FCC OET BULLETIN 65 SUPPLEMENT C 01-01
IEEE STD 1528:2003
RSS-102 Issue 4, March 2010

CLASS II PERMISSIVE CHANGE

SAR EVALUATION REPORT

For

PCIe Wireless Mini Card
(Tested inside of Panasonic Tablet PC CF-D1)

MODEL: F5521gw
FCC ID: VV7-MBMF5521GW1
IC: 287AG-MBMF5521GW1

REPORT NUMBER: 11J13788-1

ISSUE DATE: June 22, 2011

Prepared for

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	June 22, 2011	Initial Issue	--

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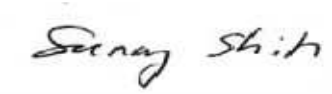
1. ATTESTATION OF TEST RESULTS

Applicant name:	Ericsson AB Lindholmspiren 11 Gothenburg, Se 417 56, Sweden		
EUT description:	PCIe Wireless Mini Card. Tested inside Panasonic Tablet PC, CF-D1		
Model number:	F5521gw		
Device category:	Portable		
Exposure category:	General Population/Uncontrolled Exposure		
Date tested:	May 23 – May 24, 2011		
FCC / IC Rule Parts	Freq. Range [MHz]	Highest 1-g SAR (W/kg)	Limit (W/kg)
22H / RSS-132	824 - 849	0.226 W/kg (UMTS Band V) Secondary Portrait	1.6
24E / RSS-133	1850 - 1910	0.344 W/kg (GPRS1900) Secondary Portrait	
Applicable Standards			Test Results
FCC OET Bulletin 65 Supplement C 01-01, IEEE Std 1528:2003 IC RSS 102 Issue 4			Pass

Compliance Certification Services, Inc. (UL 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 UL 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 UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL 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
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Compliance Certification Services (UL CCS)

Tested By:

Hung Thai
RF Engineer
Compliance Certification Services (UL CCS)

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C, IEEE STD 1528: 2003, IC RSS 102 Issue 4 and the following KDB Test Procedures.

- 447498 D01 Mobile Portable RF Exposure v04
- 941225 D01 SAR test for 3G devices
- 941225 D02 Guidance for 3GPP R6 and R7 HSPA v02v01
- 941225 D03 SAR Test Reduction GSM GPRS EDGE v01

3. FACILITIES AND ACCREDITATION

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

UL 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		
Oval Flat Phantom (ELI 4.0)	SPEAG	QD OVA001 B	1017	N/A		
Dielectronic Probe kit	HP	85070C	N/A	N/A		
Wireless comunication test set	Agilent	E5515C (8960)	GB46160222	6	17	2012
E-Field Probe	SPEAG	EX3DV4	3749	12	13	2011
Data Acquisition Electronics	SPEAG	DAE4	1239	11	17	2011
Data Acquisition Electronics	SPEAG	DAE3	427	7	21	2011
System Validation Dipole	SPEAG	D2450V2	706	4	19	2012
System Validation Dipole	SPEAG	*D5GHzV2	1075	9	3	2011
Thermometer	ERTCO	639-1S	1718	7	19	2011
Amplifier	Mini-Circuits	ZVE-8G	90606	N/A		
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
ESA Series Network Analyzer	Agilent	E5071B	MY42100131	8	2	2011
Synthesized Signal Generator	HP	83732B	US34490599	7	14	2012
Power Meter	Giga-tronics	8651A	8651404	3	13	2012
Power Sensor	Giga-tronics	80701A	1834588	3	13	2012
Simulating Liquid	SPEAG	M2450	N/A	Within 24 hrs of first test		
Simulating Liquid	SPAEG	M5800	N/A	Within 24 hrs of first test		

Note:

Per KDB 450824 D02 requirements for dipole calibration, UL 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 UL CCS)
4. Impedance is within 5Ω of calibrated measurement (test data on file in UL CCS)

4.2. MEASUREMENT UNCERTAINTY

Measurement uncertainty for 300 MHz to 3 GHz averaged over 1 gram					
Component	error, %	Probe Distribution	Divisor	Sensitivity	U (Xi), %
Measurement System					
Probe Calibration (k=1)	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	0.64	1.85
Liquid Conductivity - measurement	2.57	Normal	1	0.64	1.64
Liquid Permittivity - deviation from target	5.00	Rectangular	1.732	0.6	1.73
Liquid Permittivity - measurement	0.72	Normal	1	0.6	0.43
				Combined Standard Uncertainty Uc(y) =	9.59
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 19.18	%
				Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence = 1.52	dB

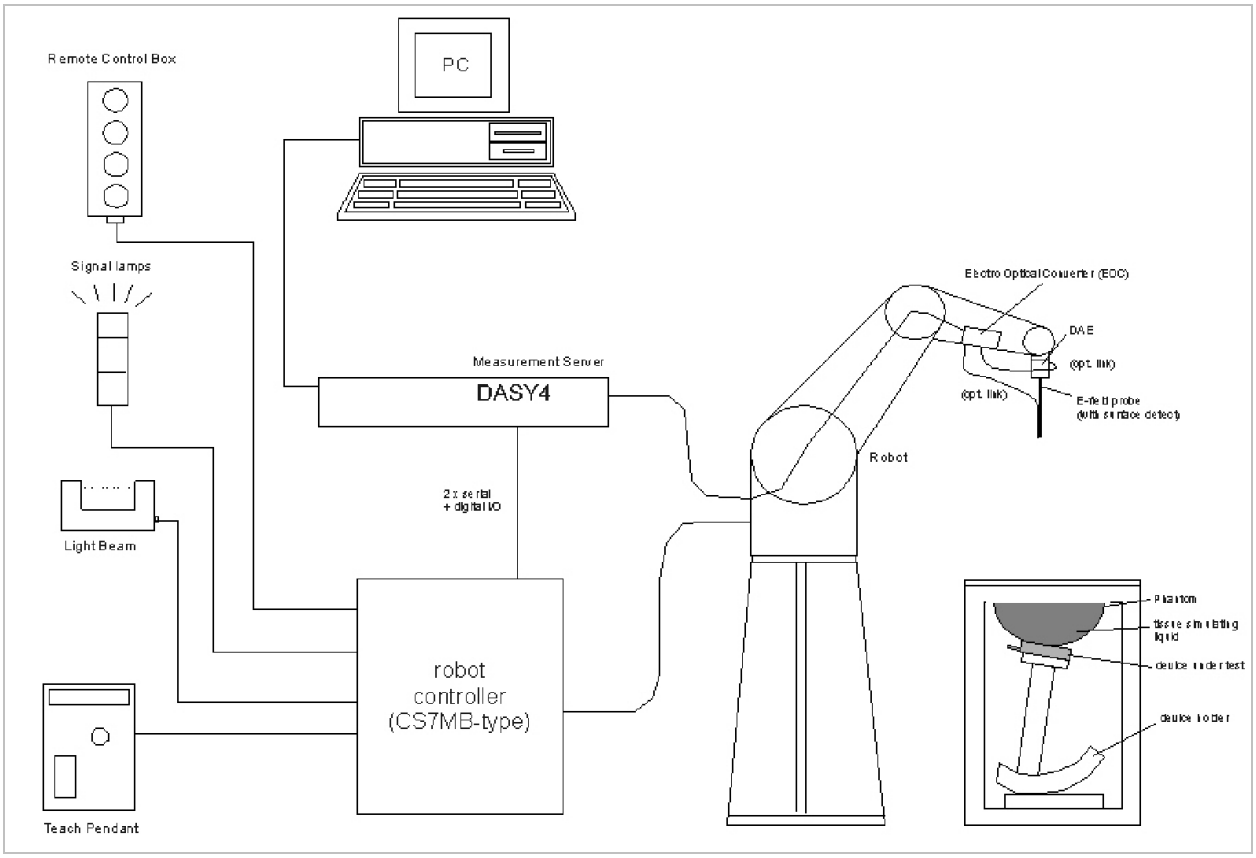
5. EQUIPMENT UNDER TEST

The EUT is the F5521gw Ericsson Mobile Broadband Module. F5521gw is a dual mode device, able to connect via UMTS/HSPA and GSM/GPRS//EDGE.

Tested inside Panasonic Tablet PC, CF-D1.

Normal operation:	Tablet mode - Multiple display orientations supporting both portrait and landscape configurations.
Antenna tested:	Manufactured / Part number Panasonic / Main: DFUP2055ZA(1) BT / DFUP2066ZA
Antenna-to-antenna/user separation distances:	See Section 16 for details of antenna locations and separation distances.
Simultaneous transmission:	• WWAN can transmit simultaneously with WiFi • WWAN can transmit simultaneously with Bluetooth • WiFi can transmit simultaneously with Bluetooth
Assessment for SAR evaluation for Simultaneous transmission: (According to KDB 616217, Table 2)	**WiFi and BT** WiFi can transmit simultaneously with Bluetooth. Due to Bluetooth's (FCC ID: DFUP2066ZA; IC: 216A-CFBT11A) maximum output is < 60/f(GHz) mW and stand-alone SAR is not required, thus WiFi and Bluetooth are not considered as co-located transmitters each other. **WWAN and WiFi** SAR is not required due to $\sum (SAR_{1g}) <$ SAR limit. Refer to Section 13 for Simultaneous SAR test data summary

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 validating the proper functioning of the system.

7. COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS

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

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

Salt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
Water: De-ionized, 16 MΩ+ resistivity HEC: Hydroxyethyl Cellulose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

Simulating Liquids for 5 GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	78
Mineral oil	11
Emulsifiers	9
Additives and Salt	2

8. TISSUE DIELECTRIC PARAMETERS

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 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 (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)

8.1. LIQUID CHECK RESULTS

Measured by: Art Tham

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/23/2011	Body 850	e'	54.4282	Relative Permittivity (ϵ_r):	54.43	55.16	-1.32	5
		e''	21.1563	Conductivity (σ):	1.00	0.99	1.29	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 40%
May 23, 2011 04:54 PM

Frequency	e'	e''
800000000.	54.8810	21.3912
805000000.	54.8449	21.3714
810000000.	54.8190	21.3484
815000000.	54.7826	21.3300
820000000.	54.7426	21.3118
825000000.	54.6973	21.2909
830000000.	54.6457	21.2685
835000000.	54.5927	21.2354
840000000.	54.5399	21.2109
845000000.	54.4826	21.1843
850000000.	**54.4282**	**21.1563**
855000000.	54.3732	21.1275
860000000.	54.3187	21.1037
865000000.	54.2592	21.0830
870000000.	54.2079	21.0583
875000000.	54.1485	21.0434
880000000.	54.0929	21.0303
885000000.	54.0481	21.0167
890000000.	54.0002	21.0051
895000000.	53.9500	21.0000
900000000.	53.9013	20.9931
905000000.	53.8631	20.9820
910000000.	53.8259	20.9752
915000000.	53.7844	20.9668
920000000.	53.7481	20.9556
925000000.	53.7030	20.9435
930000000.	53.6669	20.9285
935000000.	53.6348	20.9128
940000000.	53.5931	20.8929
945000000.	53.5529	20.8760
950000000.	53.5114	20.8583

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

Measured by: Hung Thai

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
5/24/2011	Body 1900	e'	53.6854	Relative Permittivity (ϵ_r):	53.69	53.30	0.72	5
		e''	14.7568	Conductivity (σ):	1.56	1.52	2.57	5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C; Relative humidity = 42%
May 24, 2011 09:42 AM

Frequency	e'	e''
1710000000.	54.3689	14.0300
1720000000.	54.3394	14.0690
1730000000.	54.3055	14.1102
1740000000.	54.2720	14.1544
1750000000.	54.2380	14.1967
1760000000.	54.2002	14.2390
1770000000.	54.1594	14.2787
1780000000.	54.1224	14.3179
1790000000.	54.0854	14.3585
1800000000.	54.0473	14.3971
1810000000.	54.0107	14.4341
1820000000.	53.9753	14.4696
1830000000.	53.9383	14.5046
1840000000.	53.8998	14.5406
1850000000.	53.8690	14.5792
1860000000.	53.8300	14.6130
1870000000.	53.7952	14.6514
1880000000.	53.7554	14.6881
1890000000.	53.7197	14.7231
1900000000.	**53.6854**	**14.7568**
1910000000.	53.6479	14.7938

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

9. SYSTEM VERIFICATION

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 EX3DV3 was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 fine cube was chosen for cube
- Distance between probe sensors and phantom surface was set to 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 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. date	SAR Avg (mW/g)		
			Tissue:	Head	Body
D835V2 SN: 4d002	D1835V2-4d002_Apr11	4/4/11	1g SAR:	9.36	10.2
			10g SAR:	6.12	6.68
D1900V2 SN: 5d043	D1900V2-5d043_Nov09	11/24/09	1g SAR:	39.8	40.4
			10g SAR:	20.7	21.4

9.1. SYSTEM CHECK RESULTS

System validation dipole	Date Tested	Measured (Normalized to 1 W)		Target	Delta (%)	Tolerance (%)
		Tissue:	Body			
D835V2 SN: 4d002	05/23/11	1g SAR:	9.44	10.2	-7.45	±10
		10g SAR:	6.21	6.68	-7.04	
D1900V2 SN: 5d043	05/24/11	1g SAR:	41.7	40.4	3.22	±10
		10g SAR:	21.9	21.4	2.34	

10. SAR MEASUREMENT PROCEDURES

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The Minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 2.1 mm. This distance cannot be smaller than the Distance of sensor calibration points to probe tip as defined in the probe properties (for example, 1.2 mm for an EX3DV3 probe type).

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY4 software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528, EN 50361 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures ≥ 7 x 7 x 9 points within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

Step 5: Z-Scan

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation, the extrapolated distance should not be larger than the step size in Z-direction.

11. RF OUTPUT POWER VERIFICATION

11.1. GSM

GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slot	Frame Avg Pwr
GSM850	128	824.2	32.5	23.5	32.4	26.4
	190	836.6	32.3	23.3	32.2	26.2
	251	848.8	32.4	23.4	32.3	26.3
GSM1900	512	1850.2	30.0	21.0	29.9	23.9
	661	1880.0	30.0	21.0	29.8	23.8
	810	1909.8	29.8	20.8	29.8	23.8

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	f (MHz)	Avg burst Pwr (dBm)			
			1 slot	Frame Avg Pwr	2 slot	Frame Avg Pwr
GSM850	128	824.2	26.6	17.6	26.5	20.5
	190	836.6	26.5	17.5	26.4	20.4
	251	848.8	26.5	17.5	26.4	20.4
GSM1900	512	1850.2	26.0	17.0	25.9	19.9
	661	1880	25.9	16.9	25.8	19.8
	810	1909.8	25.9	16.9	25.8	19.8

Note:

1. Since the source-based time-averaged output power for EGPRS mode is lower than that in the GPRS mode, therefore Body SAR test reduction is applicable for this device.
2. Based on output power above and time slots, the following worst-case configurations were chosen for Body SAR testing.
    a. GPRS850 2 time slots
    b. GPRS1900 2 time slots

11.2. 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 12.2kbps RMC	4132	4357	826.4	23.9
		4183	4408	836.6	23.8
		4233	4458	846.6	24.0
UMTS1900 (Band II)	Rel 99 12.2kps RMC	9262	9662	1852.4	22.8
		9400	9800	1880.0	22.7
		9538	9938	1907.6	22.8

12. SUMMARY OF TEST RESULT

Configuration	Antenna-to-User distance	SAR Require	Comments
(1) Bottom Face	40 mm from Main antenna-to-user	Yes	
Primary Portrait	255 mm from Mmin antenna-to-User	No	SAR is not required due to separation distance > 20 cm from antenna-to-user.
Secondary Landscape	6 mm from Main antenna-to-User	No	SAR is not required since antennas is disabled by software at secondary landscape orientation.
Primary Landscape	235 mm from Main antenna-to-User	No	SAR is not required due to separation distance > 20 cm from antenna-to-user.
(2) Secondary Portrait	17 mm from Main Antenna-to-User	Yes	

12.1. GPRS 850 & 1900

(1) Bottom Face

Band	Mode	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
GPRS 850	2	128	824.2		
		190	836.6	0.099	0.070
		251	848.8		
GPRS 1900	2	512	1850.2		
		661	1880.0	0.057	0.025
		810	1909.8		

(2) Secondary Portrait

Band	Mode	Ch No.	Freq. (MHz)	SAR (mW/g)	
				1-g	10-g
GPRS 850	2	128	824.2		
		190	836.6	0.204	0.123
		251	848.8		
GPRS 1900	2	512	1850.2		
		661	1880.0	**0.344**	0.194
		810	1909.8		

12.2. UMTS BAND V & II

Test reduction considerations:
KDB 941225 D01 – Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is < 75% of the SAR limit.

Note: The modes with highest output power channels were chosen for the conducted output power.

(1) Bottom Face

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Band V	R99	4132	4357	826.4		
	12.2kbps	4183	4408	836.6	0.111	0.081
	RMC	4233	4458	846.6		
Band II	R99	9262	9662	1850.2		
	12.2kbps	9400	9800	1880	0.027	0.018
	RMC	9538	9938	1907.6		

(2) Secondary Portrait

Band	Mode	UL Ch No.	DL Ch No.	f (MHz)	SAR (mW/g)	
					1-g	10-g
Band V	R99	4132	4357	826.4		
	12.2kbps	4183	4408	836.6	**0.226**	0.137
	RMC	4233	4458	846.6		
Band II	R99	9262	9662	1850.2		
	12.2kbps	9400	9800	1880	0.250	0.140
	RMC	9538	9938	1907.6		

13. SIMULTANEOUS SAR TEST DATA SUMMARY

WWAN Main Antenna + WiFi Antenna B

Test position	WWAN Pk SAR (W/kg)		WiFi (Main ant. A) Pk SAR (W/kg)		∑ 1g SAR (W/kg)
Bottom face	GSM850	0.099	2.4 GHz	0.037	0.136
			5 GHz bands	0.110	0.209
	GSM1900	0.057	2.4 GHz	0.037	0.094
			5 GHz bands	0.110	0.167
	UMTS Band V	0.111	2.4 GHz	0.037	0.148
			5 GHz bands	0.110	0.221
	UMTS Band II	0.027	2.4 GHz	0.037	0.064
			5 GHz bands	0.110	0.137
Secondary Portrait	GSM850	0.204	2.4 GHz	0.053	0.257
			5 GHz bands	0.048	0.252
	GSM1900	0.344	2.4 GHz	0.053	0.397
			5 GHz bands	0.048	0.392
	UMTS Band V	0.226	2.4 GHz	0.053	0.279
			5 GHz bands	0.048	0.274
	UMTS Band II	0.250	2.4 GHz	0.053	0.303
			5 GHz bands	0.048	0.298

Note(s):

1. Simultaneous Transmission SAR evaluation is not required due to ∑ (1g SAR) < SAR limit.
2. Please refer to WiFi SAR report (11J13788-1, FCC ID: ACJ9TGWL11A) for SAR data.

14. WORST-CASE SAR TEST PLOTS

Date/Time: 5/24/2011 1:52:54 PM

Test Laboratory: UL CCS

GPRS 1900_Secondary Portrait

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

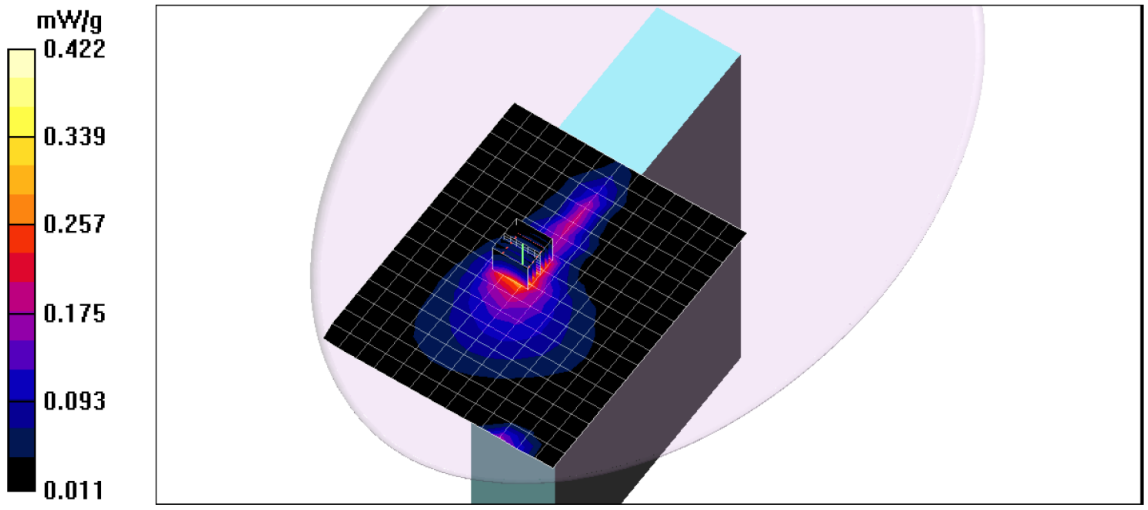
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:4
Medium parameters used: f = 1880 MHz; σ = 1.54 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 - SN3749; ConvF(7.33, 7.33, 7.33); Calibrated: 12/13/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 7/21/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Post processing SW: SEMCAD, V1.8 Build 186

Mode 2_M-Ch/Area Scan (14x17x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.322 mW/g

Mode 2_M-Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 14.6 V/m; Power Drift = 0.089 dB
Peak SAR (extrapolated) = 0.585 W/kg
SAR(1 g) = 0.344 mW/g; SAR(10 g) = 0.194 mW/g
Maximum value of SAR (measured) = 0.422 mW/g



Date/Time: 5/24/2011 2:28:22 PM

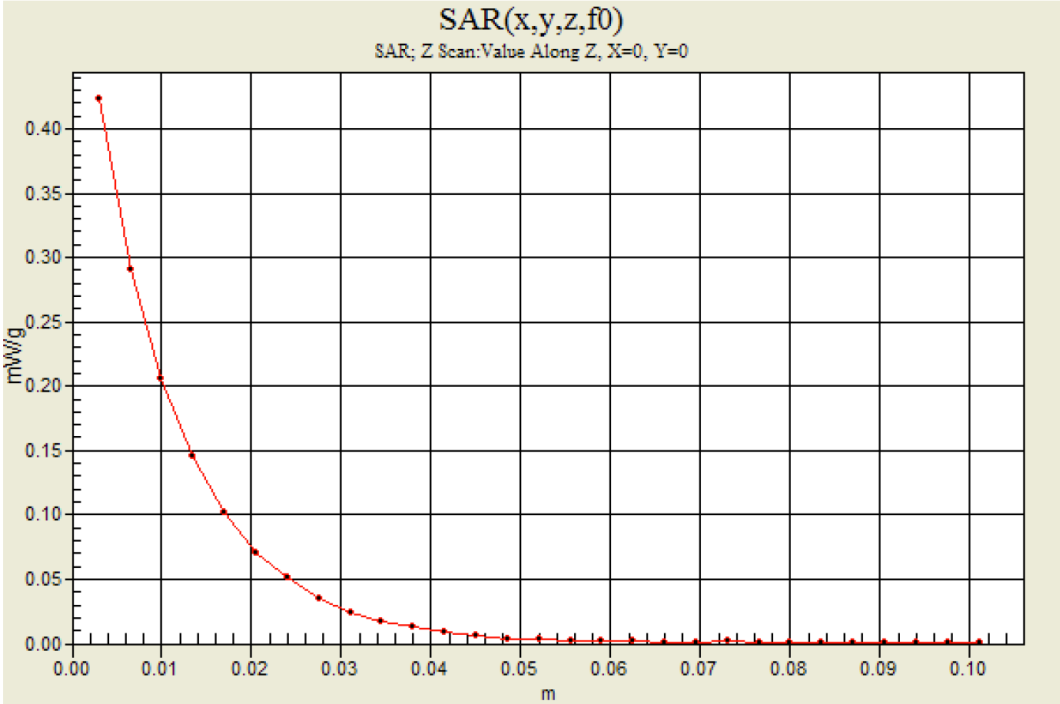
Test Laboratory: UL CCS

GPRS 1900_Secondary Portrait

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

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:4

Mode 2_M-Ch/Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm
Maximum value of SAR (measured) = 0.423 mW/g



Date/Time: 5/24/2011 2:08:22 AM

Test Laboratory: UL CCS

UMTS Band V_Secondary Portrait

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

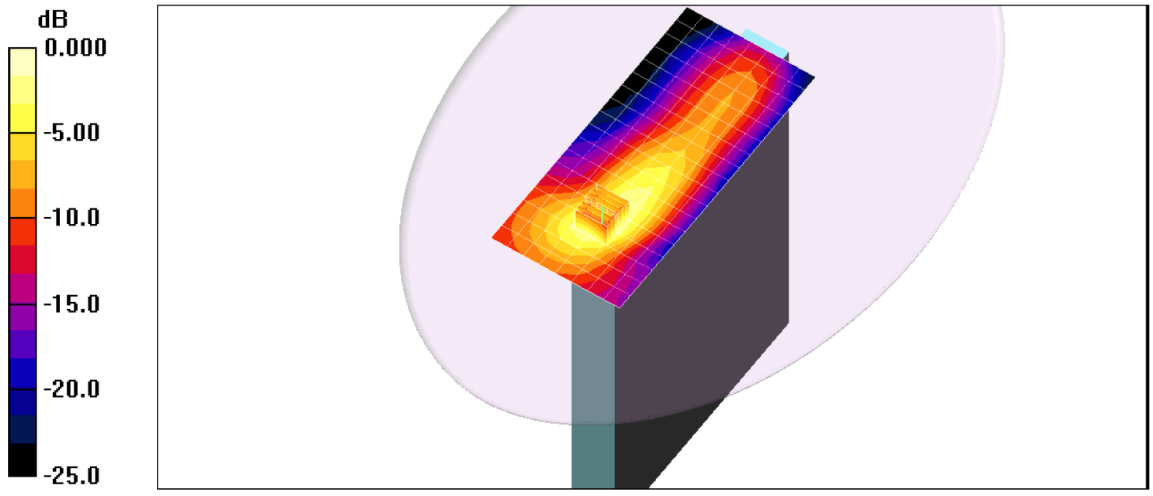
Communication System: UMTS Band V; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.988 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 - SN3749; ConvF(8.79, 8.79, 8.79); Calibrated: 12/13/2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn427; Calibrated: 7/21/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN:1003
- Measurement SW: DASY4, V4.7 Build 80; Post processing SW: SEMCAD, V1.8 Build 186

Rel.99_M-Ch/Area Scan (9x19x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.263 mW/g

Rel.99_M-Ch/Zoom Scan (7x7x9)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 16.4 V/m; Power Drift = -0.196 dB
Peak SAR (extrapolated) = 0.393 W/kg
SAR(1 g) = 0.226 mW/g; SAR(10 g) = 0.137 mW/g
Maximum value of SAR (measured) = 0.274 mW/g



0 dB = 0.274mW/g

Date/Time: 5/24/2011 2:37:36 AM

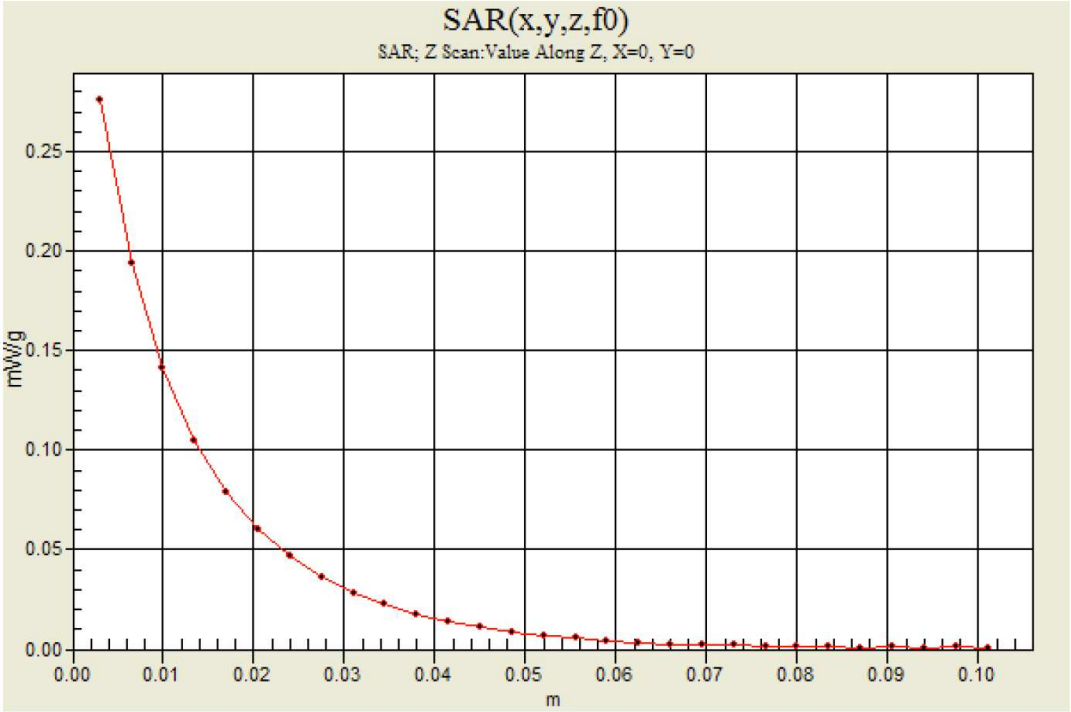
Test Laboratory: UL CCS

UMTS Band V_Secondary Portrait

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

Communication System: UMTS Band V; Frequency: 836.6 MHz; Duty Cycle: 1:1

Rel.99_M-Ch/Z Scan (1x1x29): Measurement grid: dx=20mm, dy=20mm, dz=3.5mm
Maximum value of SAR (measured) = 0.276 mW/g



15. ATTACHMENTS

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