SAR Evaluation Report

IN ACCORDANCE WITH THE REQUIREMENTS OF
FCC REPORT AND ORDER:
ET DOCKET 93-62, AND OET BULLETIN 65 SUPPLEMENT C

FOR

Express MINI-PCI USB Wireless CDMA Modem Module

Model: MC5720

FCC ID: N7N-MC5720

REPORT NUMBER: 06U10026-3B

ISSUE DATE: MARCH 29, 2006

Prepared for

SIERRA WIRELESS
2290 COSMOS CT
CARLSBAD CA 92009
UNITED STATES

Prepared by

COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
MORGAN HILL, CA 95037
United States

LAB CODE:200065-0

Revision History

Rev.	Issued date	Revisions	Revised By
A	February 2, 2006	Initial	HS
B	March 29, 2006	Correction of Intel Golan WLAN FCC ID	ND

CERTIFICATE OF COMPLIANCE (SAR EVALUATION)

DATES OF TEST: January 26, 2006

APPLICANT: ADDRESS:	SIERRA WIRELESS 2290 COSMOS CT CARLSBAD CA 92009 UNITED STATES
FCC ID: MODEL:	N7N-MC5720 MC5720
DEVICE CATEGORY: EXPOSURE CATEGORY:	Portable Device General Population/Uncontrolled Exposure

Express MINI-PCI USB Wireless CDMA Modem Module is installed in a host device.

Test Sample is a:	Production unit	
Host device(s):	Host Devices 12.1" KS-Note	WLAN Module / FCC ID 1. Gwinette / PPD-AR5BXB6 2. Golanl / PD9LEN3945ABG
FCC Rule Parts	Frequency Range [MHz]	The Highest SAR Values [1g]
22H	824.7 – 848.31	Body-worn: 0.085 W/kg Collocated with Gwinette: 0.084 W/kg Collocated with Golan: 0.101 W/kg
24E	1851.25 – 1908.75	Body-worn: 0.150 W/kg Collocated with Gwinette: 0.151 W/kg Collocated with Golan: 0.152 W/kg

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for General Population/Uncontrolled Exposure limits specified in ANSI/IEEE Std. C95.1-1992 and had been tested in accordance with the measurement procedures specified in FCC OET 65 Supplement C (Edition 01-01). And RSS-102 Issue 1 (Provisional) September 25, 1999.

The maximum 1g SAR level measured for all the tests performed did not exceed the limits for General Population/Uncontrolled Exposure (W/kg) Partial Body of 1.6 W/kg. Level defined in Supplement C (Edition 01-01) to OET Bulletin 65 (97-01).

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 Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services 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:

Hsin Fu Shih

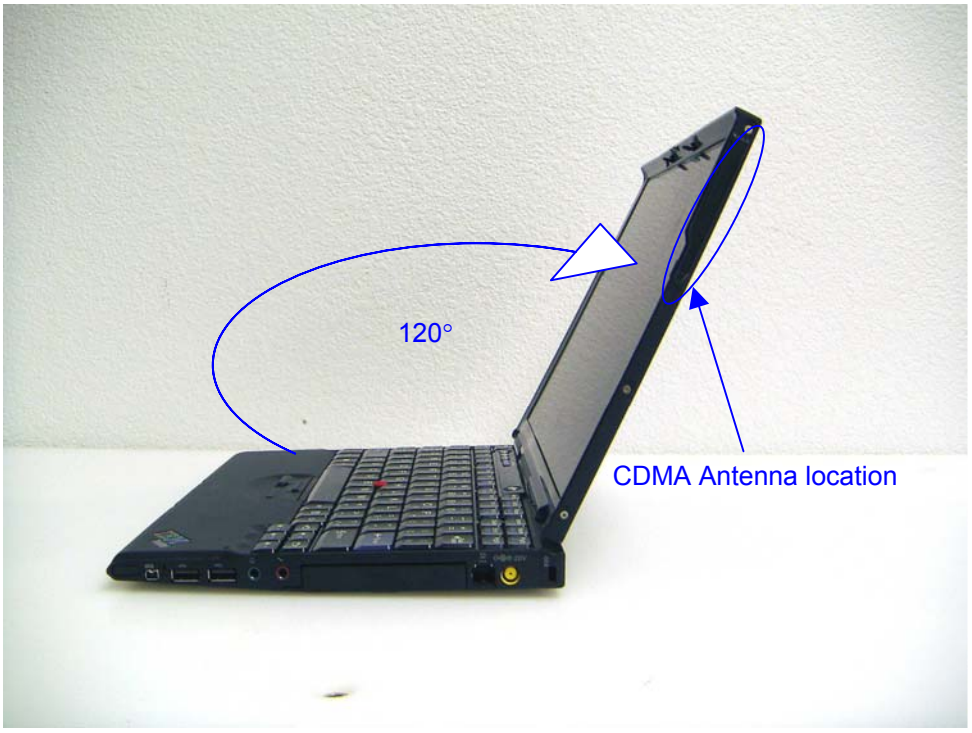
Hsin Fu Shih
Senior Engineer
Compliance Certification Services

Tested By:

Ninous Davoudi
EMC Engineer
Compliance Certification Services

Table of Contents

1 EQUIPMENT UNDER TEST (EUT) DESCRIPTION

Express MINI-PCI USB Wireless CDMA Modem Module is installed in a host device.	
Host device(s):	Host Devices: 12.1" KS-Note WLAN Module / FCC ID: 1. Gwinette / PPD-AR5BXB6; 2. Intel / PD9LEN3945ABG
Normal operation:	Lap-held position 
Power supply:	Power supplied through the laptop computer (host device)
CDMA Antenna:	Wistron Neweb Corporation, Dual Planner Inverted F

2 FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

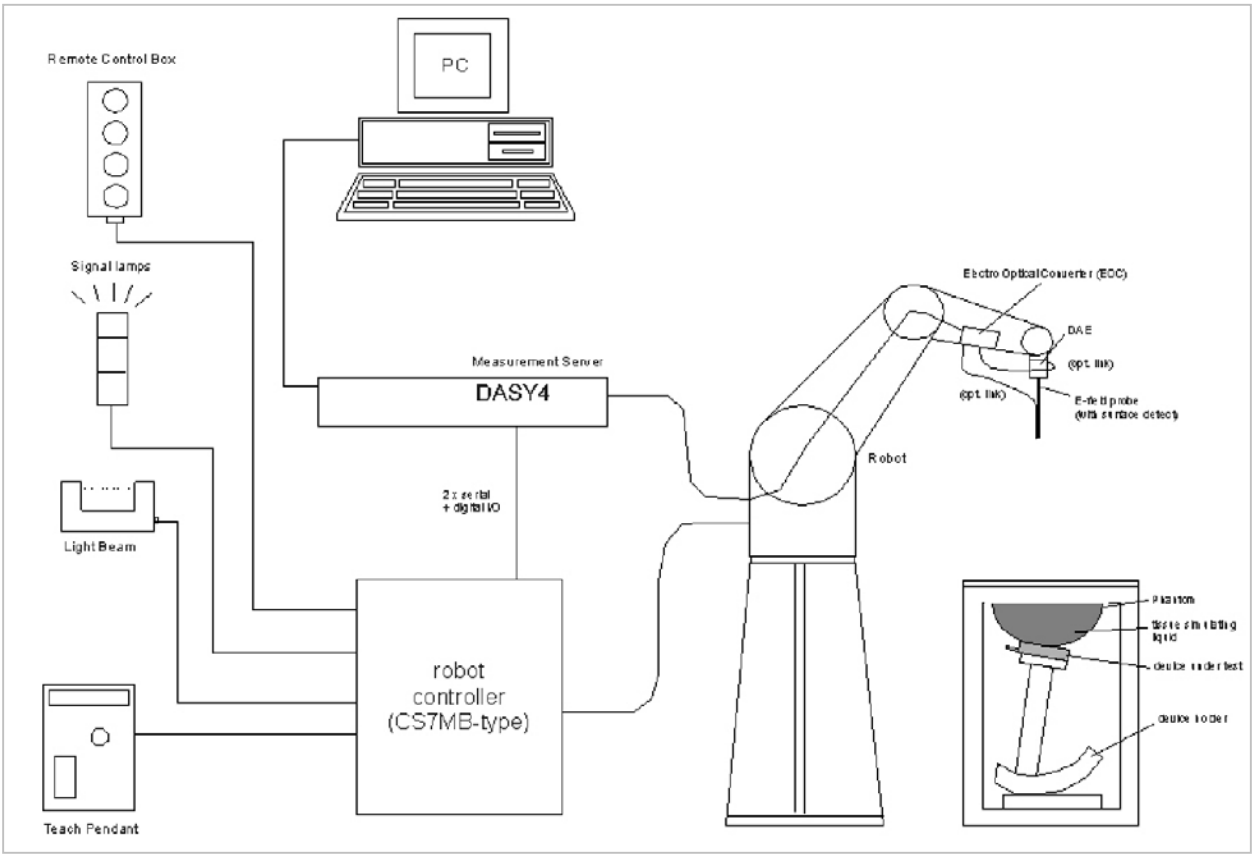
NVLAP®

LAB CODE:200065-0

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

No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

3 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.

3.1 COMPOSITION OF INGREDIENTS FOR TISSUE SIMULATING LIQUID

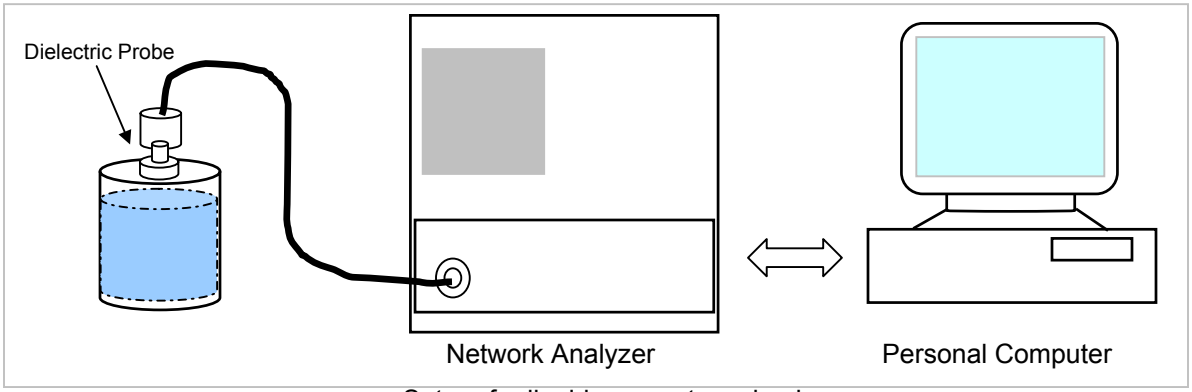
The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

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

4 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

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)

4.1 SIMULATING LIQUID PARAMETER CHECK RESULT

Simulating Liquid Parameter Check Result @ Muscle 835 MHz

Room Ambient Temperature = 23°C; Relative humidity = 35% Measured by: Ninous Davoudi

Simulating Liquid f (MHz)	Temp. (°C)	Depth (cm)	Parameters		Target	Measured	Deviation (%)	Limit (%)
835	21	15	e'	Relative Permittivity (e"):	55.2	54.1005	-1.99	± 5
			20.7248	Conductivity (σ):	0.97	0.9627	-0.75	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 21 deg C
January 26, 2006 09:17 AM

Frequency	e'	e"
750000000.	55.0038	21.0812
755000000.	54.9417	21.0647
760000000.	54.8702	21.0162
765000000.	54.8248	21.0064
770000000.	54.7805	20.9964
775000000.	54.7269	20.9897
780000000.	54.6602	20.9412
785000000.	54.6157	20.9202
790000000.	54.5482	20.8960
795000000.	54.5130	20.8951
800000000.	54.4449	20.8944
805000000.	54.4046	20.8726
810000000.	54.3686	20.8439
815000000.	54.3163	20.7988
820000000.	54.2722	20.7736
825000000.	54.2375	20.7563
830000000.	54.1278	20.7278
835000000.	54.1005	20.7248
840000000.	54.0791	20.6757
845000000.	54.0247	20.6828
850000000.	53.9475	20.6550
855000000.	53.9238	20.6509
860000000.	53.8749	20.6347
865000000.	53.8327	20.6054
870000000.	53.7777	20.6240
875000000.	53.7189	20.6015
880000000.	53.6695	20.6286
885000000.	53.6107	20.6277
890000000.	53.5635	20.6538
895000000.	53.5310	20.5800
900000000.	53.4869	20.5686
905000000.	53.3953	20.5396
910000000.	53.3683	20.5271

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 Parameter Check Result @ Muscle 900 MHz

Room Ambient Temperature = 23°C; Relative humidity = 35% Measured by: Ninous Davoudi

Simulating Liquid f (MHz)	Temp. (°C)	Depth (cm)	Parameters		Target	Measured	Deviation (%)	Limit (%)
900	21	15	ε"	Relative Permittivity (ε_r):	55.0	53.4189	-2.87	± 5
			20.3815	Conductivity (σ):	1.05	1.0205	-2.81	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 21 deg C
January 26, 2006 10:06 AM

Frequency	e'	e"
850000000.	53.8982	20.3478
855000000.	53.8588	20.3618
860000000.	53.8391	20.3683
865000000.	53.7687	20.3510
870000000.	53.7135	20.3709
875000000.	53.6617	20.3682
880000000.	53.6158	20.4057
885000000.	53.5512	20.4186
890000000.	53.5004	20.4367
895000000.	53.4603	20.3983
900000000.	53.4189	20.3815
905000000.	53.3427	20.3528
910000000.	53.3166	20.3305
915000000.	53.2734	20.2895
920000000.	53.2655	20.2962
925000000.	53.2246	20.2444
930000000.	53.1793	20.2305
935000000.	53.1471	20.2216
940000000.	53.0915	20.2525
945000000.	53.0351	20.2535
950000000.	52.9761	20.2457

The conductivity (σ) can be given as:

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

where f = target f * 10^6

ε_0 = 8.854 * 10^{-12}

Simulating Liquid Dielectric Parameters Check Result @ Muscle 1800 MHz

Room Ambient Temperature = 23°C; Relative humidity = 35% Measured by: Ninous Davoudi

Simulating Liquid			Parameters		Target	Measured	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1800	21.5	15	ε"	Relative Permittivity (ϵ_r):	53.3	52.9525	-0.65	± 5
			15.4286	Conductivity (σ):	1.52	1.5450	1.64	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 21.5 deg C
January 26, 2006 03:19 PM

Frequency	e'	e"
1710000000.	53.2578	15.2567
1720000000.	53.2214	15.2781
1730000000.	53.1999	15.3060
1740000000.	53.1439	15.3255
1750000000.	53.1178	15.3428
1760000000.	53.0863	15.3426
1770000000.	53.0674	15.3728
1780000000.	53.0442	15.3956
1790000000.	52.9884	15.4167
1800000000.	52.9525	15.4286
1810000000.	52.9013	15.4504
1820000000.	52.8753	15.4951
1830000000.	52.8053	15.5119
1840000000.	52.7574	15.5433
1850000000.	52.7434	15.5527
1860000000.	52.7226	15.5647
1870000000.	52.7142	15.5806
1880000000.	52.6914	15.5947
1890000000.	52.6425	15.6105
1900000000.	52.6335	15.6237
1910000000.	52.5756	15.6376

The conductivity (σ) can be given as:

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

where f = target f * 10^6

ε_0 = 8.854 * 10^{-12}

Simulating Liquid Dielectric Parameters Check Result @ Muscle 1900 MHz

Room Ambient Temperature = 23°C; Relative humidity = 35% Measured by: Ninous Davoudi

Simulating Liquid			Parameters		Target	Measured	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	22	15	ε"	Relative Permittivity (ϵ_r):	53.3	51.6264	-3.14	± 5
			14.1399	Conductivity (σ):	1.52	1.4946	-1.67	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 22 deg C
January 26, 2006 03:54 PM

Frequency	e'	e"
1710000000.	52.3760	13.4997
1720000000.	52.3197	13.5480
1730000000.	52.2990	13.5749
1740000000.	52.2486	13.6117
1750000000.	52.2067	13.6561
1760000000.	52.1720	13.6805
1770000000.	52.1400	13.7315
1780000000.	52.1015	13.7594
1790000000.	52.0591	13.8015
1800000000.	52.0249	13.8297
1810000000.	51.9775	13.8694
1820000000.	51.9309	13.8909
1830000000.	51.8739	13.9395
1840000000.	51.8393	13.9870
1850000000.	51.7980	14.0406
1860000000.	51.7472	14.0564
1870000000.	51.7197	14.0844
1880000000.	51.6909	14.0887
1890000000.	51.6555	14.1277
1900000000.	51.6264	14.1399
1910000000.	51.5762	14.1821

The conductivity (σ) can be given as:

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

where f = target f * 10^6

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

5 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 f 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.
- Special 5 x 5 x 7 fine cube was chosen for cube integration(dx=dy=7.5mm; dz=5mm).
- Distance between probe sensors and phantom surface was set to 2.5 (below 3 G) mm.
- 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	850	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.

5.1 SYSTEM PERFORMANCE CHECK RESULTS

System Validation Dipole: D900V2 SN: 108

Date: January 26, 2006

Ambient Temperature = 23°C; Relative humidity = 35% Measured by: Ninous Davoudi

Muscle Simulating Liquid			Mrasured		$Target_{1g}$	Deviation[%]	Limit [%]
f (MHz)	Temp. [°C]	Depth [cm]	1g	Normalized to 1 W			
900	21	15	2.67	10.68	11.1	-3.78	± 10
			10g	Normalized to 1 W	$Target_{10g}$	Deviation[%]	Limit [%]
			1.74	6.96	7.17	-2.93	± 10

System Validation Dipole: D1800V2 SN: 294

Date: January 26, 2006

Ambient Temperature: 23°C; Relative humidity: 35% Measured by: Ninous Davoudi

Muscle Simulating Liquid			Mrasured		$Target_{1g}$	Deviation[%]	Limit [%]
f (MHz)	Temp. [°C]	Depth [cm]	1g	Normalized to 1 W			
1800	21.5	15	9.24	36.96	38.5	-4.00	± 10
			10g	Normalized to 1 W	$Target_{10g}$	Deviation[%]	Limit [%]
			4.87	19.48	20.3	-4.04	± 10

6 SAR MEASUREMENT 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 EUT. 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 2.5 mm from the inner surface of the shell. The area covers the entire dimension of the EUT 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 EUT to ensure that the hotspot was correctly identified.

c) Around this point, a volume of X=Y=Z=30 mm is assessed by measuring 5 x 5 x 7 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.

DASY4 SAR MEASUREMENT 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 5 x 5 x 7 mm 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.

7 PROCEDURES USED TO ESTABLISH TEST SIGNAL

The manufacturer supplied a special driving program (Hyper Terminal) by using the following commands to turn the transmitter on and change the channels and bands:

at!oem=176

OK

at!diag

OK

at!tx=1

OK

at!chan=XXXX,1 or 0

OK

at!allup=1

OK

"at!chan=" changes both the band and the channels. Channels the first # then the comma followed by the band 0= cellular and 1= PCS.

Conducted powers were measured prior to SAR measurement.

CDMA Cell Band:

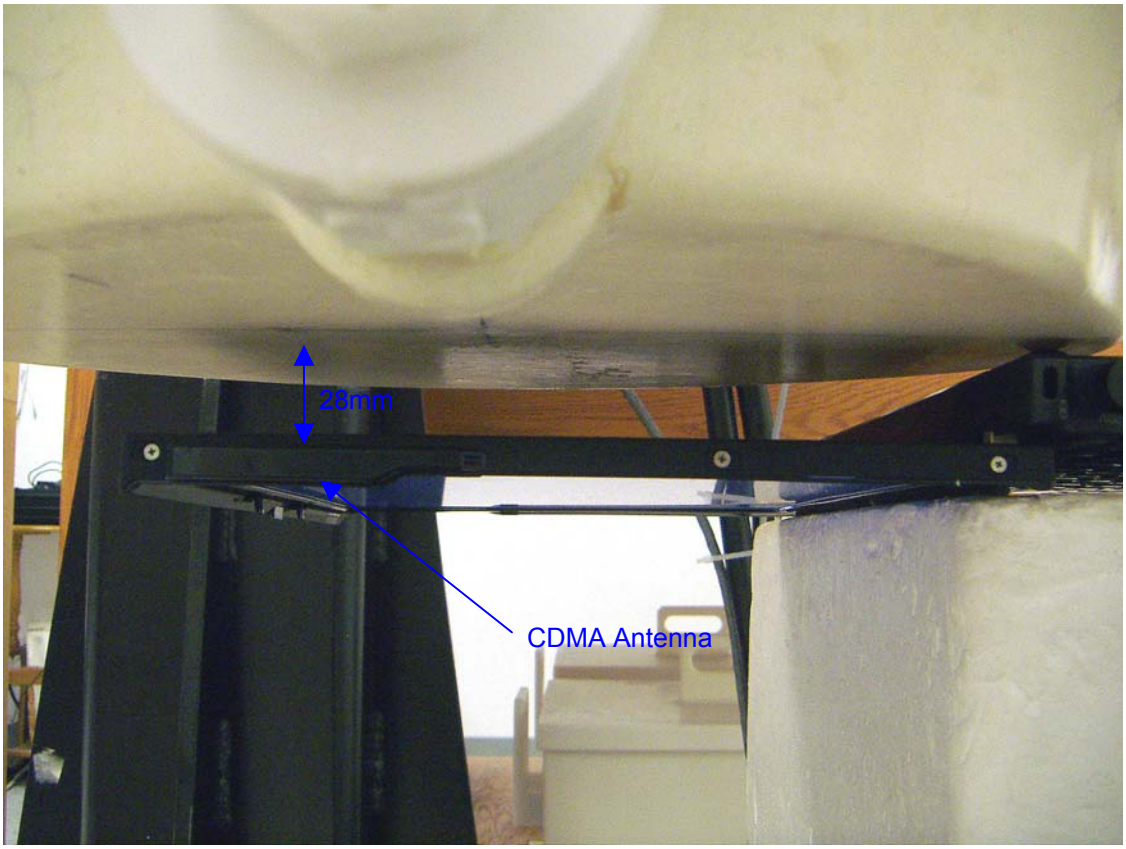
Ch	f (MHz)	Conducted Power Avg Power
1013	824.70	26.10
384	836.52	25.88
777	848.31	25.40

CDMA PCS Bnad:

Ch	f (MHz)	Conducted Power Avg Power
25	1851.25	26.02
600	1880.00	26.31
1175	1908.75	25.80

8 SAR TEST SUMMARY

8.1 Lap Held -worst case

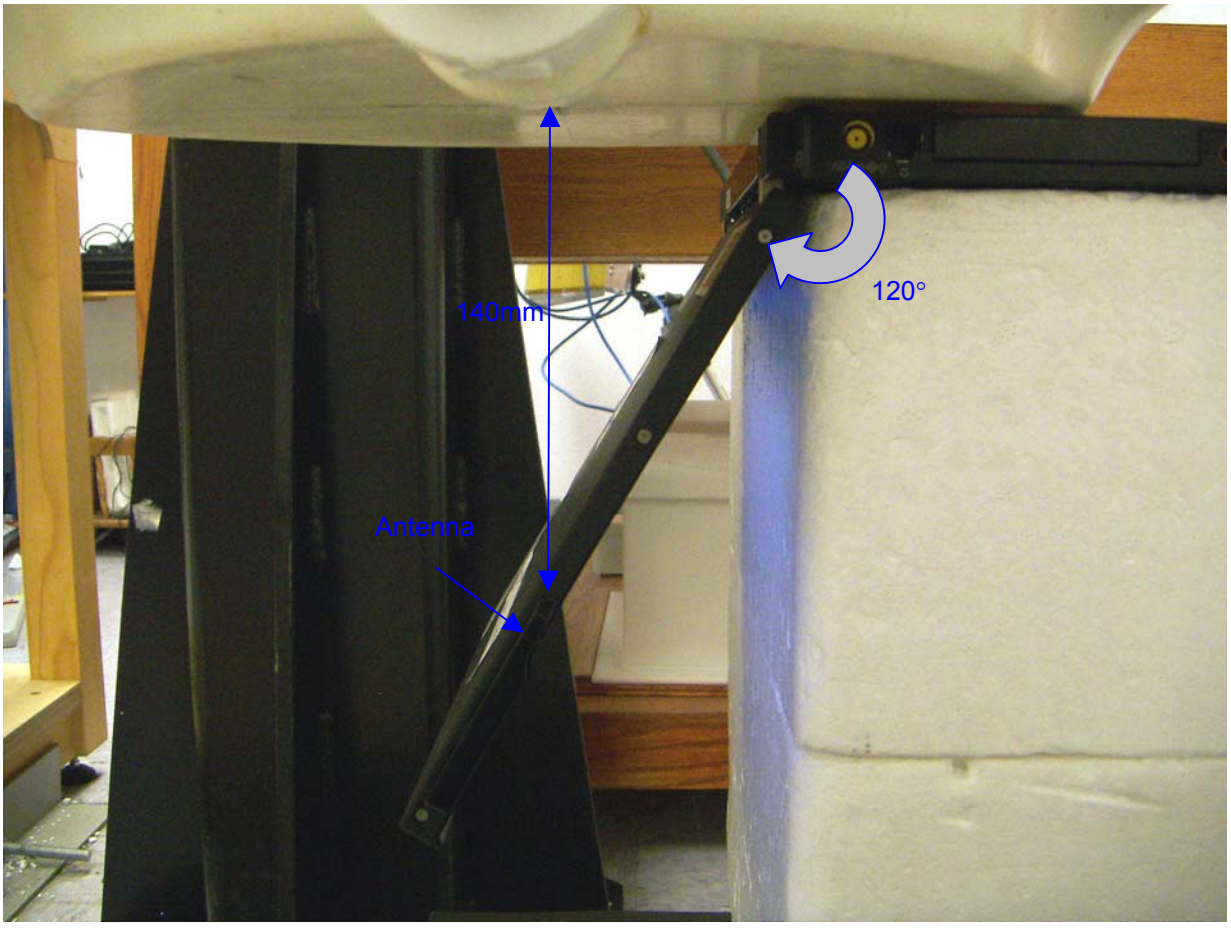


CDMA Cell band					
Channel	f (MHz)	Measured 1g (mW/g)	Power Drift (dB)	Extrapolated 1g (mW/g)	Limit (mW/g)
1013	824.70	0.085	0.000	**0.085**	1.6
384	836.52	0.052	0.000	0.052	1.6
777	848.31	0.039	-0.067	0.039	1.6
1013 [4)]	836.52	0.084	0.000	0.084	1.6
1013 [5)]	836.52	0.101	0.000	**0.101**	1.6
CDMA PCS band					
Channel	f (MHz)	Measured 1g (mW/g)	Power Drift (dB)	Extrapolated 1g (mW/g)	Limit (mW/g)
25	1851.25	0.149	-0.043	**0.150**	1.6
600	1880.00	0.150	-0.009	0.150	1.6
1175	1908.75	0.108	-0.104	0.111	1.6
25 [4)]	1908.75	0.150	-0.039	0.151	1.6
25 [5)]	1908.75	0.152	0.000	**0.152**	1.6

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 measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process.
2) The SAR measured at the middle channel for this configuration is at least 3 dB lower than SAR limit, thus testing at low & high channel is optional.
3) Please see attachment for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) Co-location with WLAN Gwinnet, FCC ID: PPD-AR5BXB6
5) Co-location with WLAN Golan, FCC ID: PD9LEN3945ABG

8.2 Lap Held-normal



CDMA Cell band					
Channel	f (MHz)	Measured 1g (mW/g)	Power Drift (dB)	Extrapolated 1g (mW/g)	Limit (mW/g)
1013 384 777	824.70 836.52 848.31	0.007	0.000	0.007	1.6

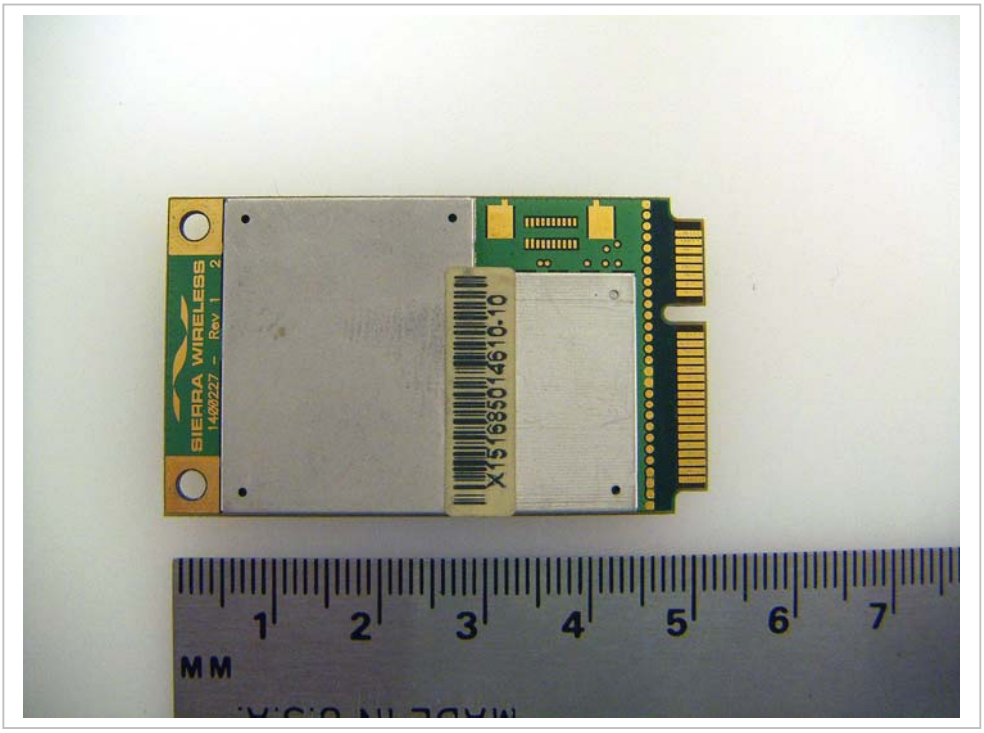
Notes:

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 measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process.
2) PCS band for this position was skipped due to the very low SAR values.
3) The SAR measured at the middle channel for this configuration is at least 3 dB lower than SAR limit, thus testing at low & high channel is optional.
4) Please see attachment for the detailed measurement data and plots showing the maximum SAR location of the EUT.
5) Co-location with WLAN Gwinnet, FCC ID: PPD-AR5BXB6
6) Co-location with WLAN Golan, FCC ID: PD9LEN3945ABG

9 PHOTO

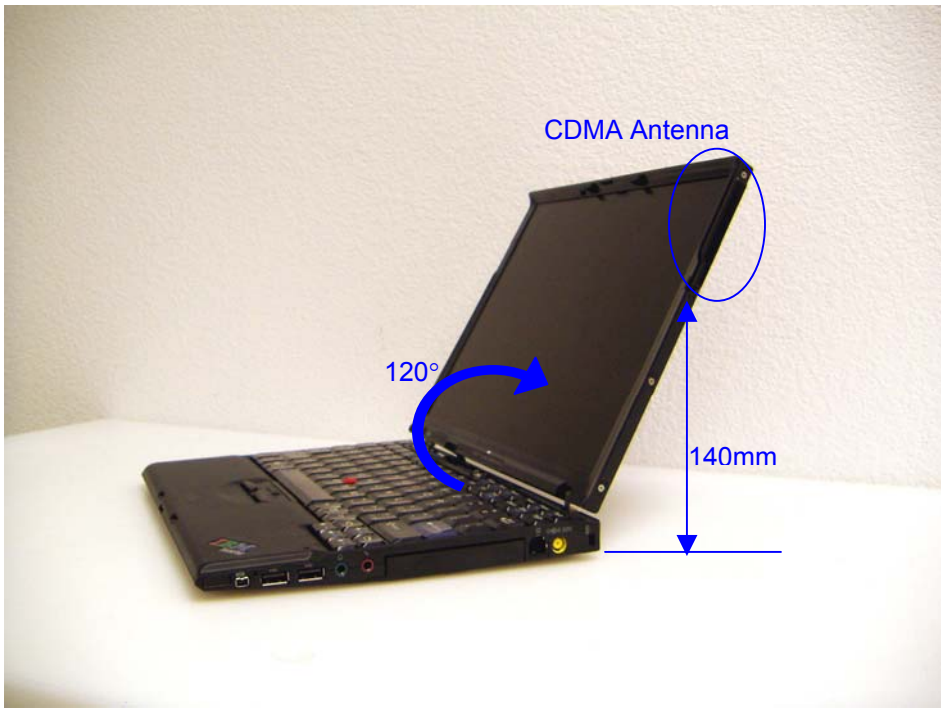
9.1 EUT

Express MINI-PCI USB Wireless CDMA Modem Module

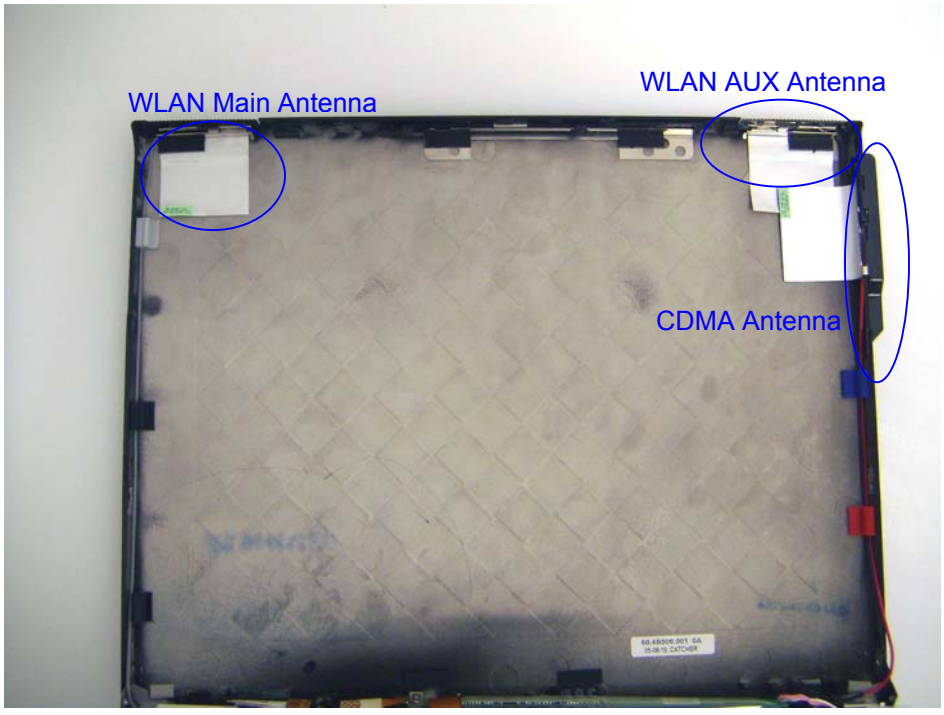


9.2 HOST DEVICE

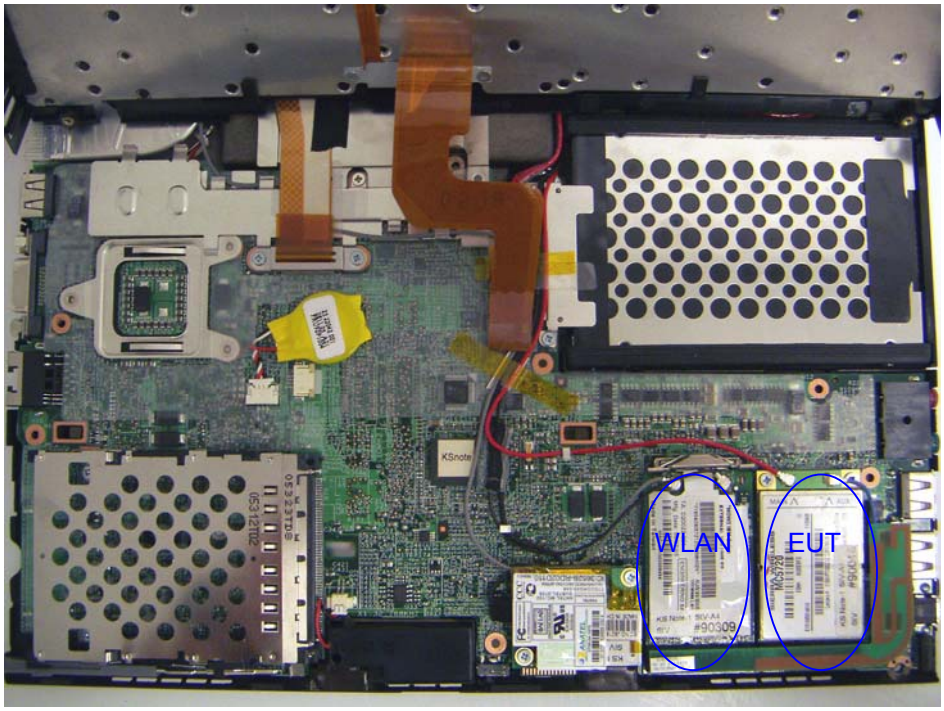
12.1” KS-Note



Antenna Location



EUT Location



10 MEASUREMENT UNCERTAINTY

10.1 MEASUREMENT UNCERTAINTY FOR 300 MHZ – 3GHZ

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

11 TEST EQUIPMENT LIST

Name of Equipment	Manufacturer	Type/Model	Serial Number	Cal. Due date
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
S-Parameter Network Analyzer	Agilent	8753ES-6	US39173569	2/9/07
Electronic Probe kit	Hewlett Packard	85070C	N/A	N/A
E-Field Probe	SPEAG	EX3DV3	3531	7/21/06
E-Field Probe	SPEAG	EX3DV4	3552	3/19/06
SAM Phantom (SAM1)	SPEAG	TP-1185	QD000P40CA	N/A
SAM Phantom (SAM2)	SPEAG	TP-1015	N/A	N/A
Data Acquisition Electronics	SPEAG	DAE3 V1	500	2/7/06
System Validation Dipole	SPEAG	D900V2	108	3/22/06
System Validation Dipole	SPEAG	D1800V2	294	3/18/06
Power Meter	Giga-tronics	8651A	8651404	12/27/06
Power Sensor	Giga-tronics	80701A	1834588	12/27/07
Amplifier	Mini-Circuits	ZVE-8G	0360	N/A
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A
Radio Communication Tester	Rohde & Schwarz	CMU 200	838114/032	12/17/06
Simulating Liquid	CCS	M835	N/A	Within 24 hrs of first test
Simulating Liquid	CCS	M900	N/A	Within 24 hrs of first test
Simulating Liquid	CCS	M1800	N/A	Within 24 hrs of first test
Simulating Liquid	CCS	M1900	N/A	Within 24 hrs of first test

12 ATTACHMENT

No.	Contents	No. of page (s)
1	System Performance Check Plots	4
2	SAR Test Plots	13
3	Certificate of E-filed Probe EX3DV4 SN 3531	10
4	Certificate of System Validation Dipole (D900V2SN108)	6
5	Certificate of System Validation Dipole (D1800V2SN294)	6

END OF REPORT