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

SAR EVALUATION REPORT

FOR

GSM/GPRS CLASS 10/EDGE/HSDPA/HSUPA/WCDMA MODULE
(INSTALLED IN A LENOVO THINKPAD X200T TABLET SERIES)

MODEL NUMBER: F3507G
FCC ID: VV7-MBMF3507G-L

REPORT NUMBER: 08U11870-5A

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Revision History

Rev.	Issued date	Revisions	Revised By
--	July 3, 2008	Initial issue	Sunny Shih
A	July 21, 2008	Added justification for reduction of testing for HSPA modes in section 12.	Sunny Shih

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1 ATTESTATION OF TEST RESULTS

COMPANY NAME:	ERICSSON AB LINDHOLMSPIREN 11 SE-417 56 GOTHENBURG SWEDEN
EUT DESCRIPTION:	GSM/GPRS CLASS 10/EDGE/HSDPA/HSUPA/WCDMA MODULE IS INSTALLED IN A LENOVO THINKPAD X200T Tablet SERIES
MODEL:	F3507G
DEVICE CATEGORY:	Portable
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure
DATE TESTED:	June 26th, and 27th 2008
THE HIGHEST SAR VALUES:	See Table below

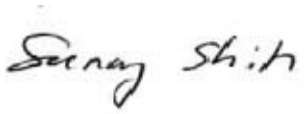
FCC / IC Rule Parts	Frequency Range [MHz]	The Highest SAR Values (1g_mW/g)	Limit (mW/g)
22H / RSS-102	824 – 849	0.243	1.6
24E / RSS-102	1850 – 1910	1.180	1.6

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC OET BULLETIN 65 SUPPLEMENT C	Pass
RSS-102 ISSUE 2	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. 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. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:



SUNNY SHIH
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

JONATHAN KING
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 and IC RSS 102 Issue 2: NOVERMBER 2005.

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.

5 MEASUREMENT UNCERTAINTY

Measurement uncertainty for 300 MHz – 3000 MHz

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

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

6 DEVICE UNDER TEST (DUT) DESCRIPTION

GSM/GPRS CLASS 10/EDGE/HSDPA/HSUPA/WCDMA MODULE IS INSTALLED IN A LENOVO THINKPAD X200T Tablet SERIES	
Normal operation:	Lap-held and under-arm positions.
Duty cycle:	12.5% for GPRS & EGPRS, single slot 25% for GPRS & EGPRS, 2 slots 37.5% for GPRS & EGPRS, 3 slots 50% for GPRS & EGPRS, 4 slots 100% for WCDMA and HSPA
Host Device	Lenovo ThinkPad X200 Series
Antenna(s)	See table below
Power supply:	Power supplied through laptop computer (host device)

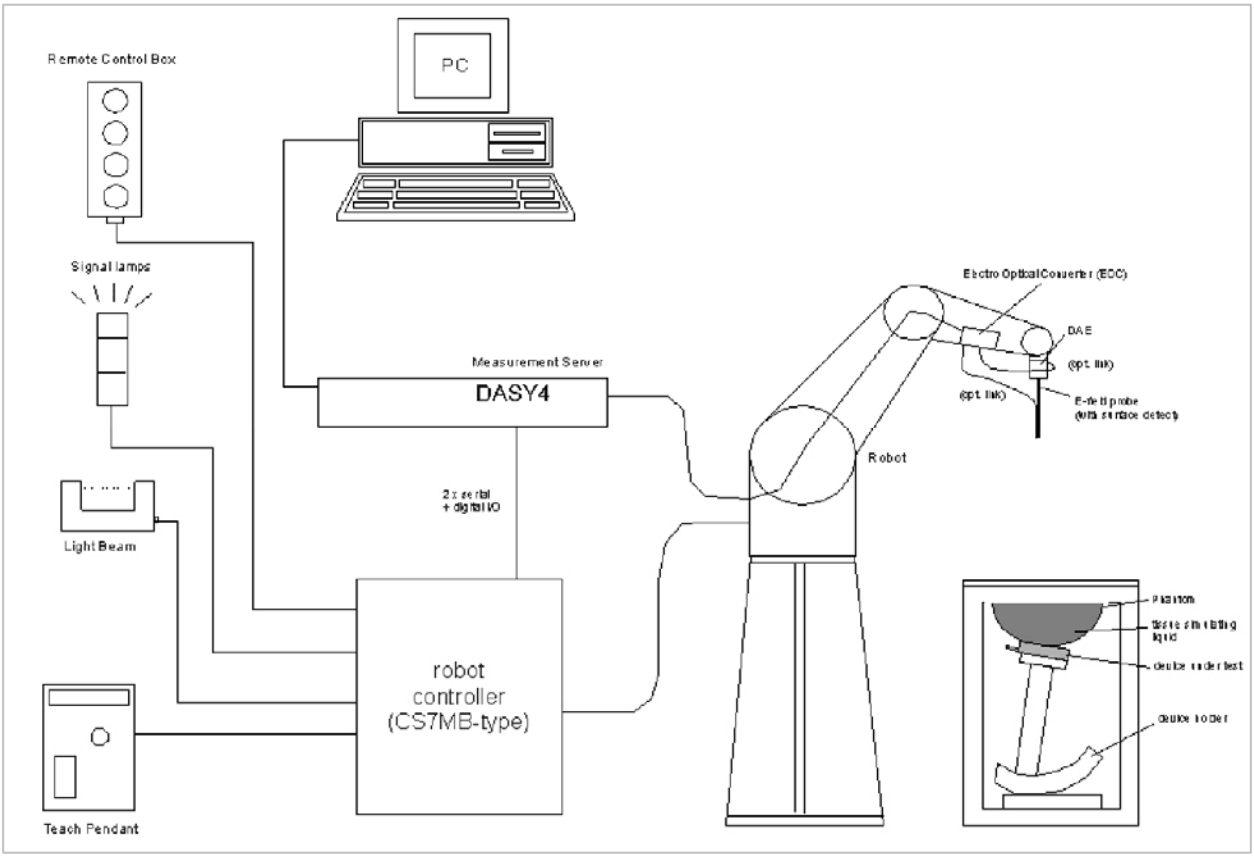
AVAILABLE ANTENNAS

Manufacturer	Type	PN
Acon	PIFA	25.90673.001
Wistron	PIFA	25.90667.001

Tested Antennas:

- Used highest gain Acon antenna for Cell band testing
- Used highest gain Wistron antenna for PCS band testing.

7 SYSTEM DESCRIPTION



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.

7.1 COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUIDS

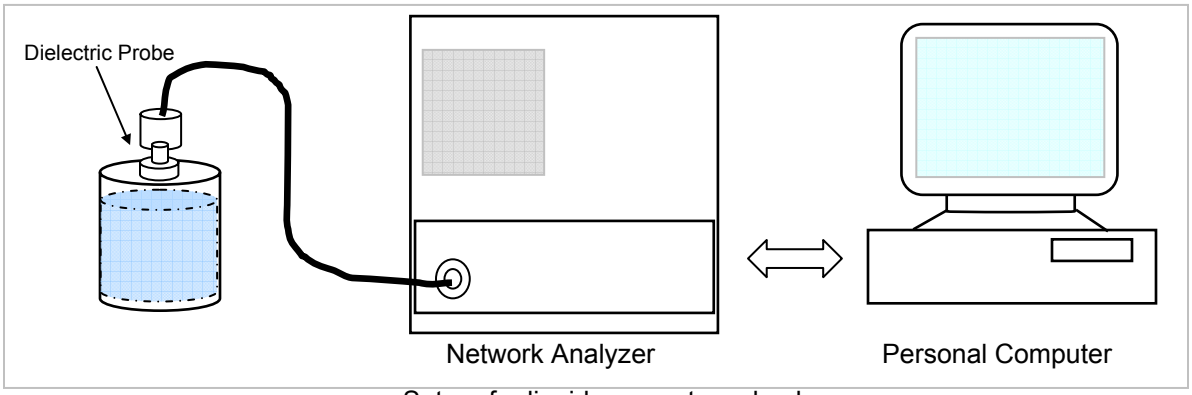
The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

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

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

8 Simulating Liquid Parameters Check

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



Set-up for liquid parameters check

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

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in IEEE Standard 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations and extrapolated according to the head parameters specified in IEEE Standard 1528.

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	**55.0**	**1.05**
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	**53.3**	**1.52**
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

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

8.1 SIMULATING LIQUID PARAMETER CHECK RESULT

Simulating Liquid Dielectric Parameters Check Result @ Muscle 835 MHz

Room Ambient Temperature =24 °C; Relative humidity =35 % Measured by: Walter Alvarez

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
835	23	15	e'	55.5029	Relative Permittivity (ϵ_r):	55.5029	55.2	0.55	± 5
			e"	21.0207	Conductivity (σ):	0.97646	0.97	0.67	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
June 27, 2008 11:28 AM

Frequency	e'	e"
805000000.	55.7287	21.1451
810000000.	55.7116	21.1203
815000000.	55.6617	21.0963
820000000.	55.6160	21.0653
825000000.	55.5767	21.0491
830000000.	55.5329	21.0179
835000000.	**55.5029**	**21.0207**
840000000.	55.4747	20.9674
845000000.	55.4080	20.9842
850000000.	55.3720	20.9345
855000000.	55.3084	20.8959
860000000.	55.2604	20.8951
865000000.	55.2118	20.8622
870000000.	55.1736	20.8256
875000000.	55.1156	20.8184
880000000.	55.0955	20.7965
885000000.	55.0303	20.7926
890000000.	54.9972	20.7866
895000000.	54.9596	20.7404
900000000.	54.9561	20.7123
905000000.	54.9126	20.6742
910000000.	54.8538	20.6479
915000000.	54.8167	20.6338
920000000.	54.7858	20.6328
925000000.	54.7290	20.6168
930000000.	54.7198	20.6018
935000000.	54.6619	20.5662
940000000.	54.5962	20.5342
945000000.	54.5582	20.5418
950000000.	54.5273	20.5160

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 Check Result @ Muscle 1900 MHz

Room Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Jonathan King

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
1900	23	15	e'	52.108	Relative Permittivity (ϵ_r):	52.1080	53.3	-2.24	± 5
			e"	14.2836	Conductivity (σ):	1.50977	1.52	-0.67	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
June 26, 2008 8:44 AM

Frequency	e'	e"
1710000000.	52.7956	13.8014
1720000000.	52.7673	13.8244
1730000000.	52.7241	13.8669
1740000000.	52.6694	13.8971
1750000000.	52.6312	13.9358
1760000000.	52.5816	13.9408
1770000000.	52.5501	13.9782
1780000000.	52.5070	14.0037
1790000000.	52.4683	14.0149
1800000000.	52.4424	14.0517
1810000000.	52.4079	14.0634
1820000000.	52.3604	14.0831
1830000000.	52.3313	14.1051
1840000000.	52.3052	14.1285
1850000000.	52.2680	14.1616
1860000000.	52.2437	14.1909
1870000000.	52.2092	14.2186
1880000000.	52.1819	14.2402
1890000000.	52.1544	14.2515
1900000000.	**52.1080**	**14.2836**
1910000000.	52.0773	14.2876

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 Check Result @ Muscle 1900 MHz

Room Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Jonathan King

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
1900	23	15	e'	51.5269	Relative Permittivity (ε_r):	51.5269	53.3	-3.33	± 5
			e"	14.5409	Conductivity (σ):	1.53696	1.52	1.12	± 5

Liquid Check
Ambient temperature: 24 deg. C; Liquid temperature: 23 deg. C
June 27, 2008 09:20 AM

Frequency	e'	e"
1710000000.	52.1562	14.0648
1720000000.	52.1230	14.0879
1730000000.	52.1034	14.1074
1740000000.	52.0547	14.1288
1750000000.	52.0279	14.1615
1760000000.	51.9953	14.1846
1770000000.	51.9670	14.2368
1780000000.	51.9330	14.2577
1790000000.	51.9013	14.2877
1800000000.	51.8709	14.2954
1810000000.	51.8228	14.3397
1820000000.	51.7813	14.3428
1830000000.	51.7457	14.3843
1840000000.	51.7069	14.4072
1850000000.	51.6682	14.4447
1860000000.	51.6500	14.4541
1870000000.	51.6145	14.4786
1880000000.	51.5820	14.5044
1890000000.	51.5562	14.5317
1900000000.	**51.5269**	**14.5409**
1910000000.	51.4749	14.5706

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 Performance Check

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

System Performance Check Measurement Conditions

- The measurements were performed in the flat section of the SAM twin phantom filled with Body simulating liquid of the following parameters.
- The DASY4 system with an Isotropic E-Field Probe EX3DV3-SN: 3531 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 7 x 7 x 7 fine cube was chosen for cube integration(dx=dy=5mm; dz=5mm).
  For 5 GHz band - Special 7 x 7 x 7 fine cube was chosen for cube integration (dx=dy=4.3mm; dz=3mm)
- Distance between probe sensors and phantom surface was set to 4 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.0mm
- The dipole input power (forward power) was 250 mW±3%.
- The results are normalized to 1 W input power.

Reference SAR Values for body-tissue

In the table below, the numerical reference SAR values of a SPEAG validation dipoles placed below the flat phantom filled with body-tissue simulating liquid are given. The reference SAR values were calculated using the finite-difference time-domain method and the geometry parameters.

Dipole Type	Distance (mm)	Frequency (MHz)	SAR (1g) [W/kg]	SAR (10g) [W/kg]	SAR (peak) [W/kg]
D450V2	15	450	5.01	3.36	7.22
D835V2	15	835	9.71	6.38	14.1
D900V2	15	900	**11.1**	**7.17**	16.3
D1450V2	10	1450	29.6	16.6	49.8
D1800V2	10	1800	**38.5**	**20.3**	67.5
D1900V2	10	1900	39.8	20.8	69.6
D2000V2	10	2000	**40.9**	**21.2**	71.5
D2450V2	10	2450	51.2	23.7	97.6

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

9.1 SYSTEM PERFORMANCE CHECK RESULTS

System Validation Dipole: D835V2 SN:4d002

Date: June 27, 2008

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Jonathan King

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
835	23	15	1g	2.39	9.56	9.71	-1.54	± 10
			10g	1.58	6.32	6.38	-0.94	± 10

System Validation Dipole: D1900V2 SN:5d043

Date: June 26, 2008

Ambient Temperature = 24°C; Relative humidity = 40% Measured by: Jonathan King

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	23	15	1g	9.12	36.48	39.8	-8.34	± 10
			10g	4.84	19.36	20.8	-6.92	± 10

Date: June 27, 2008

Ambient Temperature = 24°C; Relative humidity = 35% Measured by: Jonathan King

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	23	15	1g	9.29	37.16	39.8	-6.63	± 10
			10g	4.93	19.72	20.8	-5.19	± 10

10 SAR MEASURMENT PROCEDURE

A summary of the procedure follows:

a) A measurement of the SAR value at a fixed location is used as a reference value for assessing the power drop of the DUT. The SAR at this point is measured at the start of the test, and then again at the end of the test.

b) The SAR distribution at the exposed flat section of the flat phantom is measured at a distance of 3 mm from the inner surface of the shell. The area covers the entire dimension of the DUT and the horizontal grid spacing is 15 mm x 15 mm. Based on this data, the area of the maximum absorption is determined by Spline interpolation. The first Area Scan covers the entire dimension of the DUT to ensure that the hotspot was correctly identified.

For 5 GHz band - The SAR distribution at the exposed flat section of the flat phantom is measured at a distance of 2.0 mm from the inner surface of the shell. The area covers the entire dimension of the DUT and the horizontal grid spacing is 10 mm x 10 mm. Based on this data, the area of the maximum absorption is determined by Spline interpolation. The first Area Scan covers the entire dimension of the DUT to ensure that the hotspot was correctly identified.

c) Around this point, a volume of X=Y= 30 and Z=21 mm is assessed by measuring 7 x 7 x 9 mm points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure:

For 5 GHz band - Around this point, a volume of X=Y=24 and Z=20 mm is assessed by measuring 7 x 7 x 9 mm points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure:

(i) The data at the surface are extrapolated, since the centre of the dipoles is 1.2 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation is based on a least square algorithm. A polynomial of the fourth order is calculated through the points in z-axes. This polynomial is then used to evaluate the points between the surface and the probe tip.

(ii) The maximum interpolated value is searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g and 10 g) are computed using the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the “Not a knot”- condition (in x, y and z-direction). The volume is integrated with the trapezoidal – algorithm. One thousand points (10 x 10 x 10) are interpolated to calculate the averages.

(iii) All neighbouring volumes are evaluated until no neighbouring volume with a higher average value is found.

(iv) The SAR value at the same location as in Step (a) is again measured to evaluate the actual power drift.

10.1 DASY4 SAR MEASURMENT PROCEDURE

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.

For 5 GHz band – Same as above except the Zoom Scan measures 7 x 7 x 9 points.

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 PROCEDURE USED TO ESTABLISH TEST SIGNAL

GSM/EGSM Procedure
The following settings were used to configure the Radio Communication Tester, CMU200.

GPRS/EGPRS

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900

Press **Connection control** to choose the different menus
Press **RESET** > choose all to reset all settings

Connection	Press **Signal Off** to turn off the signal and change settings Network Support > GSM+GPRS or GSM+EGPRS Main Service > Packet Data Service selection > Test Mode A – Auto Slot Config. off	
MS Signal	Press Slot Config bottom on the right twice to select and change the number of time slots and power setting	
	> Slot configuration	> Uplink/Gamma > 33 dBm for GPRS 850/900 > 27 dBm for EGPRS 850/900 > 30 dBm for GPRS1800/1900 > 26 dBm for EGPRS1800/1900
BS Signal	Enter the same channel number for TCH channel (test channel) and BCCH channel	
	Frequency Offset >	+ 0 Hz
	Mode >	BCCH and TCH
	BCCH Level >	-85 dBm (May need to adjust if link is not stable)
	BCCH Channel >	choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]
	Channel Type >	Off
	P0>	4 dB
	Slot Config >	Unchanged (if already set under MS Signal)
	TCH >	choose desired test channel
	Hopping >	Off
	Main Timeslot >	3 (Default)
Network	Coding Scheme >	CS4 (GPRS) and MCS9 (EGPRS)
	Bit Stream >	2E9-1PSR Bit Pattern
AF/RF	Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input	
Connection	Press **Signal On** to turn on the signal and change settings	

GSM850

Channel	Frequency (MHz)	GPRS	
		1 slot Power (dBm)	2 slots Power (dBm)
128	824.2	32.5	32.5
190	836.6	32.6	32.6
251	848.8	32.7	32.7

Channel	Frequency (MHz)	EGPRS	
		1 slot Power (dBm)	2 slots Power (dBm)
128	824.2	27.4	27.4
190	836.6	27.2	27.2
251	848.8	27.2	27.2

GSM1900

Channel	Frequency (MHz)	GPRS	
		1 slot Power (dBm)	2 slots Power (dBm)
512	1850.2	30.3	30.3
661	1880.0	30.3	30.3
810	1909.8	30.4	30.4

Channel	Frequency (MHz)	EGPRS	
		1 slot Power (dBm)	2 slots Power (dBm)
512	1850.2	26.2	26.2
661	1880.0	26.2	26.2
810	1909.8	26.2	26.2

WCDMA + HSDPA Procedure

The following settings were used to configure the Radio Communication Tester, CMU200.

- Connection
  - Dedicated Chan (CS): RMC
  - Band Select:
    - Band VI for US Cell Band
    - Band II for US PCS Band
    - Band I for 2100MHz band
- Network
  - Requested UE Data
    - Authentication: Off
    - Security: Off
    - IMEI: ON
    - RLC Reestablish: Off
- BS Signal
  - Node –B Setting
    - RF Channel Downlink
      - Band VI: 4357 / 4407 / 4458
      - Band II: 9662 / 9800 / 9938
      - Band I: 10562 / 10700 / 10838
  - Circuit Switched
    - RMC Setting
      - Reference Channel Type: 12.2Kbps
      - Test Mode: Loop Mode 1 RLC TM
      - Channel Data Source DTCH: All One
    - Signaling RAB Setting
      - SRB Cell DCH: 13.6 Kbps
  - HSDPA HS-DSCH
    - Fixed Reference Channel
      - H-Set Selection: H-Set 1 QPSK
- UE Signal
  - Analyzer Setting
    - RF Channel Uplink:
      - Band VI: 4132 / 4182 / 4233
      - Band II: 9262 / 9400 / 9538
      - Band I; 9612 / 9750 / 9888
    - UE power Control
      - Max Allowed UE Power: 25

WCDMA + HSDUPA Procedure

The following settings were used to configure the Radio Communication Tester, CMU200.

- Connection
  - Dedicated Chan (CS): RMC
  - Band Select:
    - Band VI for US Cell Band
    - Band II for US PCS Band
    - Band I for 2100MHz band
- Network
  - Requested UE Data
    - Authentication: Off
    - Security: Off
    - IMEI: ON
    - RLC Reestablish: Off
- BS Signal
  - Node –B Setting
    - RF Channel Downlink
      - Band VI: 4357 / 4407 / 4458
      - Band II: 9662 / 9800 / 9938
      - Band I: 10562 / 10700 / 10838
  - Circuit Switched
    - RMC Setting
      - Reference Channel Type: 12.2Kbps
      - Test Mode: Loop Mode 1 RLC TM
      - Channel Data Source DTCH: All One
    - Signaling RAB Setting
      - SRB Cell DCH: 13.6 Kbps
  - HSDPA HS-DSCH
    - Fixed Reference Channel
      - H-Set Selection: H-Set 1 QPSK
- UE Signal
  - Analyzer Setting
    - RF Channel Uplink:
      - Band VI: 4132 / 4182 / 4233
      - Band II: 9262 / 9400 / 9538
      - Band I; 9612 / 9750 / 9888
    - UE power Control
      - Max Allowed UE Power: 25

- UE Gain Factor
  - **HSDPA (for WCDMA + HSDPA mode only**)
    - βc: 2 (See table below for settings)
    - βd: 15 (See table below for settings)
    - DeltaACK: 5
    - DeltaNACK: 5
    - DeltaCQI: 2

The Quantization of the Gain Paramenters			
Signaled values for β_c and β_d	Quantized amplitude ratios β_c and β_d	Signaled values for β_c and β_d	Quantized amplitude ratios β_c and β_d
15	1.0 (15/15)	7	7/15
14	14/15	6	6/15
13	13/15	5	5/15
12	12/15	4	4/15
11	11/15	3	3/15
10	10/15	2	2/15
9	9/15	1	1/15
8	8/15	0	Switch off

Average & Peak Power Measurement Results

WCDMA Rel 99

	Cell Band			PCS Band		
Channel	Low	Middle	High	Low	Middle	High
Peak(dBm)	25.75	26.37	26.00	26.48	26.52	26.24
Avg.(dBm)	22.85	**23.49**	23.10	23.50	**23.69**	23.43

WCDMA + HSDPA

		Cell Band			PCS Band		
Sub Test	Channel	Low	Middle	High	Low	Middle	High
1	Peak(dBm)	26.25	26.50	26.28	26.70	26.72	26.30
	Avg.(dBm)	23.40	23.62	23.52	23.80	23.80	23.70
2	Peak(dBm)	25.74	26.06	25.92	26.25	26.35	26.20
	Avg.(dBm)	22.22	22.52	22.36	22.74	22.76	22.73
3	Peak(dBm)	25.92	26.14	26.01	26.54	26.50	26.48
	Avg.(dBm)	22.21	22.50	22.29	22.76	22.70	22.72
4	Peak(dBm)	25.30	25.88	25.55	26.09	25.98	25.90
	Avg.(dBm)	21.29	21.41	21.24	21.67	21.56	21.70

WCDMA + HSUPA

		Cell Band			PCS Band		
Sub Test	Channel	Low	Middle	High	Low	Middle	High
1	Peak(dBm)	26.21	26.48	26.12	27.00	27.00	26.75
	Avg.(dBm)	23.20	23.60	23.45	23.83	23.85	23.81
2	Peak(dBm)	26.24	26.46	26.18	26.90	26.85	26.65
	Avg.(dBm)	23.33	23.62	23.37	23.82	23.79	23.72
3	Peak(dBm)	26.20	26.49	26.18	26.89	26.86	26.66
	Avg.(dBm)	23.21	23.63	23.39	23.83	23.85	23.79
4	Peak(dBm)	26.10	26.51	26.18	26.89	26.87	26.50
	Avg.(dBm)	23.38	23.60	23.24	23.81	23.81	23.71
5	Peak(dBm)	26.20	26.52	26.23	26.82	26.70	26.33
	Avg.(dBm)	23.34	23.69	23.56	23.80	23.76	23.70

12 SAR MEASURMENT RESULTS

SAR measured for HSPA was skipped due to the maximum average output of each RF channel with HSPA active is less than ¼ dB that measured without HSPA using 12.2 kbps RMC (WCDMA) and the maximum SAR for 12.2 kbps RMC (WCDMA) is less than 75% of the SAR limit.

12.1 CELL BAND

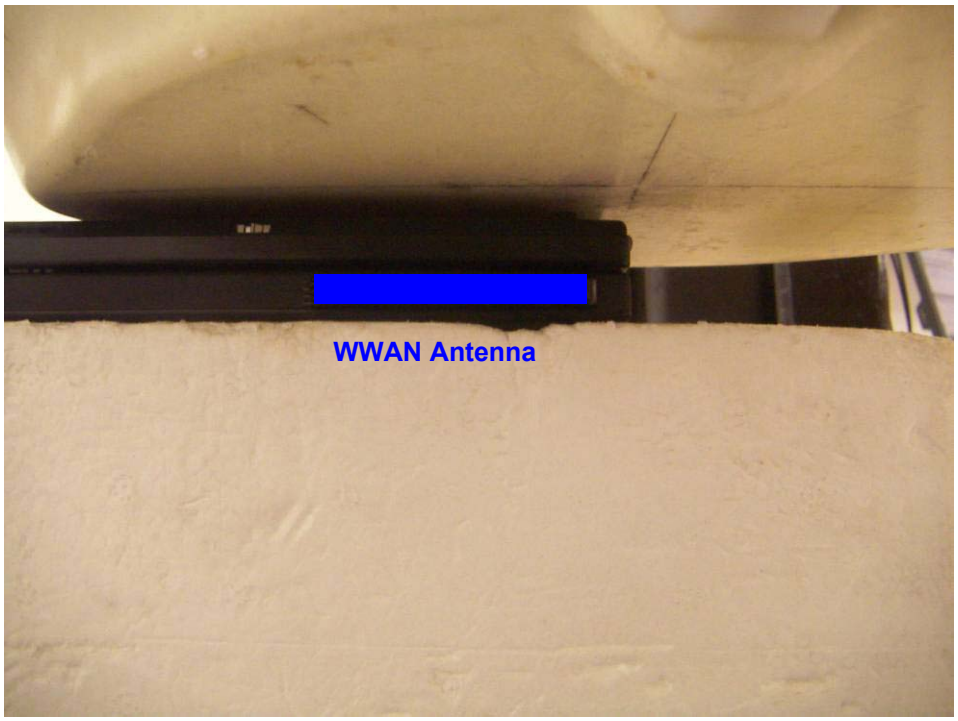
12.1.1 Primary Portrait Position

GPRS - 2 Slots				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
128 **190** 251	824.20 **836.60** 848.80	**0.243**	**0.000**	**0.243**
WCDMA - 12.2 k RMC				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
4132 4182 4233	826.40 836.40 846.60	0.145	-0.409	0.159

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.

12.1.2 Lap-held Position



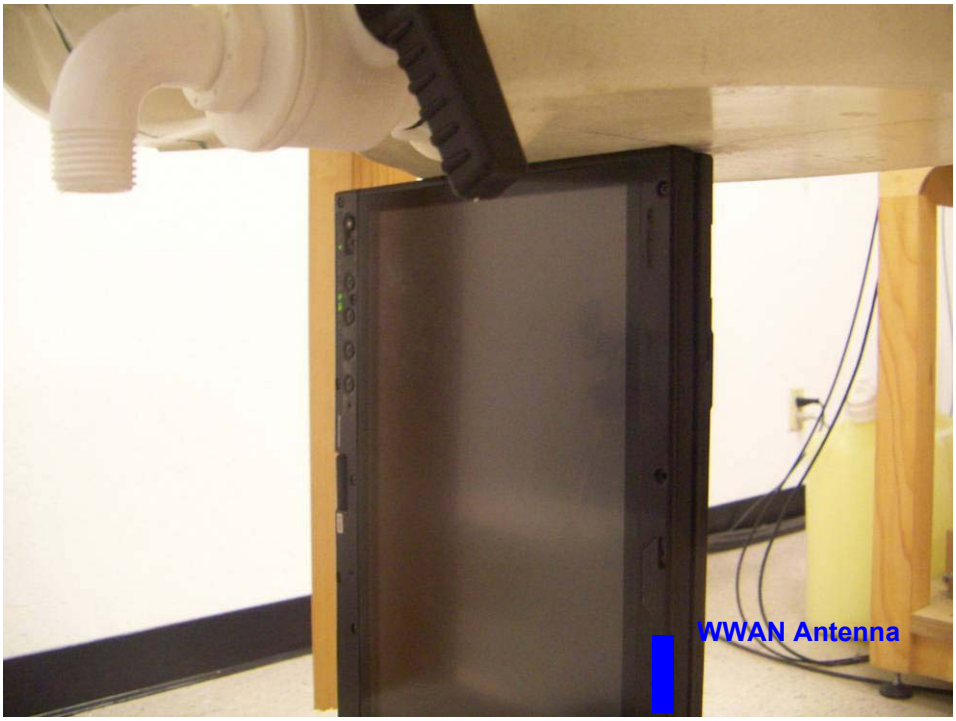
GPRS - 2 Slots				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
128 190 251	824.20 836.60 848.80	0.167	-0.031	0.168
WCDMA 12.2k RMC				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
4132 4182 4233	826.40 836.40 846.60	0.113	-0.102	0.116

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.

12.1.3 Secondary Portrait Position

Note: Testing for this position was skipped due to the large separation distance between the antenna and the phantom (>20cm).



12.1.4 Primary Landscape Position

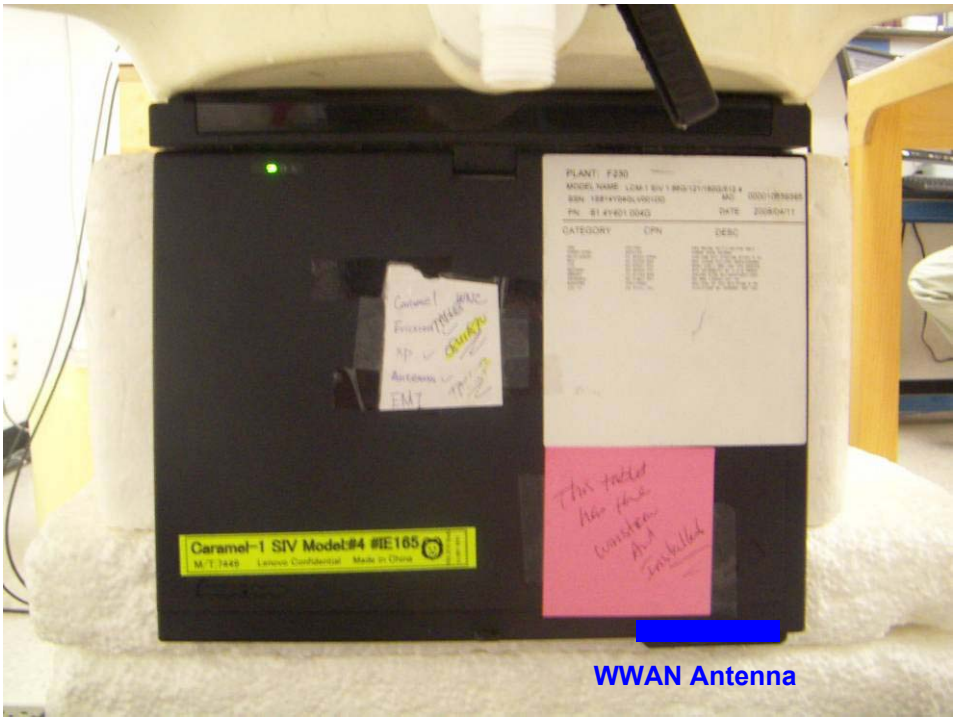
Note: Testing for this position was skipped due to the large separation distance between the antenna and the phantom (>20cm).

12.1.5 Secondary Landscape Position

Note: Testing for this position was skipped since the WWAN radio is disabled at this position.

12.1.6 Normal Use Position

Note: Testing for this position was skipped due to the large separation distance between the antenna and the phantom (>20cm).



12.2 PCS BAND

12.2.1 Primary Portrait Position,

GPRS - 2 Slots				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
512	1850.20	0.616	-0.542	0.698
661	1880.00	0.826	0.000	0.826
810	**1909.80**	**1.180**	**0.000**	**1.180**
WCDMA - 12.2k RMC				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
9262	1852.40	1.050	-0.230	1.107
9400	1880.00	1.170	0.000	1.170
9538	1907.60	1.140	0.000	1.140

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.

12.2.2 Lap-held Position

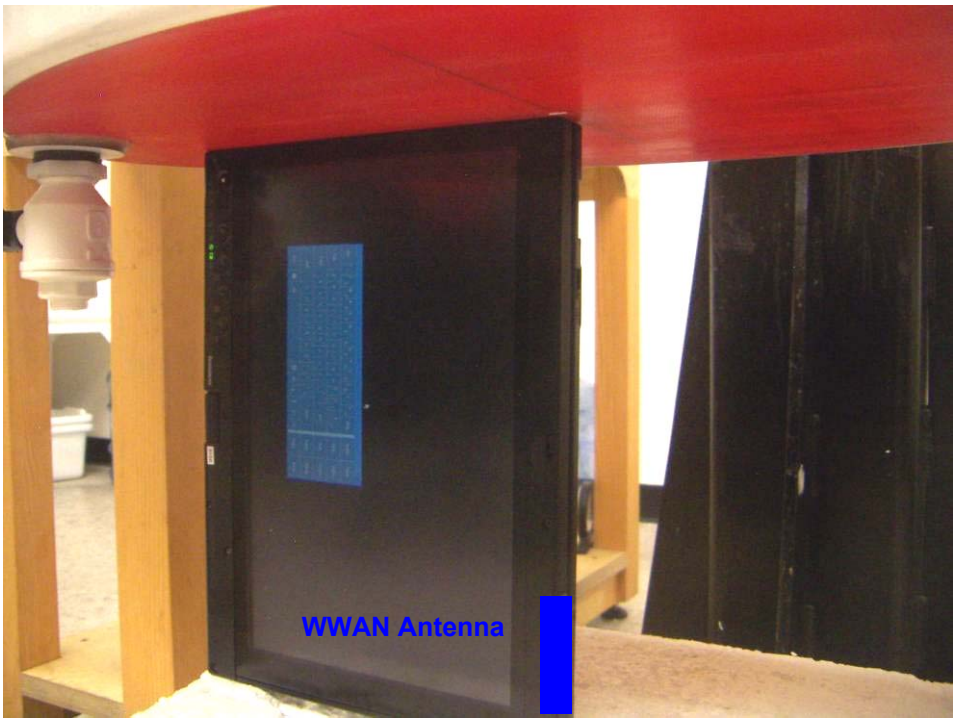
GPRS - 2 Slots				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
512 661 810	1850.20 1880.00 1909.80	0.408	0.000	0.408
WCDMA - 12.2k RMC				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
9262 9400 9538	1852.40 1880.00 1907.60	0.345	0.000	0.345

Notes:

1) The exact method of extrapolation is Measured SAR x 10^(-drift/10). The SAR reported at the end of the measurement process by the DASY4 system can be scaled up by the Power drift to determine the SAR at the beginning of the measurement process.
2) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.

12.2.3 Secondary Portrait Position,

Note: Testing for this position was skipped due to the large separation distance between the antenna and the phantom (>20cm).



12.2.4 Primary Landscape Position,

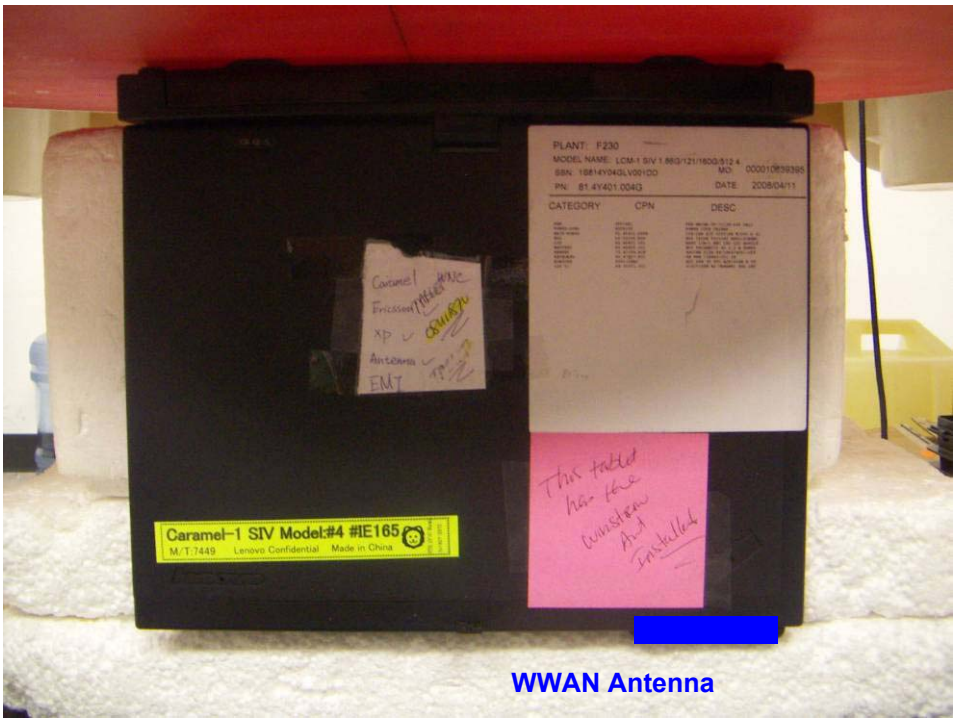
Note: Testing for this position was skipped due to the large separation distance between the antenna and the phantom (>20cm).

12.2.5 Secondary Landscape Position,

Note: Testing for this position was skipped since the WWAN radio is disabled at this position.

12.2.6 Normal Use Position,

Note: Testing for this position was skipped due to the large separation distance between the antenna and the phantom (>20cm).



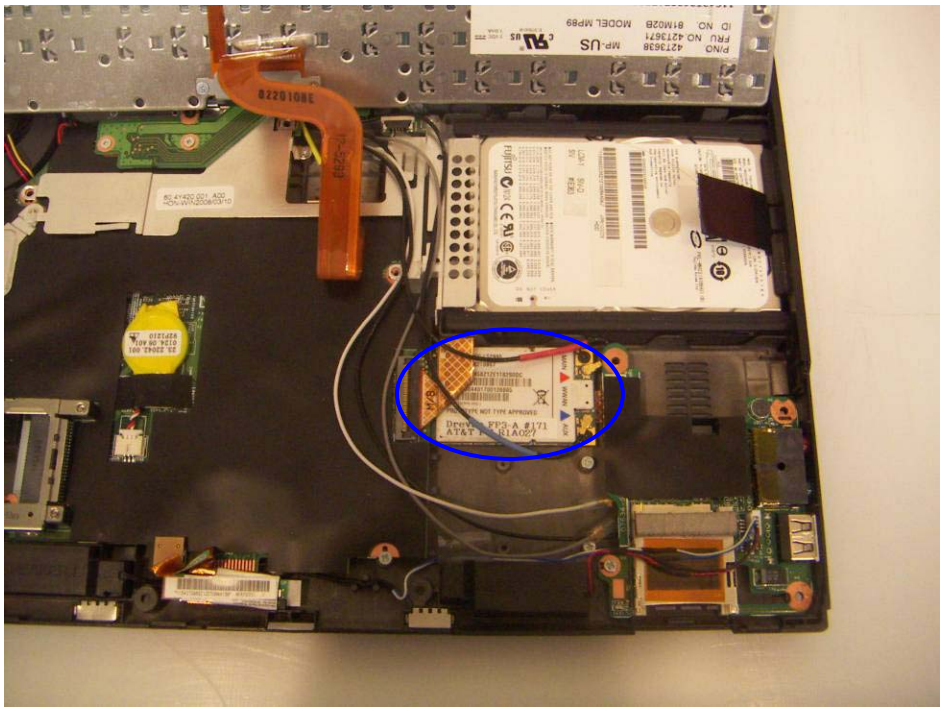
13 ATTACHMENTS

No.	Contents	No. Of Pages
1	System Performance Check Plots	6
2	SAR Test Plots	13
3	Certificate of E-Field Probe - EX3DV3SN3531	10
4	Certificate of System Validation Dipole - D835V2 SN:4d002	9
5	Certificate of System Validation Dipole - D1900V2 SN:5d043	9

14 PHOTOS

EUT (WWAN Module) – F3507g

EUT Location



WWAN Antenna Location

Tablet Mode

END OF REPORT