FCC OET BULLETIN 65 SUPPLEMENT C
IC RSS-102 ISSUE 3

SAR EVALUATION REPORT

For

iPad
(With GSM850/1900, UMTS850/1900 and WiFi/Bluetooth)

MODEL: A1337
Serial Number: YM00302LEMD
IMEI: 00 107200 185484 1

FCC ID: BCG-E2328A
IC: 579C-E2328A

REPORT NUMBER: 10U13035-3B2
ISSUE DATE: March 11, 2010

Prepared for

APPLE INC
1 INFINITE LOOP, MS-26A
CUPERTINO, CA 95014

Prepared by

COMPLIANCE CERTIFICATION SERVICES
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	February 15, 2010	Initial Issue	--
A	February 16, 2010	Updated antenna separation distances	Sunny Shih
B	March 8, 2010	- Added 5.5 GHz band - Corrected some typos - Added EGPRS 835 and EGPRS 1900 band - Added conducted power with proximity sensor engaged	Sunny Shih
B1	March 11, 2010	- Updated section 5 - WiFi 1 can transmit simultaneously with Bluetooth - Corrected some typos in section 10	Sunny Shih
B2	March 11, 2010	- Update 850 MHz highest SAR value and plot	Sunny Shih

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	APPLE INC 1 INFINITE LOOP, MS-26A CUPERTINO, CA 95014
EUT DESCRIPTION:	iPad (With GSM850/1900, UMTS850/1900 and WiFi/Bluetooth)
MODEL NUMBER:	A1337
DEVICE CATEGORY:	Portable
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure
DATE TESTED:	February 9 - March 8, 2010

THE HIGHEST SAR VALUES:

FCC / IC Rule Parts	Frequency Range [MHz]	1-g SAR (mW/g)	Limit (mW/g)
22H / RSS-132	824 - 849	0.759 (Secondary portrait)	1.6
24E / RSS-133	1850 - 1910	1.180 (Secondary portrait)	
15.247 / RSS-102	2400 – 2483.5	1.190 (Bottom face/WiFi2)	
	5725 – 5850	0.740 (Primary portrait/WiFi1)	
15.407 / RSS-102	5150 – 5250	1.070 (Bottom face/WiFi2)	
	5250 – 5350	1.190 (Bottom face/WiFi2)	
	5500 – 5700	1.180 (Primary Portrait/WiFi1)	

APPLICABLE STANDARDS AND TEST PROCEDURES:

STANDARDS AND TEST PROCEDURES	Test Results
FCC OET Bulletin 65 Supplement C	Pass
RSS-102 ISSUE 3	Pass

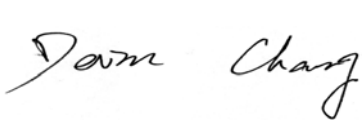
Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties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

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

2. TEST METHODOLOGY

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

- KDB 941225 D01 SAR test for 3G devices v02
- KDB 941225 D03 SAR Test Reduction GSM/GPRS/EDGE vo1
- KDB 447498 D01 Mobile Portable RF Exposure v04
- KDB 616217 D03 SAR Supp Note and Netbook Laptop v01
- KDB 248227 D01 SAR Measurement Procedure for 802 11abg v01r02

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due date		
				MM	DD	Year
Robot - Six Axes	Stäubli	RX90BL	N/A	N/A		
Robot Remote Control	Stäubli	CS7MB	3403-91535	N/A		
DASY4 Measurement Server	SPEAG	SEUMS001BA	1041	N/A		
Probe Alignment Unit	SPEAG	LB (V2)	261	N/A		
SAM Phantom (SAM1)	SPEAG	QD000P40CA	1185	N/A		
SAM Phantom (SAM2)	SPEAG	QD000P40CA	1050	N/A		
Oval Flat Phantom (ELI 4.0)	SPEAG	QD OVA001 B	1003	N/A		
Electronic Probe kit	HP	85070C	N/A	N/A		
S-Parameter Network Analyzer	Agilent	8753ES-6	MY40001647	11	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	D900V2	108	11	23	2011
System Validation Dipole	SPEAG	D1800V2	294	11	24	2011
System Validation Dipole	SPEAG	D1900V2	5d043	11	24	2011
System Validation Dipole	SPEAG	D2450V2	748	4	14	2010
System Validation Dipole	SPEAG	D5GHzV2	1075	9	3	2011
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	H1800	N/A	Within 24 hrs of first test		
Simulating Liquid	CCS	M1800	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		
Simulating Liquid	SPAEG	M5800 (5-6GHz)	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	H5800 (5-6GHz)	N/A	Within 24 hrs of first test		

Note: Per KDB 450824 D02 requirements for dipole calibration, CCS has adopted two 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)

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	5.50	N	1	1	1	5.50	5.50
Axial Isotropy	3.50	R	1.732	0.707	0.707	1.43	1.43
Hemispherical Isotropy	2.36	R	1.732	0.707	0.707	0.96	0.96
Boundary Effects	1.00	R	1.732	1	1	0.58	0.58
Linearity	6.90	R	1.732	1	1	3.98	3.98
System Detection Limits	1.00	R	1.732	1	1	0.58	0.58
Readout Electronics	0.30	N	1	1	1	0.30	0.30
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	3.00	R	1.732	1	1	1.73	1.73
RF Ambient Conditions - Reflections	3.00	R	1.732	1	1	1.73	1.73
Probe Positioner Mechnical Tolerance	0.40	R	1.732	1	1	0.23	0.23
Probe Positioning With Respect to Phantom Shell	2.90	R	1.732	1	1	1.67	1.67
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	1.00	R	1.732	1	1	0.58	0.58
Test sample Related							
Test Sample Positioning	2.90	N	1	1	1	2.90	2.90
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.	4.36	N	1	0.64	0.43	2.79	1.87
Liquid Permittivity - Target	5.00	R	1.732	0.6	0.49	1.73	1.41
Liquid Permittivity - Meas.	2.70	N	1	0.6	0.49	1.62	1.32
Combined Standard Uncertainty	RSS					10.65	10.26
Expanded Uncertainty (95% Confidence Interval)	K=2					21.29	20.53

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

Measurement uncertainty for 3 GHz – 6 GHz

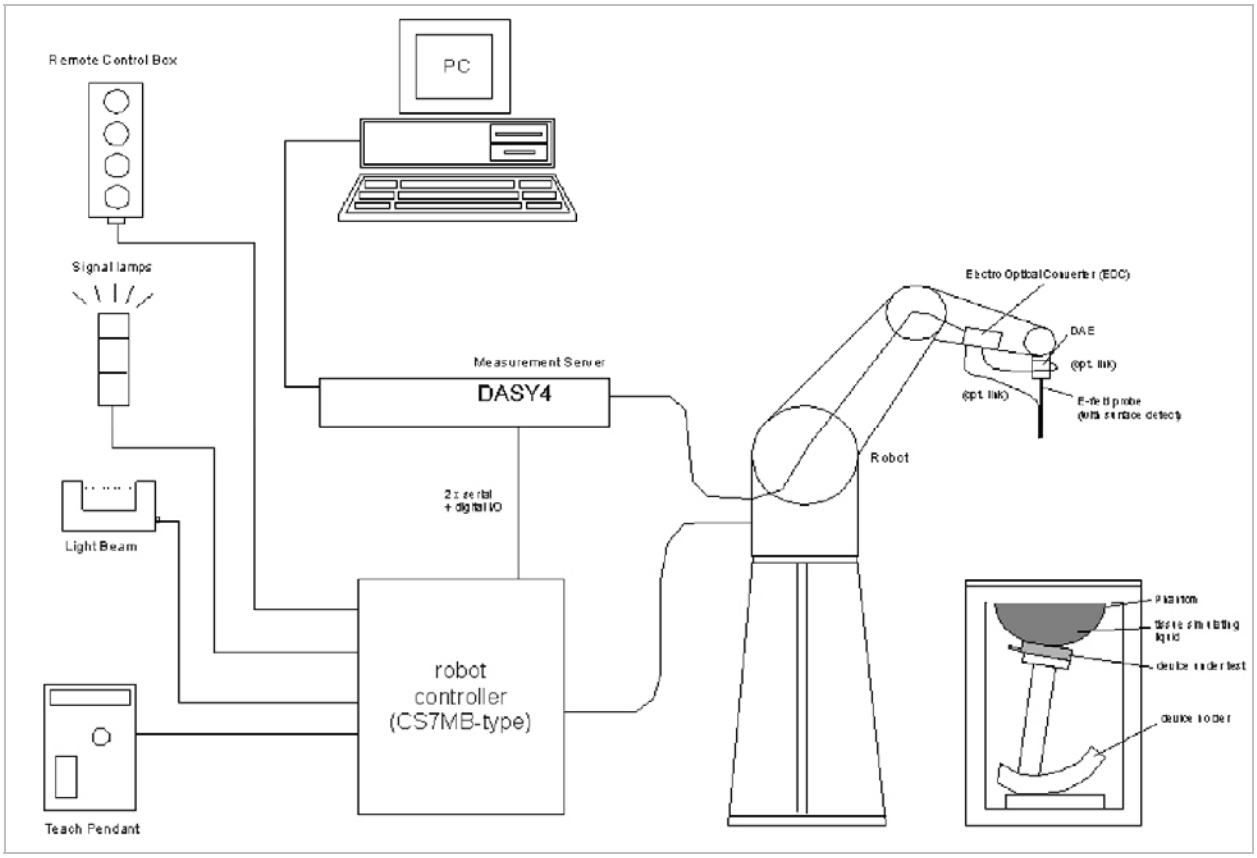
Uncertainty component	Tol. (±%)	Probe Dist.	Div.	Ci (1g)	Ci (10g)	Std. Unc.(±%)	
						Ui (1g)	Ui(10g)
Measurement System							
Probe Calibration	6.55	N	1	1	1	6.55	6.55
Axial Isotropy	3.50	R	1.732	0.707	0.707	1.43	1.43
Hemispherical Isotropy	2.36	R	1.732	0.707	0.707	0.96	0.96
Boundary Effects	1.00	R	1.732	1	1	0.58	0.58
Linearity	6.90	R	1.732	1	1	3.98	3.98
System Detection Limits	1.00	R	1.732	1	1	0.58	0.58
Readout Electronics	0.30	N	1	1	1	0.30	0.30
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	3.00	R	1.732	1	1	1.73	1.73
RF Ambient Conditions - Reflections	3.00	R	1.732	1	1	1.73	1.73
Probe Positioner Mechnical Tolerance	0.80	R	1.732	1	1	0.46	0.46
Probe Positioning With Respect to Phantom Shell	9.90	R	1.732	1	1	5.72	5.72
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	4.00	R	1.732	1	1	2.31	2.31
Test sample Related							
Test Sample Positioning	3.20	N	1	1	1	3.20	3.20
Device Holder Uncertainty	4.00	N	1	1	1	4.00	4.00
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.	4.20	N	1	0.64	0.43	2.69	1.81
Liquid Permittivity - Target	10.0	R	1.732	0.6	0.49	3.46	2.83
Liquid Permittivity - Meas.	2.02	N	1	0.6	0.49	1.21	0.99
Combined Standard Uncertainty	RSS					13.16	12.76
Expanded Uncertainty (95% Confidence Interval)	K=2					26.32	25.52

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

iPad with GSM850/1900, UMTS850/1900 and WiFi/Bluetooth Device class: B; (E)GPRS Multi-slot Class: 10	
Normal operation:	Tablet bottom face and Tablet edges - Multiple display orientations supporting both portrait and landscape configurations
Other radio modules:	WiFi (802.11abgn) and Bluetooth
Antenna tested:	Antenna — Apple part number WiFi 1 — 631-0921 (shared with BT) WiFi 2 — 631-0920 (WiFi 1 & WiFi 2 Antennas different; they are fed with different power levels) 3G Main — 631-1119
Antenna-to-antenna separation distances:	22.3 cm from 3G main antenna-to-WiFi 1 (BT) antenna 11.1 cm from 3G main antenna-to-WiFi 2 antenna 7.0 cm from WiFi 1 (BT) antenna-to-WiFi 2 antenna
Antenna-to-user separation distances:	See section 14 Antennas-to-user's separation distances.
Simultaneous transmission:	- 3G can transmit simultaneously with WiFi - 3G can transmit simultaneously with Bluetooth - WiFi 1 can transmit simultaneously with Bluetooth
Assessment for SAR evaluation for Simultaneous transmission:	**3G and BT** KDB 447498 - The Bluetooth's output power is ≤ 60/f(GHz) mW, which stand-alone SAR evaluation is not required. Thus, simultaneous transmission SAR evaluation is not required for WiFi 1 and Bluetooth antenna pair. **WiFi 1 and WiFi 2** antenna pair cannot transmit simultaneously thus simultaneous SAR evaluation is not required. **3G and WiFi** KDB 447498 4/b)/iii/(1) – located < 5 cm from the edge and the sum of the stand-alone 1-g SAR is < the SAR limit for these antennas or the SAR to peak location separation ratios are < 0.3 for all antenna pairs. Finding: When the EUT is positioned at bottom face configuration, 3G and WiFi antenna are within 5 cm to the body of user. The highest measured 3G @ bottom face is 0.567 W/kg; the highest measured WiFi @ bottom face is 1.19 W/kg. The 3G and WiFi 2 antenna separation distance is 11.1 cm. The SAR-to-peak location ratio is (1.19 +0.567) / 11.1 =0.16 **Conclusion:** Simultaneous transmission SAR evaluation is not required since the SAR-to-peak location ratio is < 0.3.

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. 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 Body Phantom (for 300 – 3000 MHz and 5800 MHz)

The 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)	Body (Supplement C 01-01)	
	ε_r	σ (S/m)
300	58.20	0.92
450	56.70	0.94
835	55.20	0.97
900	55.00	1.05
915	55.00	1.06
1450	54.00	1.30
1610	53.80	1.40
1800 – 2000	53.30	1.52
2450	52.70	1.95
3000	52.00	2.73
5800	48.20	6.00

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

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

In the current guidelines and draft standards for compliance testing of mobile phones (i.e., IEEE P1528, OET 65 Supplement C), the dielectric parameters suggested for head and body tissue simulating liquid are given only at 3.0 GHz and 5.8 GHz. As an intermediate solution, dielectric parameters for the frequencies between 5 to 5.8 GHz were obtained using linear interpolation (see table below).

SPEAG has developed suitable head and body tissue simulating liquids consisting of the following ingredients: de-ionized water, salt and a special composition including mineral oil and an emulgators. Dielectric parameters of these liquids were measured suing a HP 8570C Dielectric Probe Kit in conjunction with HP 8753ES Network Analyzer (30 kHz – 6G Hz). The differences with respect to the interpolated values were well within the desired ±5% for the whole 5 to 5.8 GHz range.

f (MHz)	Body Tissue		Reference
	rel. permitivity	conductivity	
3000	52.0	2.73	Standard
5100	49.1	5.18	Interpolated
5200	49.0	5.30	Interpolated
5300	48.9	5.42	Interpolated
5400	48.7	5.53	Interpolated
5500	48.6	5.65	Interpolated
5600	48.5	5.77	Interpolated
5700	48.3	5.88	Interpolated
5800	48.2	6.00	Standard

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

7.1. LIQUID CHECK RESULTS FOR 835 MHZ

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'	56.37	Relative Permittivity (ϵ_r):	56.370	55.2	2.12	± 5
	e"	21.79	Conductivity (σ):	1.012	0.97	4.36	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
February 09, 2010 07:14 PM

Frequency	e'	e"
780000000.	56.8407	22.1462
785000000.	56.7963	22.1024
790000000.	56.7554	22.0809
795000000.	56.7264	22.0347
800000000.	56.6878	22.0126
805000000.	56.6175	21.9891
810000000.	56.5990	21.9386
815000000.	56.5479	21.9198
820000000.	56.5229	21.8872
825000000.	56.4586	21.8306
830000000.	56.4166	21.8127
835000000.	**56.3704**	**21.7929**
840000000.	56.3490	21.7825
845000000.	56.2572	21.7165
850000000.	56.2349	21.6757
855000000.	56.1938	21.6638
860000000.	56.1734	21.6227
865000000.	56.1219	21.6351
870000000.	56.0646	21.6111
875000000.	55.9986	21.5926
880000000.	55.9685	21.5496
885000000.	55.9111	21.5493
890000000.	55.8742	21.5286
895000000.	55.8294	21.4998
900000000.	55.8216	21.5022
905000000.	55.7694	21.4348
910000000.	55.7423	21.4010
915000000.	55.7429	21.3901
920000000.	55.6591	21.3520
925000000.	55.6537	21.3061

The conductivity (σ) can be given as:

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

where $f = \text{target } f * 10^6$

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

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'	56.69	Relative Permittivity (ϵ_r):	56.693	55.2	2.70	± 5
	e"	21.73	Conductivity (σ):	1.010	0.97	4.08	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
March 08, 2010 08:26 PM

Frequency	e'	e"
780000000.	57.1418	22.0428
785000000.	57.0997	22.0156
790000000.	57.0741	22.0083
795000000.	57.0344	21.9804
800000000.	56.9904	21.9505
805000000.	56.9404	21.9243
810000000.	56.9346	21.8655
815000000.	56.8872	21.8479
820000000.	56.8564	21.7987
825000000.	56.7896	21.7741
830000000.	56.7363	21.7382
835000000.	**56.6928**	**21.7339**
840000000.	56.6285	21.7141
845000000.	56.5556	21.6681
850000000.	56.4830	21.6362
855000000.	56.4378	21.6346
860000000.	56.3852	21.6015
865000000.	56.3328	21.6136
870000000.	56.2775	21.6098
875000000.	56.2172	21.5871
880000000.	56.1934	21.5792
885000000.	56.1327	21.5664
890000000.	56.0791	21.5633
895000000.	56.0444	21.5450
900000000.	56.0658	21.5158
905000000.	56.0040	21.4922
910000000.	55.9998	21.4609
915000000.	55.9856	21.4401
920000000.	55.9110	21.4039
925000000.	55.9142	21.3514

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

7.2. LIQUID CHECK RESULTS FOR 1900 MHZ

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'	54.110	Relative Permittivity (ϵ_r):	54.1104	53.3	1.52	± 5
	e"	14.465	Conductivity (σ):	1.52898	1.52	0.59	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
February 09, 2010 12:33 AM

Frequency	e'	e"
1710000000.	54.7571	13.8698
1720000000.	54.7275	13.8891
1730000000.	54.7036	13.9219
1740000000.	54.6546	13.9748
1750000000.	54.6301	13.9909
1760000000.	54.5999	14.0409
1770000000.	54.5523	14.0764
1780000000.	54.5284	14.1205
1790000000.	54.4744	14.1357
1800000000.	54.4600	14.1733
1810000000.	54.4227	14.2045
1820000000.	54.3872	14.2347
1830000000.	54.3469	14.2652
1840000000.	54.3141	14.2904
1850000000.	54.2799	14.3404
1860000000.	54.2414	14.3690
1870000000.	54.2130	14.3966
1880000000.	54.1671	14.4275
1890000000.	54.1356	14.4548
1900000000.	**54.1104**	**14.4654**
1910000000.	54.0745	14.4944

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 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'	53.448	Relative Permittivity (ϵ_r):	53.4480	53.3	0.28	± 5
	e"	14.621	Conductivity (σ):	1.54538	1.52	1.67	± 5

Liquid Check
Ambient temperature: 23 deg. C; Liquid temperature: 22 deg. C
March 08, 2010 04:48 PM

Frequency	e'	e"
1710000000.	54.0382	14.0310
1720000000.	54.0261	14.0639
1730000000.	53.9912	14.1009
1740000000.	53.9534	14.1509
1750000000.	53.9313	14.1693
1760000000.	53.9043	14.1877
1770000000.	53.8794	14.2284
1780000000.	53.8556	14.2448
1790000000.	53.8108	14.2841
1800000000.	53.7793	14.3222
1810000000.	53.7308	14.3660
1820000000.	53.6795	14.4113
1830000000.	53.6272	14.4397
1840000000.	53.5874	14.4720
1850000000.	53.5633	14.4992
1860000000.	53.5523	14.5332
1870000000.	53.5275	14.5560
1880000000.	53.5025	14.5767
1890000000.	53.4707	14.6047
1900000000.	**53.4480**	**14.6205**
1910000000.	53.3924	14.6675

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

7.3. LIQUID CHECK RESULTS FOR 2450 MHZ

Simulating Liquid Dielectric Parameters for Body 2450 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
2450	e'	52.82	Relative Permittivity (ϵ_r):	52.824	52.7	0.23	± 5
	e"	14.65	Conductivity (σ):	1.997	1.95	2.40	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
February 10, 2010 09:46 PM

Frequency	e'	e"
2400000000.	53.0009	14.4313
2405000000.	52.9657	14.4656
2410000000.	52.9526	14.4974
2415000000.	52.9195	14.5114
2420000000.	52.8896	14.5518
2425000000.	52.8753	14.5662
2430000000.	52.8551	14.5735
2435000000.	52.8611	14.5958
2440000000.	52.8521	14.6049
2445000000.	52.8307	14.6224
2450000000.	**52.8237**	**14.6501**
2455000000.	52.8147	14.6722
2460000000.	52.8021	14.6698
2465000000.	52.7867	14.6751
2470000000.	52.7660	14.6826
2475000000.	52.7703	14.6794
2480000000.	52.7766	14.7064
2485000000.	52.7704	14.7077
2490000000.	52.7674	14.7419
2495000000.	52.7667	14.7881
2500000000.	52.7400	14.8261

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

7.4. LIQUID CHECK RESULTS FOR 5GHZ

Simulating Liquid Dielectric Parameters for Body 5 GHz

Room Ambient Temperature = 25°C; Relative humidity = 38% Measured by: Sunny Shih

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
5200	e'	48.9203	Relative Permittivity (ϵ_r):	48.9203	49.0	-0.16	± 10
	e"	18.5803	Conductivity (σ):	5.37496	5.30	1.41	± 5
5500	e'	48.2838	Relative Permittivity (ϵ_r):	48.2838	48.6	-0.65	± 10
	e"	19.0157	Conductivity (σ):	5.81827	5.65	2.98	± 5
5800	e'	47.7191	Relative Permittivity (ϵ_r):	47.7191	48.2	-1.00	± 10
	e"	19.3778	Conductivity (σ):	6.25247	6.00	4.21	± 5

Liquid temperature: 24 deg. C
February 11, 2010 10:26 AM

Frequency	e'	e''
4600000000.	50.0507	17.6551
4650000000.	49.9580	17.7093
4700000000.	49.8836	17.8385
4750000000.	49.7917	17.8820
4800000000.	49.7011	18.0114
4850000000.	49.6225	18.0551
4900000000.	49.5005	18.1578
4950000000.	49.3842	18.2393
5000000000.	49.3227	18.3133
5050000000.	49.1988	18.4008
5100000000.	49.1183	18.4591
5150000000.	49.0090	18.5630
5200000000.	**48.9203**	**18.5803**
5250000000.	48.7995	18.6911
5300000000.	48.7179	18.7374
5350000000.	48.5902	18.8127
5400000000.	48.5259	18.8929
5450000000.	48.4080	18.9380
5500000000.	**48.2838**	**19.0157**
5550000000.	48.1856	19.0568
5600000000.	48.1184	19.1268
5650000000.	48.0164	19.1873
5700000000.	47.9180	19.2595
5750000000.	47.8311	19.3271
5800000000.	**47.7191**	**19.3778**
5850000000.	47.6683	19.4461
5900000000.	47.5741	19.5025
5950000000.	47.4239	19.5629
6000000000.	47.3679	19.6286

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 Body 5 GHz

Room Ambient Temperature = 25°C; Relative humidity = 38% Measured by: Devin Chang

f (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit (%)
5500	e'	49.5832	Relative Permittivity (ϵ_r):	49.5832	48.6	2.02	± 10
	e"	18.5143	Conductivity (σ):	5.66486	5.65	0.26	± 5

Liquid temperature: 24 deg. C
March 02, 2010 07:05 PM

Frequency	e'	e"
4600000000.	50.1488	17.9403
4650000000.	50.0266	17.8131
4700000000.	49.9996	18.2059
4750000000.	50.0374	17.9925
4800000000.	49.7674	18.2796
4850000000.	49.9235	18.2838
4900000000.	49.6379	18.4519
4950000000.	49.6794	18.5393
5000000000.	49.5832	18.5143
5050000000.	49.4427	18.7679
5100000000.	49.4836	18.6604
5150000000.	49.1886	18.9726
5200000000.	49.2259	18.8109
5250000000.	48.9629	19.0391
5300000000.	48.9572	19.0153
5350000000.	48.7769	19.1045
5400000000.	48.7701	19.2558
5450000000.	48.6666	19.2311
5500000000.	**48.4566**	**19.4238**
5550000000.	48.3299	19.2097
5600000000.	48.2808	19.4413
5650000000.	48.2573	19.3274
5700000000.	47.9720	19.6513
5750000000.	48.1309	19.5796
5800000000.	47.7341	19.6607
5850000000.	48.0750	19.8349
5900000000.	47.7580	19.7307
5950000000.	47.7900	20.0668
6000000000.	47.5978	19.8860

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. SYSTEM PERFORANCE 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 Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV4-SN: 3686 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 (2.4 GHz) fine cube was chosen for cube integration and Special 8x8x10 (5 GHz) fine cube was chosen for cube integration
- Distance between probe sensors and phantom surface was set to 3mm.
  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.

Certificate no: D835V2-4d002_Apr09, Cal Due on April 2011.

f (MHz)	Head Tissue		Body Tissue	
	SAR_{1g}	SAR_{10g}	SAR_{1g}	SAR_{10g}
835	9.64	6.28	9.96	6.56

Certificate no: D1900V2-5d043_Nov09, Cal Due on Nov. 2011

f (MHz)	Head Tissue		Body Tissue	
	SAR_{1g}	SAR_{10g}	SAR_{1g}	SAR_{10g}
1900	39.8	20.7	40.4	21.4

Certificate no: D2450V2-748_April 14, 2008, Cal Due on April 2010

f (MHz)	Head Tissue		Body Tissue	
	SAR_{1g}	SAR_{10g}	SAR_{1g}	SAR_{10g}
2450			50.8	23.7

Certificate no: D5GHzV2-1075_Sep09, Cal Due on Sept. 2011.

f (MHz)	Head Tissue		Body Tissue	
	SAR_{1g}	SAR_{10g}	SAR_{1g}	SAR_{10g}
5200			79.0	22.0
5500			85.4	23.5
5800			73.2	20.1

8.1. SYSTEM CHECK RESULTS FOR D835V2

System Validation Dipole: D835V2 SN:4d002

Date: February 09, 2010

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

Medium	CW Signal (MHz)	Forward Pwr (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	835	100	1g SAR:	9.82	9.96	-1.41	±10
			10g SAR:	6.43	6.56	-1.98	

System Validation Dipole: D835V2 SN:4d002

Date: March 08, 2010

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

Medium	CW Signal (MHz)	Forward Pwr (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	835	100	1g SAR:	10.4	9.96	4.42	±10
			10g SAR:	6.83	6.56	4.12	

8.2. SYSTEM CHECK RESULTS FOR D1900V2

System Validation Dipole: D1900V2 SN: 5d043

Date: February 09, 2010

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

Medium	CW Signal (MHz)	Forward Pwr (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	1900	100	1g SAR:	37.6	40.4	-6.93	±10
			10g SAR:	19.6	21.4	-8.41	

System Validation Dipole: D1900V2 SN: 5d043

Date: March 08, 2010

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

Medium	CW Signal (MHz)	Forward Pwr (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	1900	100	1g SAR:	39.5	40.4	-2.23	±10
			10g SAR:	20.4	21.4	-4.67	

8.3. SYSTEM CHECK RESULTS FOR D2450V2

System Validation Dipole: D2450V2 SN: 748

Date: February 10, 2010

Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Devin Chang

Medium	CW Signal (MHz)	Forward Pwr (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	2450	100	1g SAR:	52.2	50.8	2.76	±10
			10g SAR:	24.3	23.7	2.53	

8.4. SYSTEM CHECK RESULTS FOR D5GHzV2

System Validation Dipole: D5GHzV2 SN: 1075

Date: February 11, 2010

Ambient Temperature = 25°C; Relative humidity = 40% Measured by: Sunny Shih

Medium	CW Signal (MHz)	Forward Pwr (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	5200	100	1g SAR:	73.0	79.0	-7.59	±10
			10g SAR:	21.0	22.0	-4.55	
Body	5800	100	1g SAR:	69.5	73.2	-5.05	±10
			10g SAR:	19.7	20.1	-1.99	

System Validation Dipole: D5GHzV2 SN: 1075

Date: March 2, 2010

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

Medium	CW Signal (MHz)	Forward Pwr (mW)	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
Body	5500	100	1g SAR:	87.6	85.4	2.58	±10
			10g SAR:	25.1	23.5	6.81	

9. OUTPUT POWER VERIFICATION

Drift: Per the requirement stated in IEEE1528 section 6.3.3., power drift shall be recorded the absolute value between step 1 and step 4. However, with repeat testing, it is not possible to obtain meaningful absolute value. In order to determine if device output has been stable during a SAR measurement, conducted power were measured before and after based upon the length of time of each SAR test to verify if the output changes are within the 5% drift (< 0.25 dB).

9.1. GSM

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch #	Freq. (MHz)	Tx Conducted Power (dBm) (Avg burst Pwr)				Delta (±5%)	
			Before		After SAR test			
			1 slot	2 slot	1 slot	2 slot	1 slot	2 slot
GSM850	128	824.2	32.2	32.2	32.1	32.1	-0.31	-0.31
	190	836.6	32.2	32.2	32.1	32.1	-0.31	-0.31
	251	848.8	32.2	32.2	32.1	32.1	-0.31	-0.31
GSM1900	512	1850.2	30.5	30.5	30.4	30.4	-0.33	-0.33
	661	1880	30.3	30.3	30.2	30.2	-0.33	-0.33
	810	1909.8	30.3	30.3	30.2	30.2	-0.33	-0.33

GPRS (GMSK) - Coding Scheme: CS1 (with Proximity Sensor Power Back-off)

Band	Ch #	Freq. (MHz)	Tx Conducted Power (dBm) (Avg burst Pwr)				Delta (±5%)	
			During SAR		After SAR test			
			1 slot	2 slot	1 slot	2 slot	1 slot	2 slot
GSM850	128	824.2	28.1	24.9	28.1	24.9	0.0	0.0
	190	836.6	28.0	24.8	28.0	24.8	0.0	0.0
	251	848.8	28.0	24.8	28.0	24.8	0.0	0.0
GSM1900	512	1850.2	25.1	22.0	25.1	22.0	0.0	0.0
	661	1880	25.1	22.0	25.1	22.0	0.0	0.0
	810	1909.8	25.1	21.9	25.1	21.9	0.0	0.0

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch #	Freq. (MHz)	Tx Conducted Power (dBm) (Avg burst Pwr)	
			1 slot	2 slot
GSM850	128	824.2	26.7	26.9
	190	836.6	26.6	26.6
	251	848.8	26.5	26.6
GSM1900	512	1850.2	25.8	26.1
	661	1880	26.1	26.3
	810	1909.8	26.0	26.4

EDGE (8PSK)-Code Scheme: CS5 with proximity sensor power back-off

Band	Ch #	Freq. (MHz)	Tx Conducted Power (dBm) (Avg burst Pwr)				Delta (±5%)	
			During SAR		After SAR test			
			1 slot	2 slot	1 slot	2 slot	1 slot	2 slot
GSM850	128	824.2	26.7	24.5	26.5	24.4	-0.7	-0.4
	190	836.6	26.6	24.6	26.5	24.5	-0.4	-0.4
	251	848.8	26.5	24.5	26.4	24.4	-0.4	-0.4
GSM1900	512	1850.2	25.3	22.4	25.2	22.3	-0.4	-0.4
	661	1880	25.6	22.6	25.5	22.5	-0.4	-0.4
	810	1909.8	25.5	22.8	25.4	22.7	-0.4	-0.4

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 #	DL Ch #	f (MHz)	Avg Tx Power (dBm)		Delta (±5%)
					Before	After SAR	
UMTS850 (Band V)	Rel 99 12.2kbps RMC	4132	4357	826.4	23.91	23.90	-0.042
		4183	4408	836.6	23.77	23.75	-0.084
		4233	4458	846.6	23.82	23.81	-0.042
UMTS1900 (Band II)	Rel 99 12.2kbps RMC	9262	9662	1852.4	21.90	21.80	-0.457
		9400	9800	1880.0	22.00	21.90	-0.455
		9538	9938	1907.6	21.60	21.50	-0.463

Rel 99 (12.2kps RMC) with proximity sensor power Back-off							
Band	Mode	UL Ch #	DL Ch #	f (MHz)	Avg Tx Power (dBm)		Delta (±5%)
					During SAR	After SAR	
UMTS850 (Band V)	Rel 99 12.2kbps RMC	4132	4357	826.4	18.83	18.80	-0.159
		4183	4408	836.6	18.62	18.60	-0.107
		4233	4458	846.6	18.66	18.64	-0.107
UMTS1900 (Band II)	Rel 99 12.2kbps RMC	9262	9662	1852.4	17.07	17.06	-0.059
		9400	9800	1880.0	16.74	16.72	-0.119
		9538	9938	1907.6	16.63	16.62	-0.060

9.3.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	Rel5 HSDPA	Rel5 HSDPA	Rel5 HSDPA	Rel5 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 5 HSDPA

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	Avg Tx Pwr (dBm)	Proximity sensor power back-off
UMTS850 (Band V)	Subtest 1	4132	4357	826.4	23.8	18.78
		4183	4408	836.6	23.7	18.57
		4233	4458	846.6	23.7	18.63
	Subtest 2	4132	4357	826.4	22.8	18.78
		4183	4408	836.6	22.7	18.60
		4233	4458	846.6	22.7	18.62
	Subtest 3	4132	4357	826.4	22.8	18.76
		4183	4408	836.0	22.8	18.65
		4233	4458	846.6	22.7	18.71
	Subtest 4	4132	4357	826.4	21.8	18.73
		4183	4408	836.4	21.8	18.68
		4233	4458	846.6	22.0	18.70
UMTS1900 (Band II)	Subtest 1	9262	9662	1852.4	21.8	17.05
		9400	9800	1880.0	22.0	16.70
		9538	9938	1907.6	21.5	16.60
	Subtest 2	9262	9662	1852.4	21.1	17.03
		9400	9800	1880.0	20.6	16.70
		9538	9938	1907.6	20.4	16.63
	Subtest 3	9262	9662	1852.4	21.4	17.10
		9400	9800	1880.0	20.6	16.69
		9538	9938	1907.6	20.3	16.60
	Subtest 4	9262	9662	1852.4	21.1	17.10
		9400	9800	1880.0	20.6	16.71
		9538	9938	1907.6	20.5	16.62

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.

9.4. WiFi

The following procedures had been used to prepare the EUT for the SAR test.
The client provided a special driver and program, wl_tools, which enable then engineer to control the frequency and output power of the module. Such program is not accessible by the end user.

Drift: Per the requirement stated in IEEE1528 section 6.3.3., power drift shall be recorded the absolute value between step 1 and step 4. However, with repeat testing, it is not possible to obtain meaningful absolute value. In order to determine if device output has been stable during a SAR measurement, conducted power were measured before and after based upon the length of time of each SAR test to verify if the output changes are within the 5% drift (< 0.25 dB).

802.11bg mode (2.4 GHz band)

Mode	Channel	Freq. (MHz)	Avg Pwr (dBm)				Delta (%)	
			Before		After SAR test			
			WiFi 1	WiFi 2	WiFi 1	WiFi 2	WiFi 1	WiFi 2
802.11b	1	2412	16.53	14.11	16.58	14.12	0.30	0.07
	6	2437	16.54	14.12	16.55	14.21	0.06	0.63
	11	2462	16.53	14.05	16.50	14.09	-0.18	0.28

Mode	Channel	Freq. (MHz)	Avg Pwr (dBm)	
			Antenna	
			WiFi 1	WiFi 2
802.11g	1	2412	13.06	13.05
	6	2437	16.53	14.11
	11	2462	12.88	12.76
802.11n (HT20)	1	2412	13.14	13.05
	6	2437	15.62	14.13
	11	2462	12.75	12.86

Note: KDB 248227 - SAR is not required for 802.11g /HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.

802.11a mode

Mode	Channel	Freq. (MHz)	Avg Pwr (dBm)				Delta (%)	
			Before		After SAR test			
			WiFi 1	WiFi 2	WiFi 1	WiFi 2	WiFi 1	WiFi 2
802.11a	36	5180	15.22	10.08	15.06	10.11	-1.06	0.30
	40	5200	15.24	10.11	15.16	10.15	-0.53	0.39
	48	5240	15.14	10.13	15.11	10.10	-0.20	-0.30
802.11a	52	5260	15.04	10.14	15.10	10.09	0.40	-0.50
	60	5300	15.16	10.18	15.08	10.07	-0.53	-1.09
	64	5320	15.10	10.05	15.22	9.98	0.79	-0.70
802.11a	100	5500	15.03	10.12	15.14	10.14	0.73	0.20
	120	5600	15.11	10.14	15.00	10.20	-0.73	0.59
	140	5700	15.06	10.03	15.10	10.08	0.26	0.50
802.11a	149	5745	15.05	10.03	15.16	10.16	0.73	1.28
	157	5785	15.22	10.07	15.21	10.13	-0.07	0.59
	165	5825	15.13	10.11	15.08	10.05	-0.33	-0.60

802.11n HT20

Band	Mode	Channel	Freq. (MHz)	Avg Pwr (dBm)	
				Antenna	
				WiFi 1	WiFi 2
5.2 GHz	802.11n HT20	36	5180	14.02	9.99
		40	5200	14.17	10.21
		48	5240	14.09	10.06
5.3 GHz	802.11n HT20	52	5260	15.09	10.00
		60	5300	15.22	10.13
		64	5320	14.13	10.17
5.6 GHz	802.11n HT20	100	5500	14.08	10.08
		120	5600	15.16	10.23
		140	5700	15.14	10.15
5.8 GHz	802.11n HT20	149	5745	15.09	10.10
		157	5785	15.16	10.11
		165	5825	15.07	10.11

Note: KDB 248227 - SAR is not required for 802.11a /HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a channels.

10. TEST RESULTS FOR 3G

1. Tablet – Bottom face (0.9 cm from 3G Main antenna-to-user/ Proximity sensor activated with power back-off)

Band	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g
GSM850	GPRS 1 slot	128	824.2			
		190	836.6	28.0	0.420	0.240
		251	848.8			
	GPRS 2 slots	128	824.2			
		190	836.6	24.8	0.411	0.235
		251	848.8			
GSM1900	GPRS 1 slot	512	1850.2			
		661	1880.0	25.1	0.255	0.135
		810	1909.8			
	GPRS 2 slots	512	1850.2			
		661	1880.0	22.0	0.255	0.137
		810	1909.8			

Band	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g
GSM1900	EGPRS 1 slot	512	1850.2			
		661	1880.0	25.6	0.387	0.206
		810	1909.8			
	EGPRS 2 slots	512	1850.2			
		661	1880.0	22.6	0.440	0.235
		810	1909.8			

Note: KDB 941225 in referencing to IEEE 1528 section 6.3.1 footnote 11:with proximity sensor actived with power back-off, the EGPRS@850 MHz power is less than GPRS@850 MHz power; the highest measured 1-g for GPRS is less than 50% of limit. Thus EGPRS @850 MHz band is not investigated.

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g
Band V	R99 12.2kbps RMC	4132	4357	826.4			
		4183	4408	836.6	18.62	0.414	0.233
		4233	4458	846.6			
Band II	R99 12.2kbps RMC	9262	9662	1850.2			
		9400	9800	1880.0	16.74	0.567	0.303
		9538	9938	1907.6			

2. Table – Edges with the following configurations

2.1 ☐ Edge - Primary Landscape (10.4 cm from 3G main antenna-to-user)

This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2).- SAR is required only for the edge with the most conservative exposure conditions

2.2 ☒ Edge - Secondary Landscape (3.8 cm from 3G main antenna-to-user)

Band	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g
GSM850	GPRS 2 slots	128	824.2			
		190	836.6	32.2	0.315	0.179
		251	848.8			
GSM1900	GPRS 2 slots	512	1850.2			
		661	1880.0	30.3	0.225	0.111
		810	1909.8			

Band	Mode	UL Ch No.	DL Ch No.	f(MHz)	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g
Band V	R99 12.2kbps RMC	4132	4357	826.4			
		4183	4408	836.6	23.77	0.215	0.122
		4233	4458	846.6			
Band II	R99 12.2kbps RMC	9262	9662	1850.2			
		9400	9800	1880.0	22.00	0.353	0.176
		9538	9938	1907.6			

2.3 ☐ Edge - Primary Portrait (21.5 cm from 3G main antenna-to-user)

This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2).- SAR is required only for the edge with the most conservative exposure conditions

2.4 ☒ Edge - Secondary Portrait (0.1 cm from 3G main antenna-to-user/Proximity sensor activated with power back-off)

Band	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g
GSM850	GPRS 1 slot	128	824.2			
		190	836.6	28.0	0.655	0.397
		251	848.8			
	GPRS 2 slots	128	824.2			
		190	836.6	24.8	0.695	0.417
		251	848.8			
GSM1900	GPRS 1 slot	512	1850.2			
		661	1880.0	25.1	0.432	0.205
		810	1909.8			
	GPRS 2 slots	512	1850.2			
		661	1880.0	22.0	0.447	0.212
		810	1909.8			

Band	Mode	Ch No.	Freq. (MHz)	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g
GSM1900	EGPRS 1 slot	512	1850.2			
		661	1880.0	25.6	0.732	0.348
		810	1909.8			
	EGPRS 2 slots	512	1850.2			
		661	1880.0	22.6	**0.763**	**0.386**
		810	1909.8			

Note: KDB 941225 in referencing to IEEE 1528 section 6.3.1 footnote 11:with proximity sensor actived with power back-off, the EGPRS@850 MHz power is less than GPRS@850 MHz power; the highest measured 1-g for GPRS is less than 50% of limit. Thus EGPRS @850 MHz band is not investigated.

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	Avg Pwr (dBm)	SAR (mW/g) 1-g	SAR (mW/g) 10-g
Band V	R99	4132	4357	826.4			
		4183	4408	836.6	18.62	0.759	0.455
		4233	4458	846.6			
Band II	R99	9262	9662	1850.2	17.07	**1.180**	**0.614**
		9400	9800	1880.0	16.74	0.927	0.438
		9538	9938	1907.6	16.63	0.887	0.401

11. TEST RESULTS FOR WiFi

11.1. 2.4 GHz BAND

KDB 248227 - SAR is not required for 802.11g /HT20 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.

1. Tablet – Bottom face

☒ 0.9 cm from WiFi 1 antenna-to-user; ☒ 0.0 cm (touch) from WiFi 2 antenna-to-user

Mode	Channel	f (MHz)	Antenna	Avg Pwr	Results (mW/g)	
				(dBm)	1g-SAR	10g-SAR
802.11b	1	2412	WiFi 1			
	6	2437	WiFi 1	16.54	0.023	0.013
	11	2462	WiFi 1			
	1	2412	WiFi 2	14.11	**1.190**	**0.410**
	6	2437	WiFi 2	14.12	1.070	0.365
	11	2462	WiFi 2	14.05	0.773	0.260

2. Table – Edges with the following configurations

2.1 Edge - Primary Landscape

☒ 3.0 cm from WiFi 1/BT antenna-to-user; ☐ 8.0 cm from WiFi 2 antenna-to-user

Mode	Channel	f (MHz)	Antenna	Avg Pwr	Results (mW/g)	
				(dBm)	1g-SAR	10g-SAR
802.11b	1	2412	WiFi 1			
	6	2437	WiFi 1	16.54	0.071	0.034
	11	2462	WiFi 1			

WiFi 2 RF conducted power is lower than WiFi 1 and WiFi 2 with 8 cm from edge is not the most conservative antenna-to-user distance at edge mode by comparing to WiFi1 with 3.0 cm from the edge. According to KDB 447498 4) b) ii) (2).- SAR is required only for the edge with the most conservative exposure conditions thus only WiFi 1 position is tested.

2.2 Edge - Secondary Landscape

☐ 12.7 cm from WiFi 1/BT antenna-to-user; ☐ 8.0 cm from WiFi 2 antenna-to-user

This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2).- SAR is required only for the edge with the most conservative exposure conditions

2.3 Edge - Primary Portrait

☒ 0.6 cm from WiFi 1/BT antenna-to-user; ☐ 11 cm from WiFi 2 antenna-to-user

Mode	Channel	f (MHz)	Antenna	Avg Pwr	Results (mW/g)	
				(dBm)	1g-SAR	10g-SAR
802.11b	1	2412	WiFi 1	16.53	1.030	0.390
	6	2437	WiFi 1	16.54	0.899	0.344
	11	2462	WiFi 1	16.53	1.040	0.397

WiFi 2 RF conducted power is lower than WiFi 1 and WiFi 2 with 11 cm from edge is not the most conservative antenna-to-user distance at edge mode by comparing to WiFi1 with 0.6 cm from the edge. According to KDB 447498 4) b) ii) (2).- SAR is required only for the edge with the most conservative exposure conditions thus only WiFi 1 position is tested

2.4 Edge - Secondary Portrait

☐ 23.0 cm from WiFi 1 antenna-to-user; ☐ 10.0 cm from WiFi 2 antenna-to-user

This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2).- SAR is required only for the edge with the most conservative exposure conditions.

11.2. 5 GHz BANDS

1. Tablet – Bottom face

☒ 0.9 cm from WiFi 1 antenna-to-user; ☒ 0.0 cm (touch) from WiFi 2 antenna-to-user

band	Channel	f (MHz)	Antenna	Avg Pwr	Results (mW/g)	
				(dBm)	1g-SAR	10g-SAR
5.2GHz	36	5180	WiFi 1			
	40	5200	WiFi 1	15.24	0.041	0.016
	48	5240	WiFi 1			
	36	5180	WiFi 2	10.08	**1.070**	**0.223**
	40	5200	WiFi 2	10.11	1.030	0.218
	48	5240	WiFi 2	10.13	1.060	0.228
5.3GHz	52	5260	WiFi 1			
	60	5300	WiFi 1	15.16	0.0026	0.00036
	64	5320	WiFi 1			
	52	5260	WiFi 2	10.14	1.020	0.223
	60	5300	WiFi 2	10.18	**1.190**	**0.263**
	64	5320	WiFi 2	10.05	0.962	0.214
5.6GHz	100	5500	WiFi 1			
	120	5600	WiFi 1	15.11	0.0024	0.00024
	140	5700	WiFi 1			
	100	5500	WiFi 2			
	120	5600	WiFi 2	10.14	0.755	0.200
	140	5700	WiFi 2			
5.8GHz	149	5745	WiFi 1			
	157	5785	WiFi 1	15.22	0.026	0.00868
	165	5825	WiFi 1			
	149	5745	WiFi 2			
	157	5785	WiFi 2	10.07	0.619	0.152
	165	5825	WiFi 2			

2. Table – Edges with the following configurations

2.1 Edge - Primary Landscape

☒ 3.0 cm from WiFi 1 antenna-to-user; ☐ 8.0 cm from WiFi 2 antenna-to-user

band (GHz)	Channel	f (MHz)	Antenna	Avg Pwr	Results (mW/g)	
				(dBm)	1g-SAR	10g-SAR
5.2	40	5200	WiFi 1	15.24	0.279	0.087
5.3	60	5300	WiFi 1	15.16	0.219	0.072
5.6	120	5600	WiFi 1	15.11	0.130	0.049
5.8	157	5785	WiFi 1	15.22	0.189	0.062

WiFi 2 RF conducted power is lower than WiFi 1 and WiFi 2 with 8 cm from edge is not the most conservative antenna-to-user distance at edge mode by comparing to WiFi1 with 3.0 cm from the edge. According to KDB 447498 4) b) ii) (2).- SAR is required only for the edge with the most conservative exposure conditions thus only WiFi 1 position is tested

2.2 Edge - Secondary Landscape

☐ 12.7 cm from WiFi 1 antenna-to-user; ☐ 8.0 cm from WiFi 2 antenna-to-user

This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2).- SAR is required only for the edge with the most conservative exposure conditions.

2.3 Edge - Primary Portrait

☒ 0.6 cm from WiFi 1 antenna-to-user; ☐ 11 cm from WiFi 2 antenna-to-user

band	Channel	f (MHz)	Antenna	Avg Pwr	Results (mW/g)	
				(dBm)	1g-SAR	10g-SAR
5.2GHz	36	5180	WiFi 1			
	40	5200	WiFi 1	15.24	0.696	0.177
	48	5240	WiFi 1			
5.3GHz	52	5260	WiFi 1			
	60	5300	WiFi 1	15.16	0.634	0.189
	64	5320	WiFi 1			
5.6GHz	100	5500	WiFi 1	15.03	1.110	0.316
	120	5600	WiFi 1	15.11	**1.180**	**0.359**
	140	5700	WiFi 1	15.06	0.696	0.192
5.8GHz	149	5745	WiFi 1			
	157	5785	WiFi 1	15.22	**0.740**	**0.200**
	165	5825	WiFi 1			

WiFi 2 RF conducted power is lower than WiFi 1 and WiFi 2 with 11 cm from edge is not the most conservative antenna-to-user distance at edge mode by comparing to WiFi1 with 0.6 cm from the edge. According to KDB 447498 4) b) ii) (2).- SAR is required only for the edge with the most conservative exposure conditions thus only WiFi 1 position is tested

2.4 Edge - Secondary Portrait

☐ 23.0 cm from WiFi 1 antenna-to-user; ☐ 10 cm from WiFi 2 antenna-to-user

This is not the most conservative antenna-to-user distance at edge mode. According to KDB 447498 4) b) ii) (2).- SAR is required only for the edge with the most conservative exposure conditions.

12. WORST-CASE SAR TEST PLOTS

Worst-case SAR Plot for Part 22

Date/Time: 2/9/2010 9:48:27 PM

Test Laboratory: Compliance Certification Services

3_Secondary portrait_UMTS Band V

DUT: Apple; Type: NA; Serial: NA

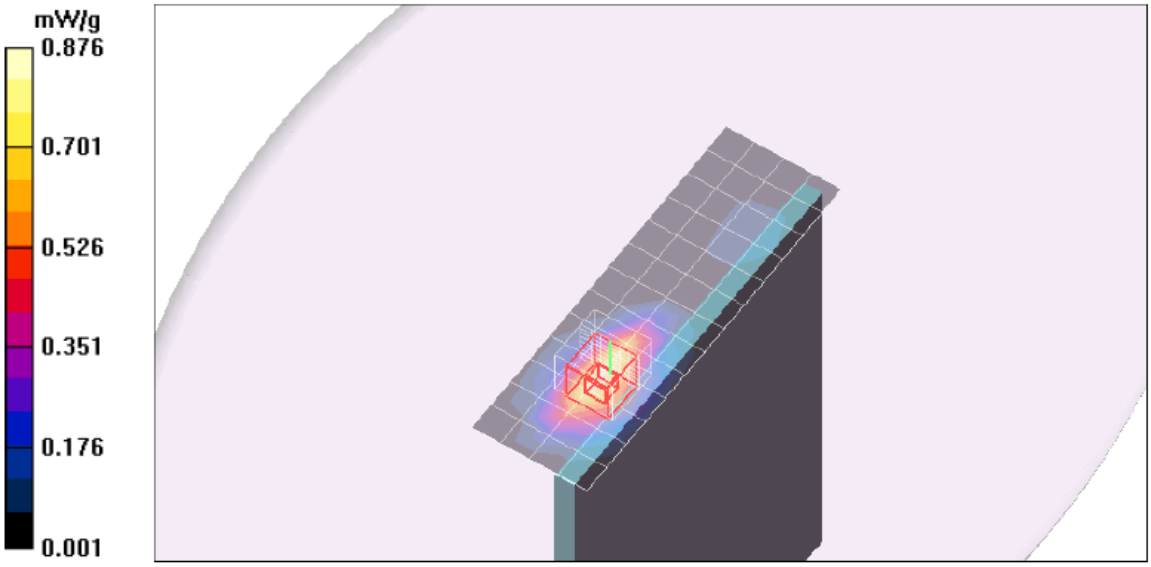
Communication System: UMTS850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 56.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 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

UMTS Band V_M ch/Area Scan (5x14x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.876 mW/g

UMTS Band V_M ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.759 mW/g; SAR(10 g) = 0.455 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.939 mW/g



Worst-case SAR Plot for Part 24

Date/Time: 2/9/2010 6:10:18 PM

Test Laboratory: Compliance Certification Services

3_Secondary portrait_UMTS Band II

DUT: Apple; Type: NA; Serial: NA

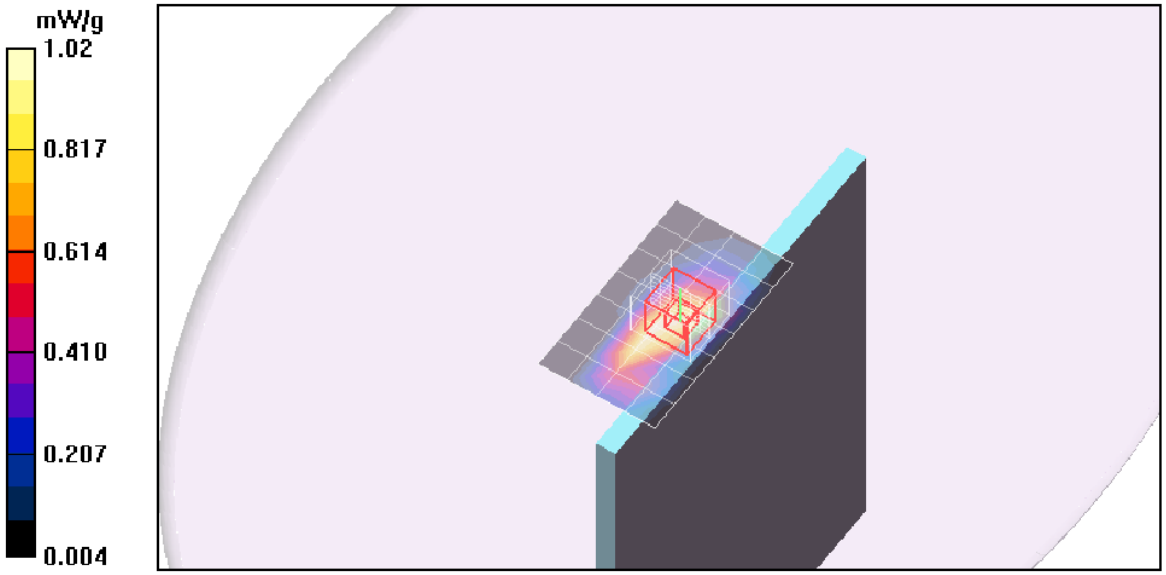
Communication System: PCS 1900; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.48 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

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

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(6.85, 6.85, 6.85); Calibrated: 3/23/2009
- 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

UMTS Band II_L ch/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.02 mW/g

UMTS Band II_L ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Peak SAR (extrapolated) = 2.20 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.614 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.52 mW/g



Worst-case SAR Plot for 2.4GHz

Date/Time: 2/10/2010 11:22:56 PM

Test Laboratory: Compliance Certification Services

11b_WiFi 2_Bottom face

DUT: Apple; Type: NA; Serial: NA

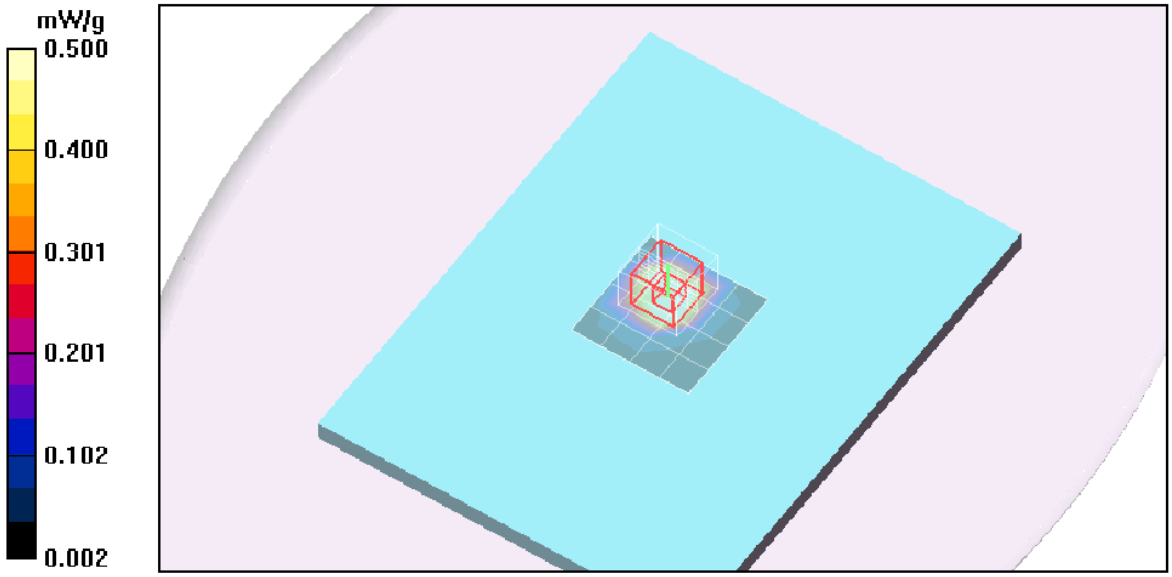
Communication System: 802.11bgn; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2412 MHz; σ = 1.95 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 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

802.11b L-ch Main Ant/Area Scan (5x5x1): Measurement grid: dx=15mm, dy=15mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.630 mW/g

802.11b L-ch Main Ant/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Peak SAR (extrapolated) = 3.25 W/kg
SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.410 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.75 mW/g



Worst-case SAR plot for 5.2 GHz

Date/Time: 2/11/2010 2:19:52 PM

Test Laboratory: Compliance Certification Services

Tablet_Bottom face_WiFi 2

DUT: Apple; Type: NA; Serial: NA

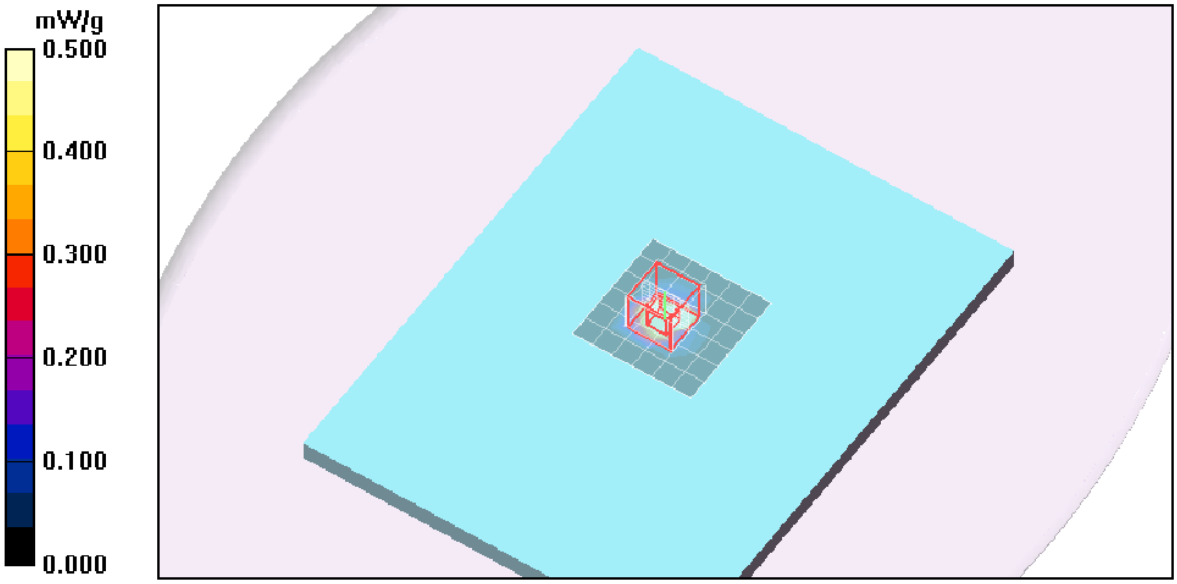
Communication System: 802.11abgn; Frequency: 5180 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5180 MHz; σ = 5.35 mho/m; ε_r = 49; ρ = 1000 kg/m^3
Phantom section: Flat Section

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(4.08, 4.08, 4.08); Calibrated: 3/23/2009
- Sensor-Surface: 2.5mm (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

WiFi 2_Ch 36/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.59 mW/g

WiFi 2_Ch 36/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Peak SAR (extrapolated) = 4.93 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.223 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 2.14 mW/g



Worst-case SAR plot for 5.3GHz

Date/Time: 2/11/2010 8:23:19 PM

Test Laboratory: Compliance Certification Services

Tablet_Bottom face_WiFi 2

DUT: Apple; Type: NA; Serial: NA

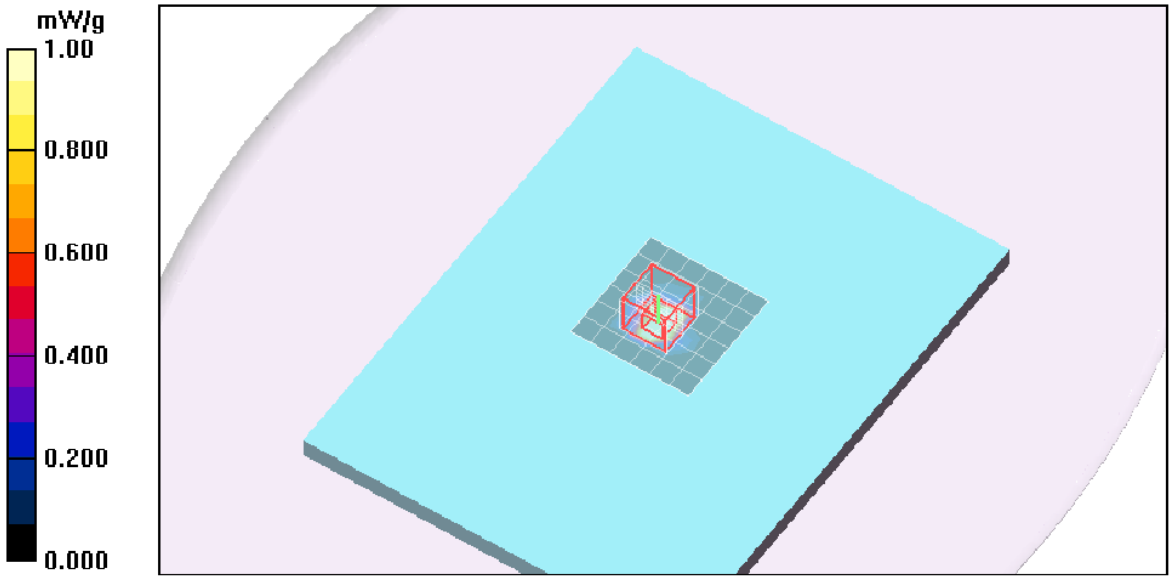
Communication System: 802.11abgn; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5300 MHz; σ = 5.52 mho/m; ε_r = 48.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

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

DASY4 Configuration:
- Area Scan setting - Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Probe: EX3DV4 - SN3686; ConvF(3.81, 3.81, 3.81); Calibrated: 3/23/2009
- Sensor-Surface: 2.5mm (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

WiFi 2_Ch 60/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.61 mW/g

WiFi 2_Ch 60/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Peak SAR (extrapolated) = 5.30 W/kg
SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.263 mW/g
Maximum value of SAR (measured) = 2.41 mW/g



Worst-case SAR plot for 5.5GHz

Date/Time: 3/2/2010 10:20:53 PM

Test Laboratory: Compliance Certification Services

Primary portrait_WiFi 1

DUT: Apple; Type: NA; Serial: NA

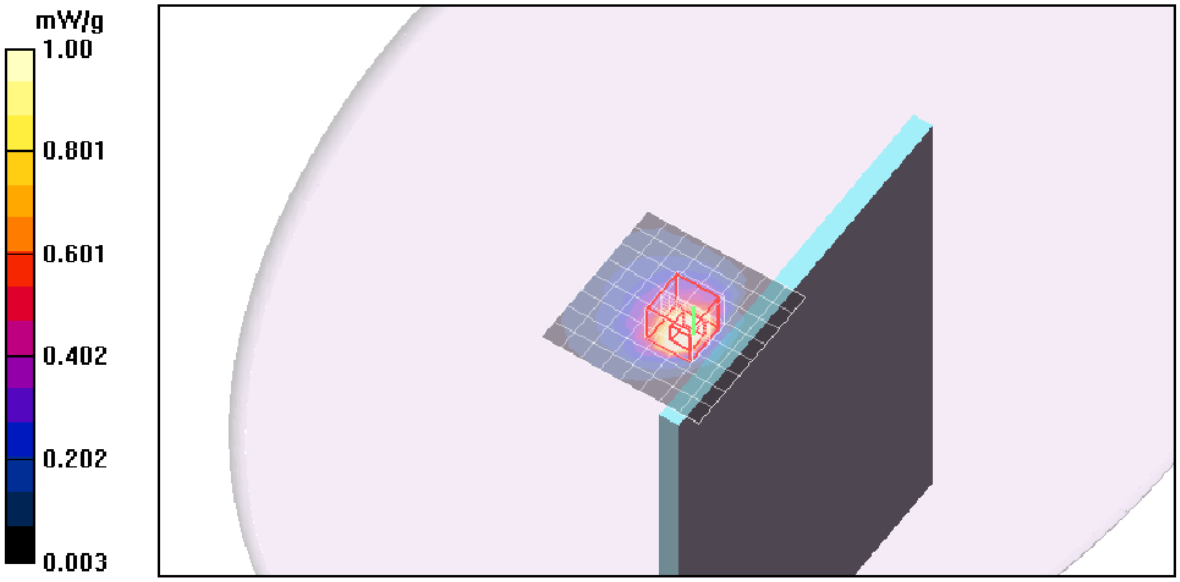
Communication System: 802.11abgn; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5600 MHz; σ = 6.06 mho/m; ε_r = 48.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

Room Ambient Temperature: 25.0 deg. C; Liquid Temperature: 24.0 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(3.61, 3.61, 3.61); Calibrated: 3/23/2009
- Sensor-Surface: 2.5mm (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

802.11a_WiFi 1_ch 120/Area Scan (9x9x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 1.83 mW/g

802.11a_WiFi 1_ch 120/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Peak SAR (extrapolated) = 4.89 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.359 mW/g
Maximum value of SAR (measured) = 2.09 mW/g



Worst-case SAR plot for 5.8GHz

Date/Time: 2/12/2010 1:27:46 AM

Test Laboratory: Compliance Certification Services

Primary portrait_WiFi 1

DUT: Apple; Type: NA; Serial: NA

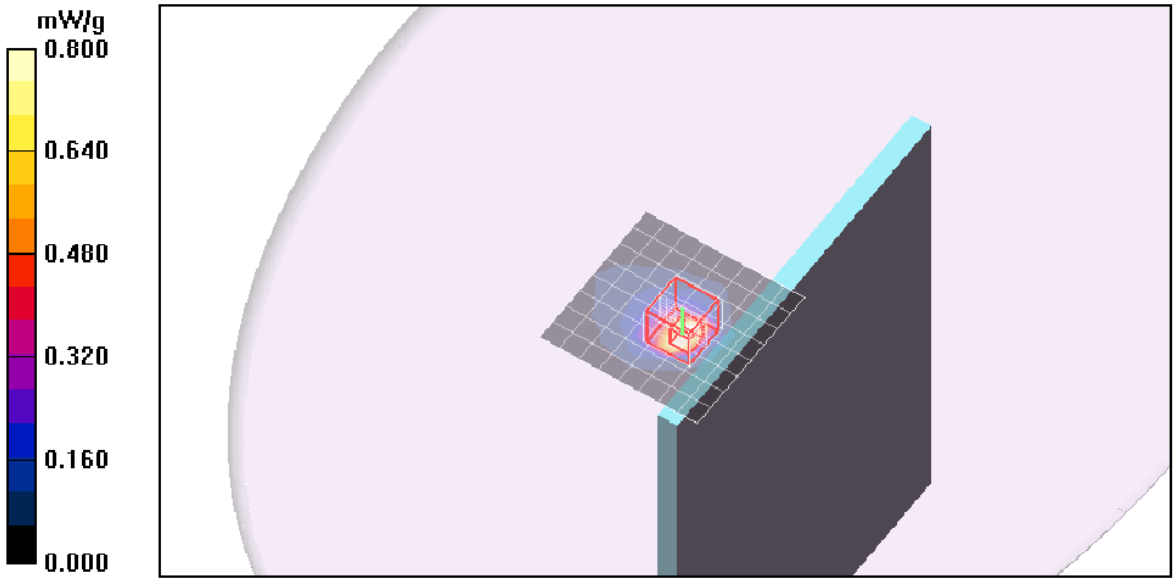
Communication System: 802.11abgn; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5785 MHz; σ = 6.23 mho/m; ε_r = 47.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

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(3.84, 3.84, 3.84); Calibrated: 3/23/2009
- Sensor-Surface: 2.5mm (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

802.11a_WiFi 1_ch 157/Area Scan (9x9x1): Measurement grid: dx=10mm, dy=10mm
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.963 mW/g

802.11a_WiFi 1_ch 157/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2.5mm
Peak SAR (extrapolated) = 3.44 W/kg
SAR(1 g) = 0.740 mW/g; SAR(10 g) = 0.200 mW/g
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.37 mW/g



13. ATTACHMENTS

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