
		4233	4458	846.6		

Body with 1.5 cm separation distance

Mode	Test position	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Rel 99 12.2kps RMC	Face up	4132	4357	826.4		
		4175	4400	835.0	0.00636	0.00469
		4233	4458	846.6		
	Face down	4132	4357	826.4		
		4175	4400	835.0	0.190	0.118
		4233	4458	846.6		
	Face down w/ extended battery	4175	4400	835.0	0.133	0.084

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10.3. GSM1900

Left Hand Side

Test position	Mode	Ch No.	f (MHz)	SAR (mW/g)	
				1-g	10-g
Touch	GSM	512	1850.2		
		661	1880	0.032	0.018
		810	1909.8		
Tilt (15°)	GSM	512	1850.2		
		661	1880	0.018	0.011
		810	1909.8		

Right Hand Side

Test position	Mode	Ch No.	f (MHz)	SAR (mW/g)	
				1-g	10-g
Touch	GSM	512	1850.2		
		661	1880	0.031	0.020
		810	1909.8		
Tilt (15°)	GSM	512	1850.2		
		661	1880	0.013	0.00536
		810	1909.8		

Left Hand Side with extended battery pack

Test position	Mode	Ch No.	f (MHz)	SAR (mW/g)	
				1-g	10-g
Touch	GSM	512	1850.2		
		661	1880	0.032	0.018
		810	1909.8		

BODY with 1.5 cm separation distance

Band	Mode	Test position	Ch No.	Freq. (MHz)	SAR (mW/g)	
					1-g	10-g
GSM835	GPRS 4 slots	Face up	512	1850.2		
			661	1880	0.047	0.031
			810	1909.8		
		Face down	512	1850.2	0.790	0.455
			661	1880	**1.090**	**0.625**
			810	1909.8	0.512	0.312
		Face down w/ extended battery	661	1880	0.418	0.254

Note: GPRS 4 slots was chosen due to max frame average power. See section 9.1

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10.4. UMTS1900 (BAND II)

Left Hand Side

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Touch	Rel 99 12.2kps RMC	9262	9662	1852.4		
		9400	9800	1880.0	**0.081**	**0.046**
		9538	9938	1907.6		
Tilt (15°)	Rel 99 12.2kps RMC	9262	9662	1852.4		
		9400	9800	1880.0	0.061	0.033
		9538	9938	1907.6		

Right Hand Side

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Touch	Rel 99 12.2kps RMC	9262	9662	1852.4		
		9400	9800	1880.0	0.077	0.044
		9538	9938	1907.6		
Tilt (15°)	Rel 99 12.2kps RMC	9262	9662	1852.4		
		9400	9800	1880.0	0.057	0.033
		9538	9938	1907.6		

Left Hand Side with extended battery pack

Test position	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Touch	Rel 99 12.2kps RMC	9262	9662	1852.4		
		9400	9800	1880.0	0.081	0.045
		9538	9938	1907.6		

Body with 1.5 cm separation distance

Mode	Test position	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Rel 99 12.2kps RMC	Face up	9262	9662	1852.4		
		9400	9800	1880.0	0.023	0.015
		9538	9938	1907.6		
	Face down	9262	9662	1852.4		
		9400	9800	1880.0	0.778	0.447
		9538	9938	1907.6		
	Face down w/ extended battery	9400	9800	1880.0	0.778	0.447

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11. WORST-CASE SAR TEST PLOTS

Worst-case HEAD SAR Plot for Part 22

Date/Time: 3/25/2010 9:17:53 PM

Test Laboratory: Compliance Certification Services

Left Hand Side

DUT: Casio; Type: N/A; Serial: N/A

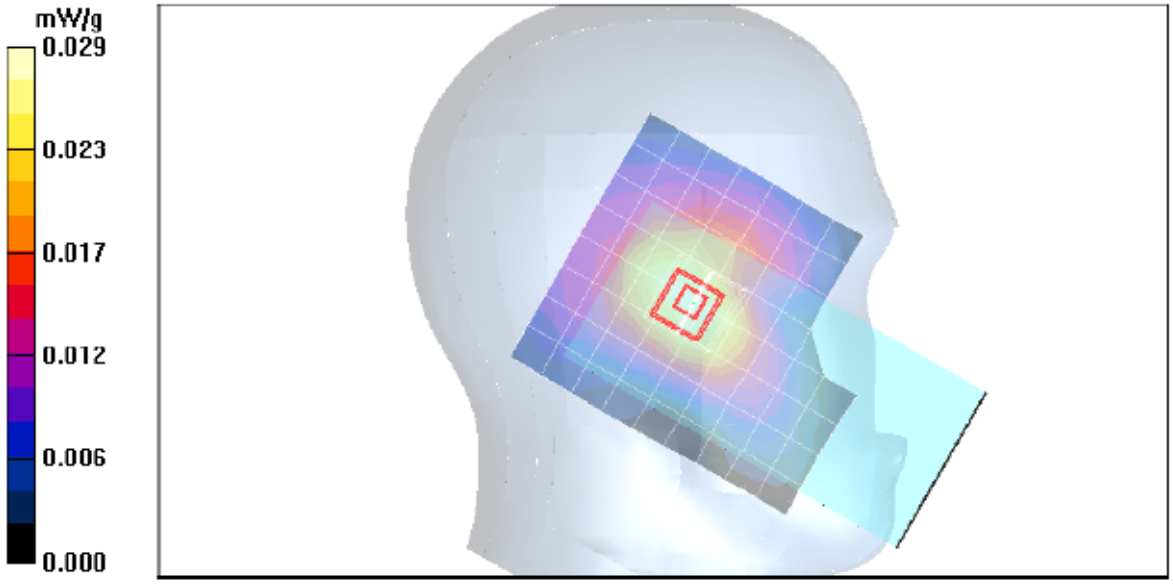
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.889 mho/m; ε_r = 43.5; ρ = 1000 kg/m^3
Phantom section: Left Section

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: EX3DV3 - SN3531; ConvF(10.13, 10.13, 10.13); Calibrated: 2/23/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 9/15/2009
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Touch position - Mid-ch/Area Scan (9x10x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.029 mW/g

Touch position - Mid-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 5.65 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 0.033 W/kg
SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.019 mW/g
Info: Interpolated medium parameters used for SAR evaluation.



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Worst-case Body SAR Plot for Part 22

Date/Time: 3/28/2010 5:57:49 PM

Test Laboratory: Compliance Certification Services

body

DUT: Casio; Type: N/A; Serial: N/A

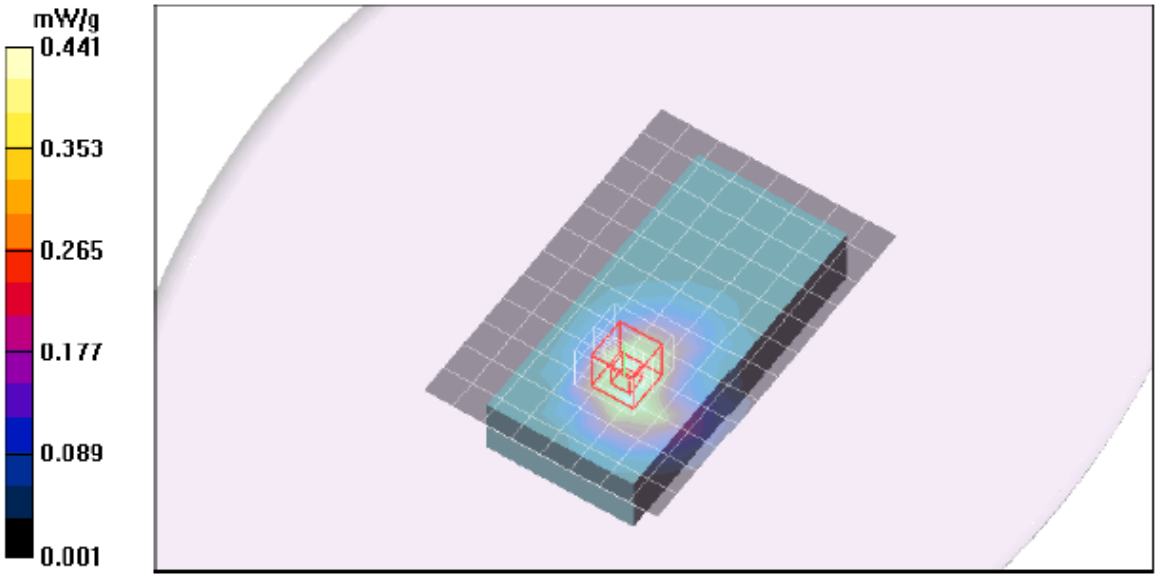
Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:4
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.983 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(10.18, 10.18, 10.18); Calibrated: 2/23/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 9/15/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Face down_GPRS 2 slots_Mid-ch/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.441 mW/g

Face down_GPRS 2 slots_Mid-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 20.7 V/m; Power Drift = -0.151 dB
Peak SAR (extrapolated) = 0.655 W/kg
SAR(1 g) = 0.406 mW/g; SAR(10 g) = 0.251 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.480 mW/g



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Worst-case Head SAR Plot for Part 24

Date/Time: 3/24/2010 5:57:52 PM

Test Laboratory: Compliance Certification Services

Left Hand Side

DUT: Casio; Type: N/A; Serial: N/A

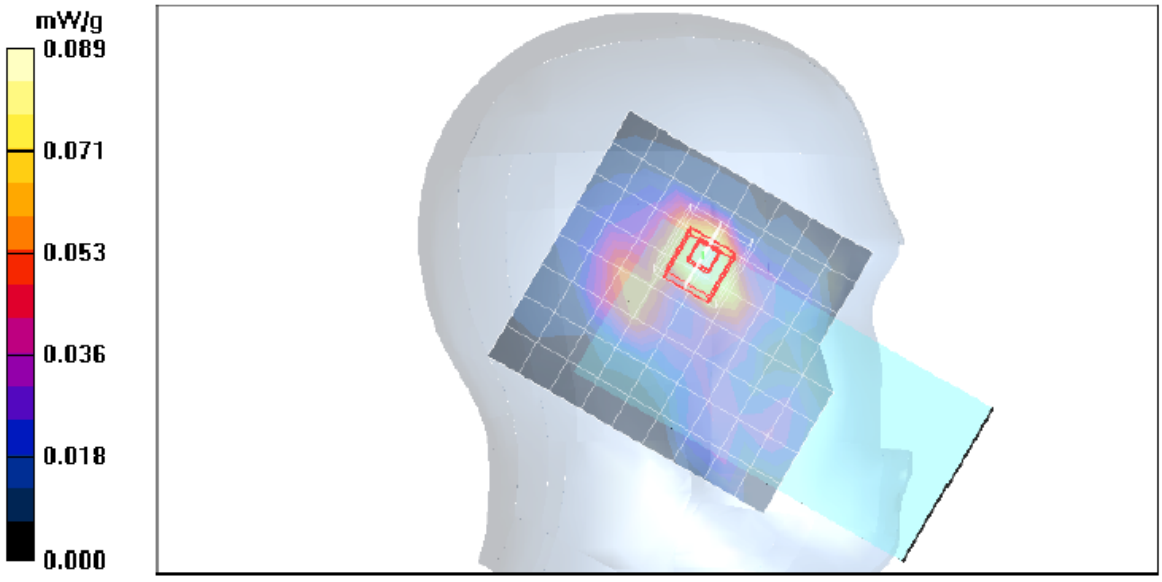
Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Left Section

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: EX3DV3 - SN3531; ConvF(8.64, 8.64, 8.64); Calibrated: 2/23/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 9/15/2009
- Phantom: SAM 2 (Twin); Type: SAM 2; Serial: 1050
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Touch position - Mid-ch/Area Scan (9x10x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.089 mW/g

Touch position - Mid-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 8.04 V/m; Power Drift = -0.164 dB
Peak SAR (extrapolated) = 0.170 W/kg
SAR(1 g) = 0.081 mW/g; SAR(10 g) = 0.046 mW/g
Maximum value of SAR (measured) = 0.104 mW/g



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Worst-case Body SAR Plot for Part 24

Date/Time: 3/23/2010 6:05:56 PM

Test Laboratory: Compliance Certification Services

body

DUT: Casio; Type: N/A; Serial: N/A

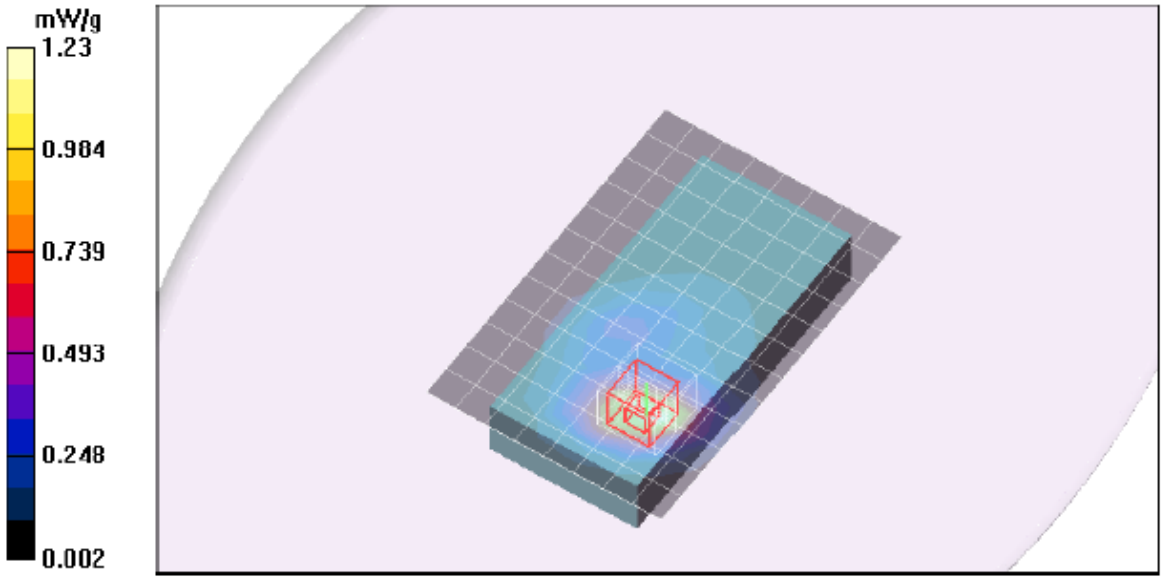
Communication System: DCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:2
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 54; ρ = 1000 kg/m^3
Phantom section: Flat Section

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: EX3DV3 - SN3531; ConvF(8.04, 8.04, 8.04); Calibrated: 2/23/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn500; Calibrated: 9/15/2009
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Face down_GPRS 4 slots_Mid-ch/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.23 mW/g

Face down_GPRS 4 slots_Mid-ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 28.2 V/m; Power Drift = 0.095 dB
Peak SAR (extrapolated) = 1.76 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.625 mW/g
Maximum value of SAR (measured) = 1.32 mW/g



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12. ATTACHMENTS

No.	Contents	No. of page (s)
1	System Performance Check Plots	4
2-1	SAR Test Plots for GSM850	8
2-2	SAR Test Plots for GSM1900	10
2-3	SAR Test Plots for UMTS Band V	8
2-4	SAR Test Plots for UMTS Band II	8
3	Certificate of E-Field Probe – EX3DV3 SN531	11
4	Certificate of System Validation Dipole - D835V2 SN:4d002	9
5	Certificate of System Validation Dipole - D1900V2 SN:5d043	9

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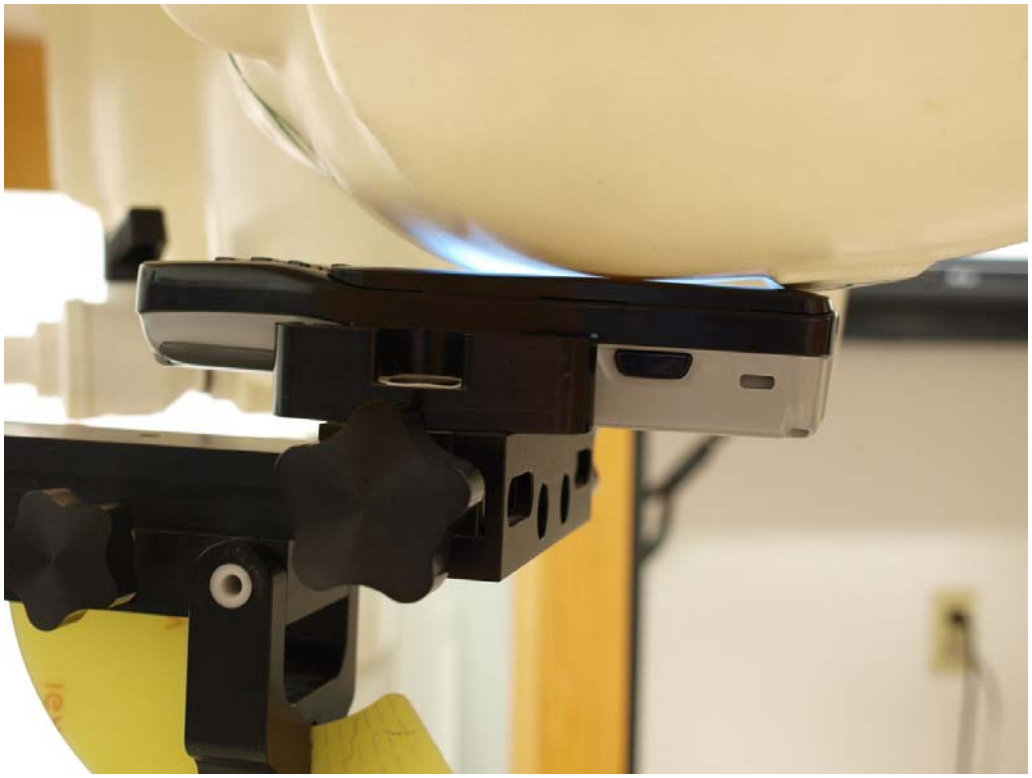
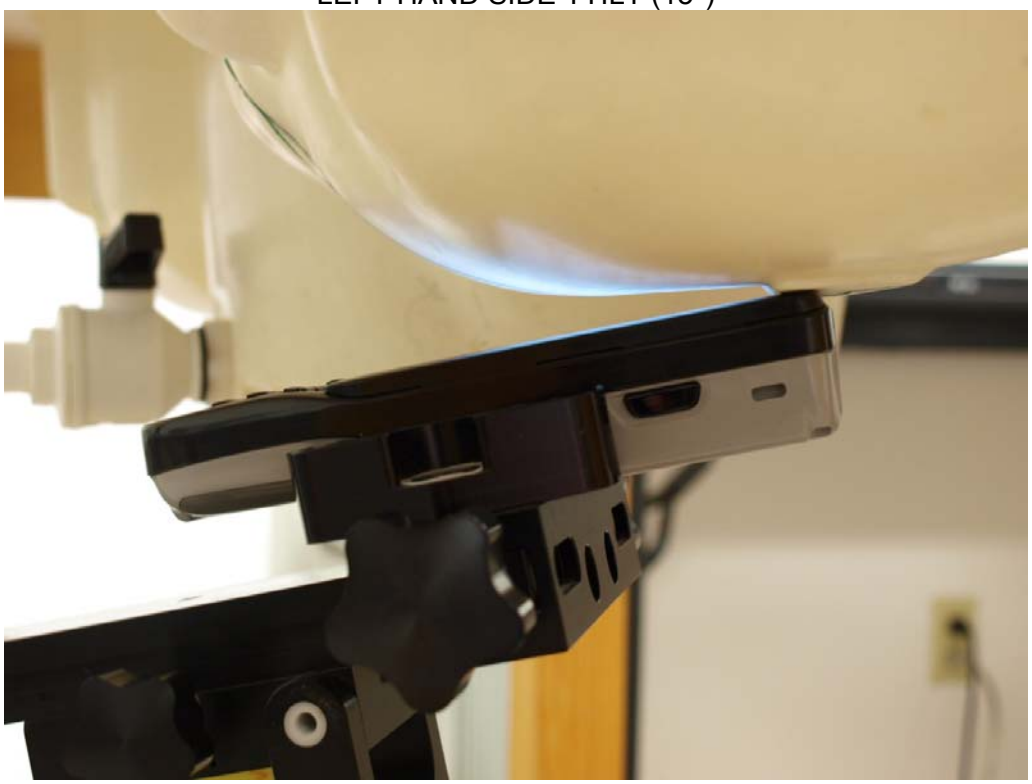
13. TEST SETUP PHOTOS

LEFT HAND SIDE TOUCH



LEFT HAND SIDE TTILT (15°)



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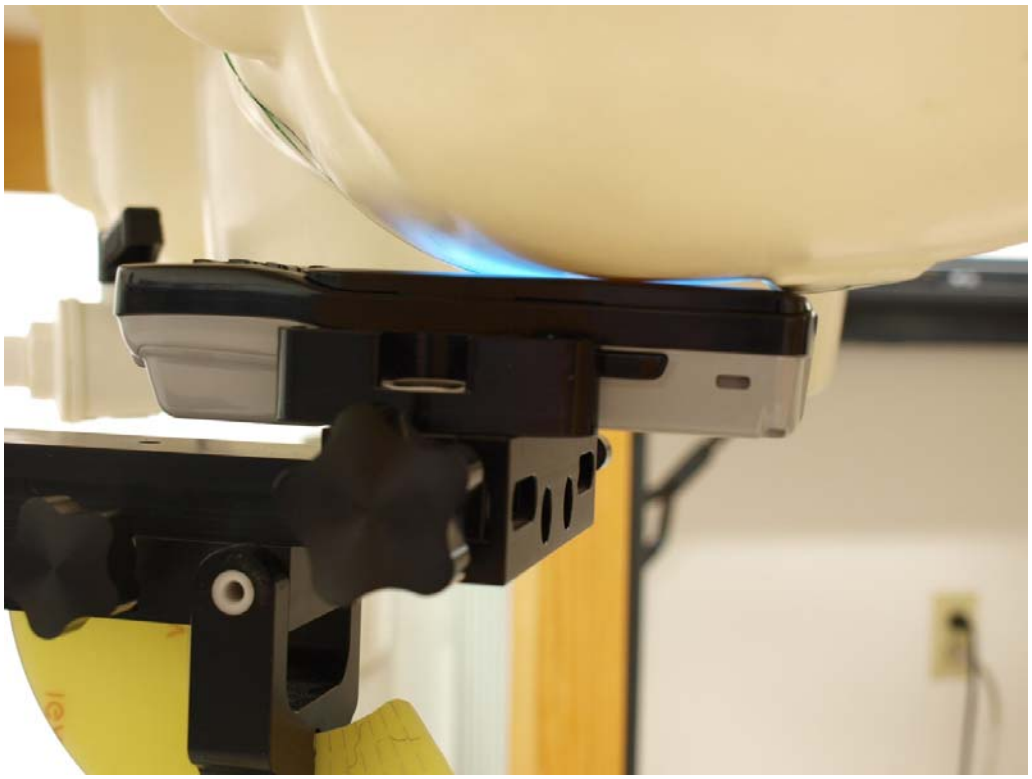
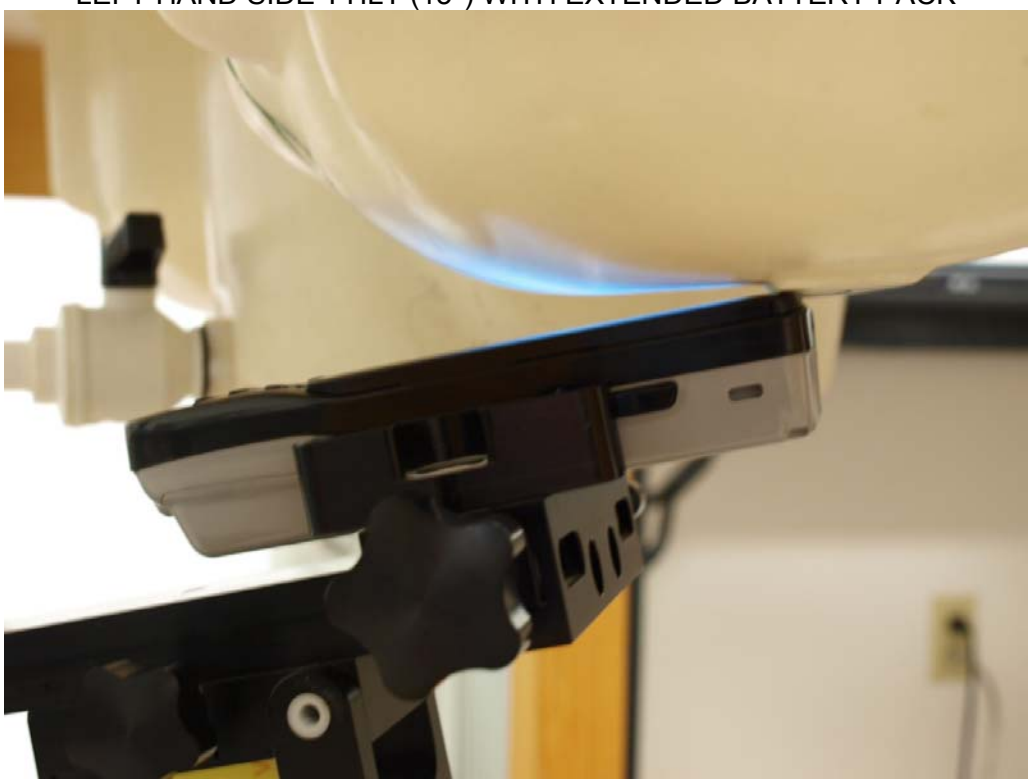
LEFT HAND SIDE TOUCH WITH EXTENDED BATTERY PACK



LEFT HAND SIDE TTILT (15°) WITH EXTENDED BATTERY PACK



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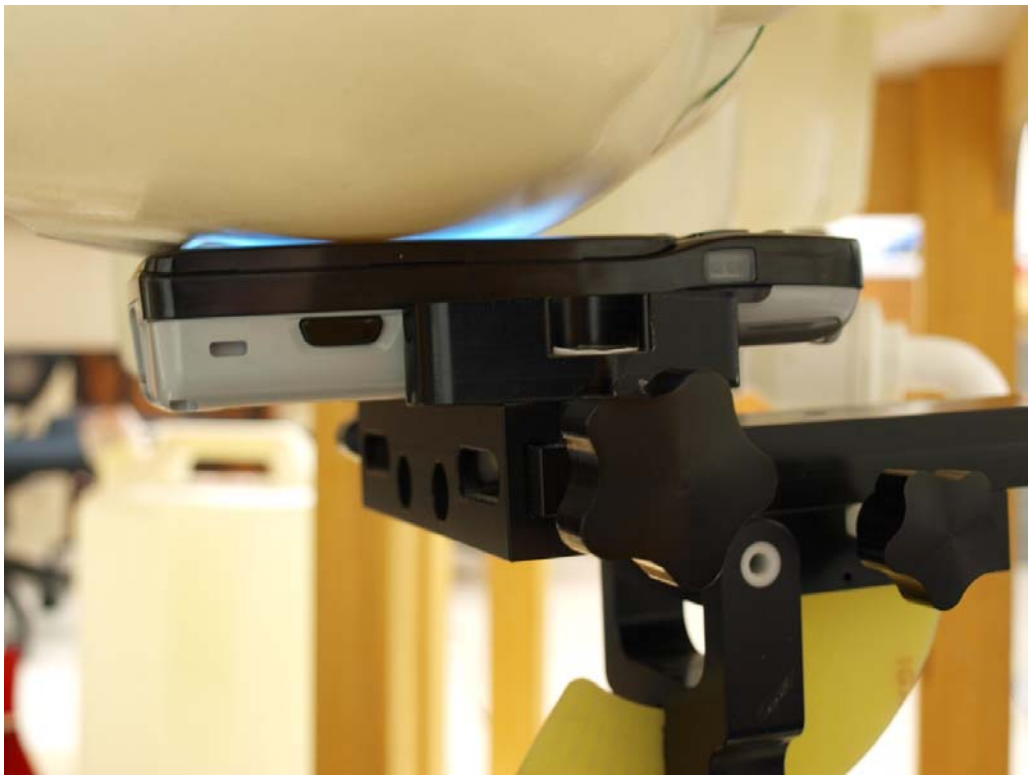
RIGHT HAND SIDE TOUCH



RIGHT HAND SIDE TILT (15°)

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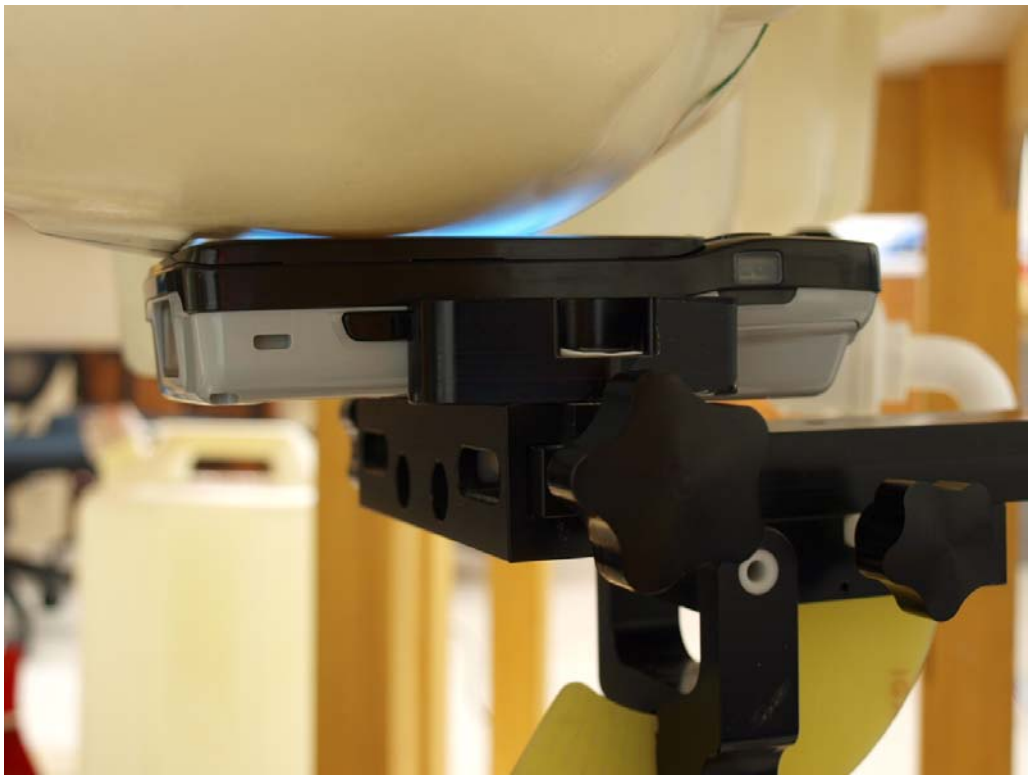
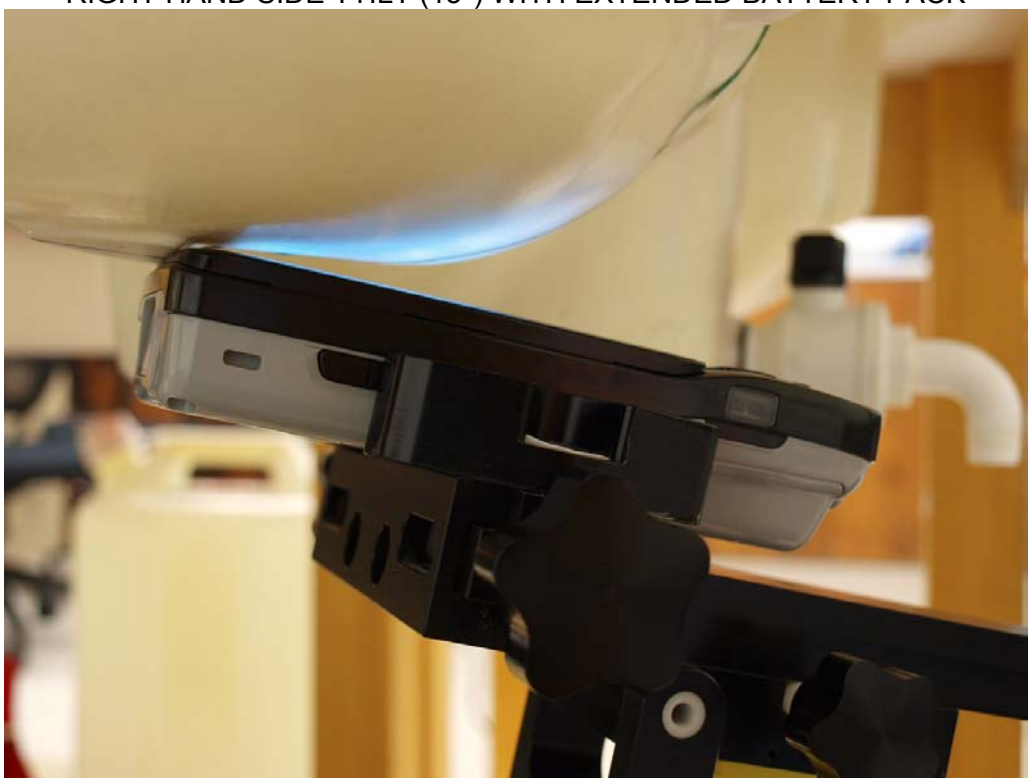
RIGHT HAND SIDE TOUCH WITH EXTENDED BATTERY PACK



RIGHT HAND SIDE TTILT (15°) WITH EXTENDED BATTERY PACK



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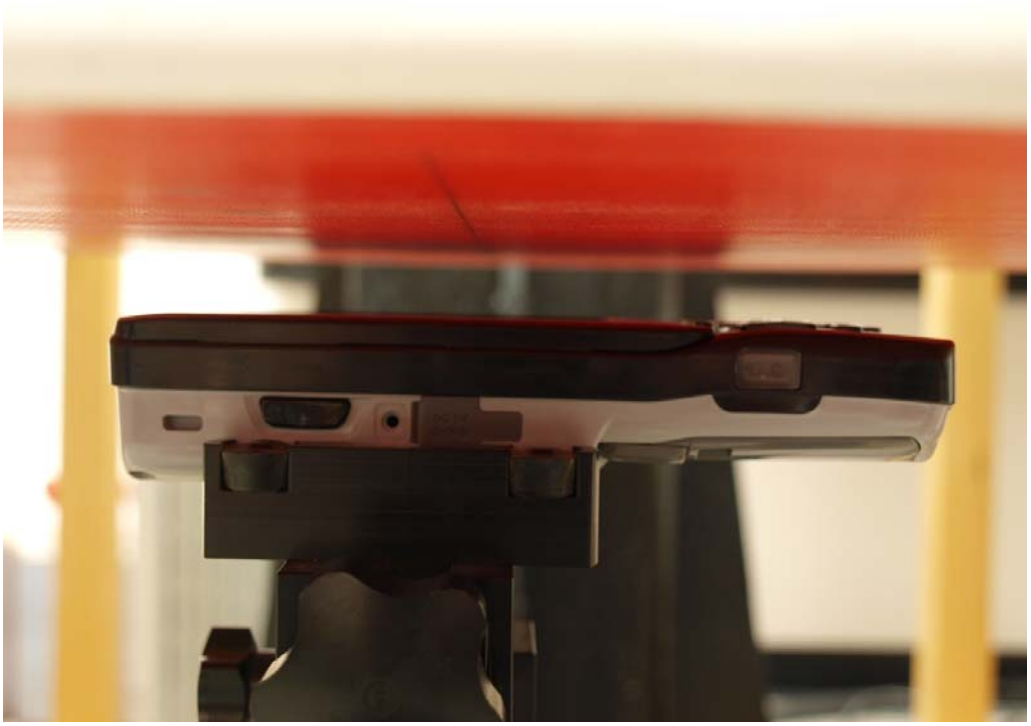
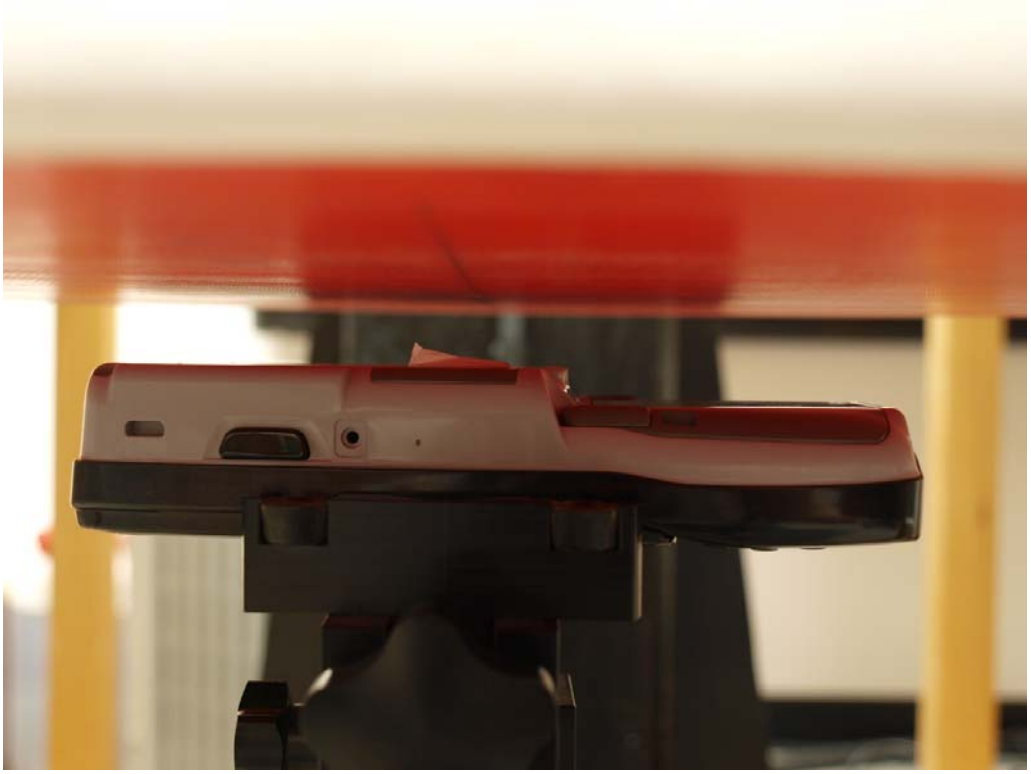
FACE UP



FACE DOWN



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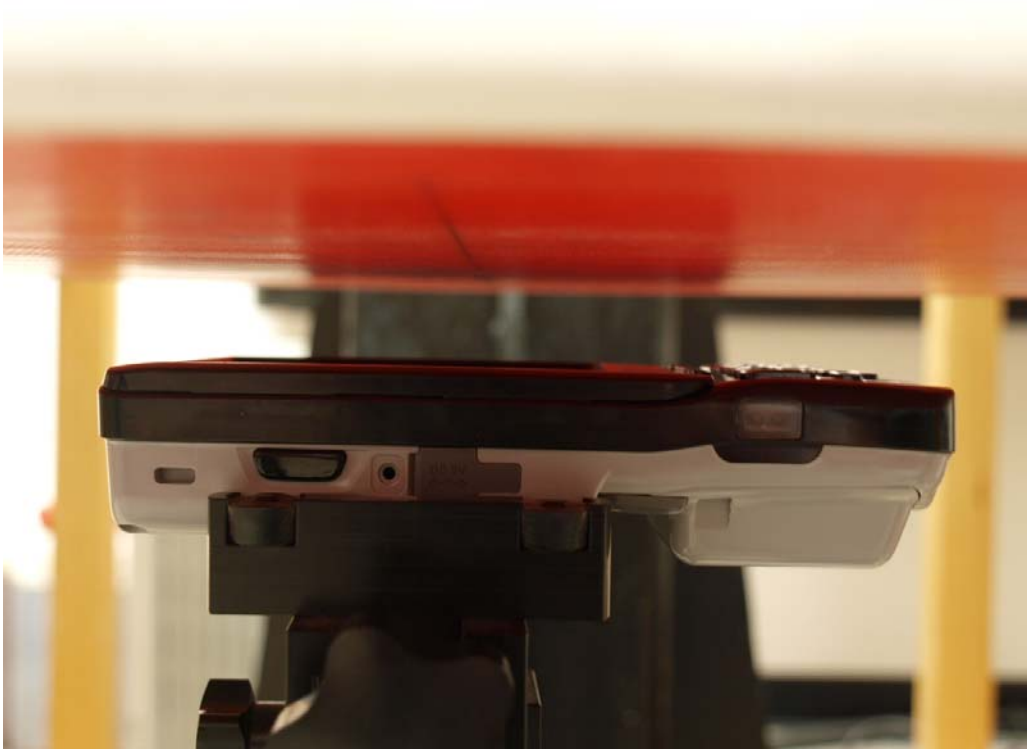
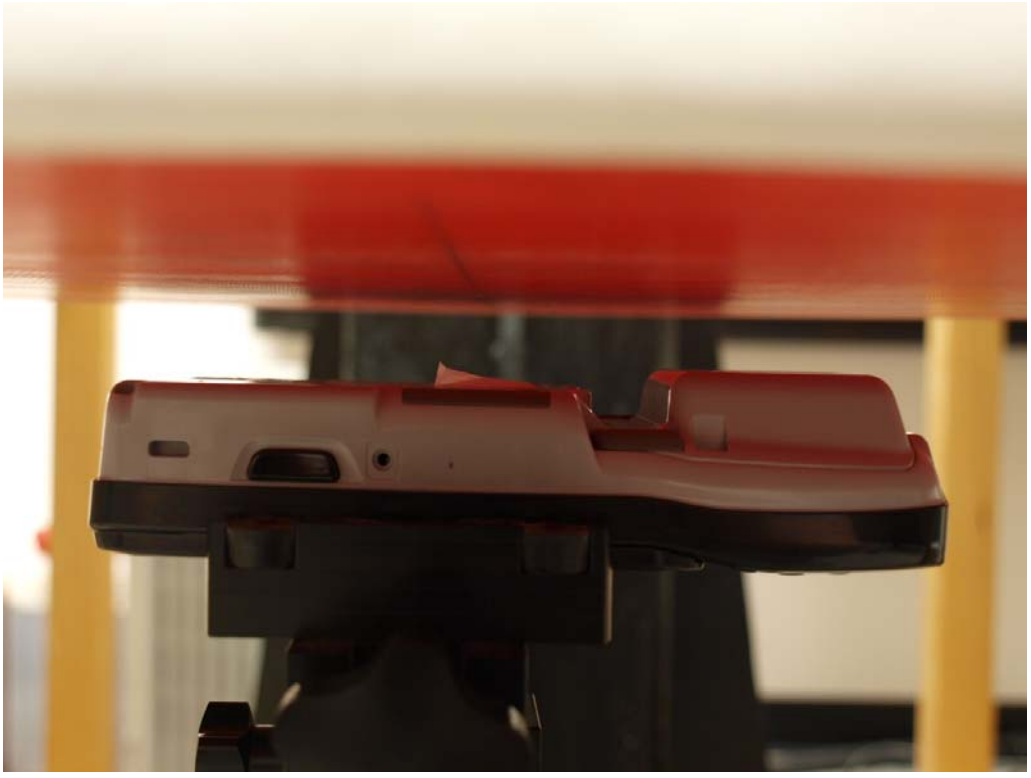
FACE UP WITH EXTENDED BATTERY PACK



FACE DOWN WITH EXTENDED BATTERY PACK



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14. HOST DEVICE PHOTO

EXTERNAL – LCD UP

EXTERNAL – LCD DOWN with Standard Battery

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EXTERNAL – LCD DOWN with Extended Battery

END OF REPORT

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