SAR Evaluation Report

**IN ACCORDANCE WITH THE REQUIREMENTS OF
FCC OET BULLETIN 65 SUPPLEMENT C
IC RSS 102 ISSUE 1 : 1999**

FOR

850/900/1800/1900/2100 MHZ 5-BAND MINI CARD MODULE

MODEL: MC8755

FCC ID: N7NMC8755

REPORT NUMBER: 06U10260-1

ISSUE DATE: APRIL 25, 2006

Prepared for

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Prepared by

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NVLAP®
LAB CODE:200065-0

Revision History

Rev.	Issued date	Revisions	Revised By
--	April 25, 2006	Initial issue	HS

CERTIFICATE OF COMPLIANCE (SAR EVALUATION)

DATES OF TEST: April 22 & 25, 2006

APPLICANT:	Sierra Wireless, Inc.
ADDRESS:	13811 Wireless Way Richmond, British Columbia V6V 3A4, Canada
FCC ID:	N7NMC8755
MODEL:	MC8755
DEVICE CATEGORY:	Portable Device
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure

850/900/1800/1900/2100 MHz 5-Band Mini Card is installed on 14" & 15" D Nots Laptops, include collocated with WLNA (Gwinette, FCC ID: PPD-AR5BXB6).

Note: This device contains 900/1800/2100 MHz bands are not operational in US territories. This report is applicable to 850 and 1900 MHz bands.
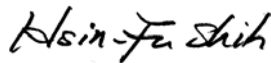
Test Sample is a:	Production unit
Host Laptops	D Note 14" and 15"

Rule Parts	Frequency Range [MHz]	The Highest SAR Values [1g_mW/g]	Collocation SAR Values [1g_mW/g]
FCC 22H	824.7-848.31	0.0791	0.0793
FCC 24E	1851.25-1908.75	0.133	0.131

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.

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: Tested By:

Hsin Fu Shih   Ninous Davoudi
Senior Engineer   EMC Engineer
Compliance Certification Services   Compliance Certification Services

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1   EQUIPMENT UNDER TEST (EUT) DESCRIPTION

850/900/1800/1900/2100 MHz 5-Band Mini Card is installed on 14" & 15" D Nots Laptops, include collocated with WLNA (Gwinette, FCC ID: PPD-AR5BXB6).	
Normal operation:	Lap-held position.
Host Device(s):	D Note 14" and 15"
Antenna(s)	1. Wistron Neweb Corporation, Dual Band Planner Inverted F 2. Foxconn Hon Hai Precision IND. CO., Ltd (R.O.C), Dual Band Planner Inverted F
Power supply:	Power supplied through the laptop computer (host device).

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."

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
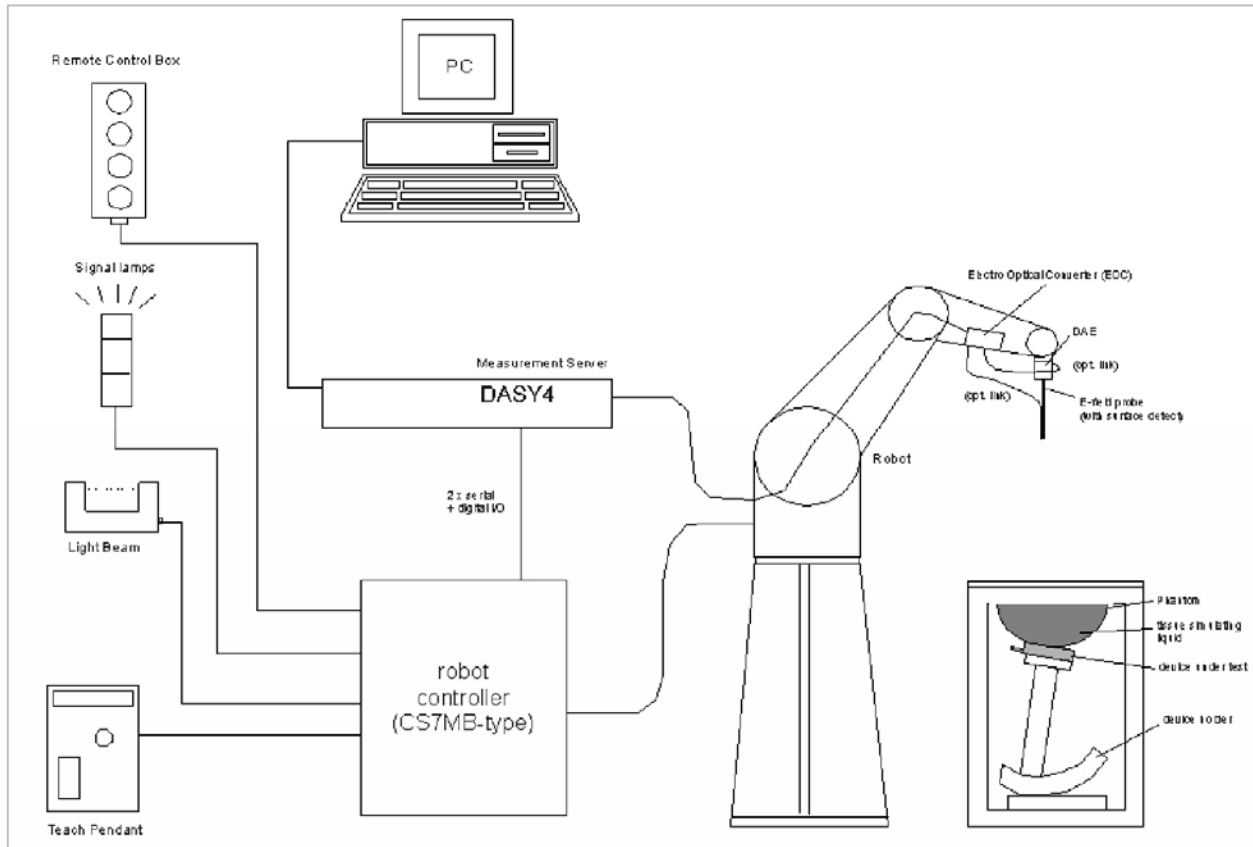
The DASY4 system for performing compliance tests consists of the following items:

- 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 SIMULATIG 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

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.
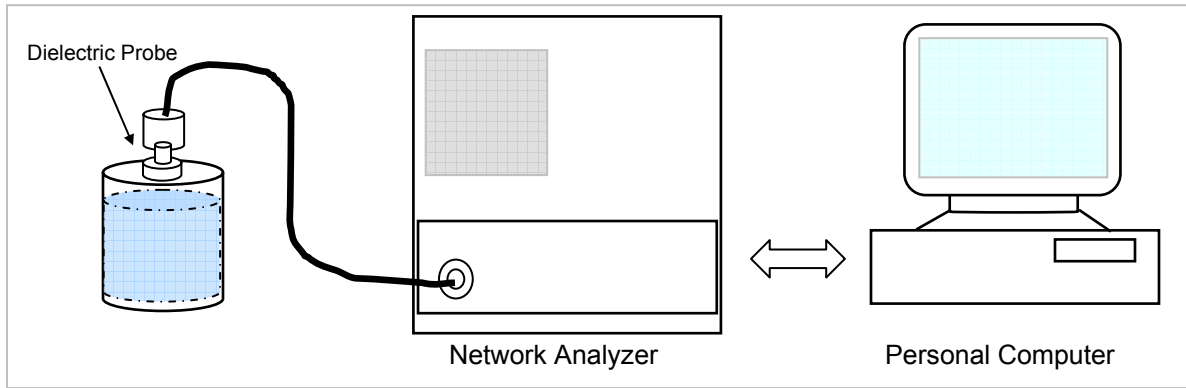
Set-up for liquid parameters check

Reference Values of Tissue Dielectric Parameters for Head and Body Phantom
(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)

4.1   SIMULATING LIQUID PARAMETER CHECK RESULT

Simulating Liquid Dielectric Parameters Check Result @ Muscle 835 MHz

Room Ambient Temperature = 22.5°C; Relative humidity = 35%   Measured by: Ninous Davoudi

Simulating Liquid			Parameters		Target	Measured	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
835	22	15	e"	Relative Permittivity (ϵ_r):	55.2	53.1184	-3.77	± 5
			20.6531	Conductivity (σ):	0.97	0.95938	-1.09	± 5

Liquid Check

Ambient temperature: 22.5 deg. C; Liquid temperature: 22 deg C

April 22, 2006 09:11 AM

Frequency	e'	e"
750000000.	54.0515	20.9796
755000000.	53.9272	20.9402
760000000.	53.9250	20.9082
765000000.	53.8706	20.8937
770000000.	53.7963	20.8511
775000000.	53.7233	20.8087
780000000.	53.7003	20.8076
785000000.	53.6128	20.8169
790000000.	53.5915	20.7808
795000000.	53.5201	20.7622
800000000.	53.4636	20.7501
805000000.	53.4253	20.7544
810000000.	53.3842	20.7316
815000000.	53.3190	20.7007
820000000.	53.2627	20.6449
825000000.	53.2087	20.6552
830000000.	53.1604	20.6470
835000000.	53.1184	20.6531
840000000.	53.0722	20.5843
845000000.	53.0059	20.5778
850000000.	52.9659	20.5510

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 = 22.5°C; Relative humidity = 35%   Measured by: Ninous Davoudi

Simulating Liquid			Parameters		Target	Measured	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	22	15	є"	Relative Permittivity (ϵ_r):	53.3	51.2096	-3.92	± 5
			14.1969	Conductivity (σ):	1.52	1.50060	-1.28	± 5

Liquid Check
Ambient temperature: 22.5 deg. C; Liquid temperature: 22 deg C
April 22, 2006 09:38 AM

Frequency	e'	e"
1710000000.	51.9263	13.5003
1720000000.	51.8901	13.5279
1730000000.	51.8648	13.5576
1740000000.	51.8093	13.6008
1750000000.	51.7740	13.6352
1760000000.	51.7349	13.6799
1770000000.	51.6925	13.7311
1780000000.	51.6372	13.7682
1790000000.	51.6156	13.8133
1800000000.	51.5767	13.8480
1810000000.	51.5436	13.8745
1820000000.	51.5194	13.9008
1830000000.	51.4707	13.9338
1840000000.	51.4316	13.9590
1850000000.	51.3989	14.0143
1860000000.	51.3455	14.0595
1870000000.	51.3003	14.0872
1880000000.	51.2648	14.1281
1890000000.	51.2339	14.1477
1900000000.	51.2096	14.1969
1910000000.	51.1656	14.2215

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 = 23°C; Relative humidity = 45%   Measured by: Ninous Davoudi

Simulating Liquid			Parameters		Target	Measured	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	22.5	15	ε″	Relative Permittivity (ε$_r$):	53.3	50.8047	-4.68	± 5
			14.3255	Conductivity (σ):	1.52	1.51420	-0.38	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 22.5 deg C
April 25, 2006 05:46 PM

Frequency	e'	e"
1710000000.	51.5524	13.6401
1720000000.	51.5047	13.6787
1730000000.	51.4649	13.7290
1740000000.	51.4035	13.7539
1750000000.	51.3648	13.8002
1760000000.	51.3291	13.8300
1770000000.	51.2888	13.8602
1780000000.	51.2489	13.8973
1790000000.	51.2235	13.9193
1800000000.	51.1756	13.9634
1810000000.	51.1522	13.9876
1820000000.	51.0962	14.0213
1830000000.	51.0721	14.0569
1840000000.	51.0133	14.1078
1850000000.	50.9841	14.1411
1860000000.	50.9624	14.1893
1870000000.	50.9121	14.2058
1880000000.	50.8756	14.2566
1890000000.	50.8422	14.2804
1900000000.	50.8047	14.3255
1910000000.	50.7786	14.3575

The conductivity (σ) can be given as:

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

$where \quad f = target\ f * 10^6$
$\quad\quad\quad \varepsilon_0 = 8.854 * 10^{-12}$

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 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 5 x 5 x 7 fine cube was chosen for cube integration(dx=dy=7.5mm; dz=5mm).
  For 5 GHz band - Special 8x8x8 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.

5.1   SYSTEM PERFORMANCE CHECK RESULTS

System Validation Dipole: D835V2 SN:4d002

Date: April 22, 2006

Ambient Temperature = 22.5°C; Relative humidity = 35%   Measured by: Ninous Davoudi

Body Simulating Liquid			Mrasured		Target_1g	Deviation[%]	Limit [%]
f (MHz)	Temp. [°C]	Depth [cm]	1g	Normalized to 1 W			
835	22	15	2.37	9.48	9.71	-2.37	± 10
			10g	Normalized to 1 W	Target_10g	Deviation[%]	Limit [%]
			1.56	6.24	6.38	-2.19	± 10

System Validation Dipole: D1900V2 SN:5d043

Date: April 22, 2006

Ambient Temperature = 22.5°C; Relative humidity = 35%   Measured by: Ninous Davoudi

Body Simulating Liquid			Mrasured		Target_1g	Deviation[%]	Limit [%]
f (MHz)	Temp. [°C]	Depth [cm]	1g	Normalized to 1 W			
1900	22	15	10.30	41.2	39.8	3.52	± 10
			10g	Normalized to 1 W	Target_10g	Deviation[%]	Limit [%]
			5.41	21.64	20.8	4.04	± 10

Date: April 25, 2006

Ambient Temperature = 23°C; Relative humidity = 45%   Measured by: Ninous Davoudi

Body Simulating Liquid			Mrasured		Target_1g	Deviation[%]	Limit [%]
f (MHz)	Temp. [°C]	Depth [cm]	1g	Normalized to 1 W			
1900	22.5	15	10.60	42.4	39.8	6.53	± 10
			10g	Normalized to 1 W	Target_10g	Deviation[%]	Limit [%]
			5.55	22.2	20.8	6.73	± 10

6   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 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 4 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.

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 EUT 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 EUT 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 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:

For 5 GHz band - Around this point, a volume of X=Y=Z=30 mm is assessed by measuring 8 x 8 x 8 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.

6.1 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 5 x 5 x 7 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 8 x 8 x 8 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.

7   PROCEDURE USED TO ESTABLISH TEST SIGNAL

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

MC8755_TX_GSM850_xxx

MC8755_TX_EDGE850_xxx

MC8755_TX_GSM1900_xxx

MC8755_TX_EDGE1900_xxx

Conducted powers were measured prior to SAR measurement.

GSM850 [GPRS Class: Class 10 (2 slot)]

The cable assembly insertion loss of 10.58 dB (including 9.81 dB pad and 0.77dB cable) was entered as an offset in the power meter to allow for direct reading of power.

GPRS mode

Channel	Frequency (MHz)	Power (dBm)
128	824.2	31.82
192	837.0	31.91
251	848.8	32.07

EGPRS (EDGE) mode

Channel	Frequency (MHz)	Power (dBm)
128	824.2	26.84
192	837.0	26.67
251	848.8	26.64

GSM1900 [GPRS Class: Class 10 (2 slot)]

The cable assembly insertion loss of 10.7 dB (including 10.02 dB pad and 0.86 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

GPRS mode

Channel	Frequency (MHz)	Power (dBm)
512	1850.20	28.92
661	1880.00	29.87
810	1909.80	29.04

EGPRS (EDGE) mode

Channel	Frequency (MHz)	Power (dBm)
512	1850.20	26.11
661	1880.00	26.02
810	1909.80	25.87

8   SAR MEASURMENT RESULTS

Note: This device contains 900/1800/2100 MHz bands are not operational in US territories. This report is applicable to 850 and 1900 MHz bands.

8.1   D NOTE14 INCH-GSM 850

GSM 850

Test Mode	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1] SAR 1g (mW/g)
GPRS	128	824.2	0.0333	0.000	0.0333
	192	837.0	0.0539	0.000	0.0539
	251	848.8	0.0791	0.000	**0.0791**
	251[4]	848.8	0.0793	0.000	**0.0793**
EGPRS	128	824.2			
	192	837.0	0.0179	0.000	0.0179
	251	848.8			

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) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) Collocation with Gwinnette WLAN module FCC ID: PPD-AR5BXB6.
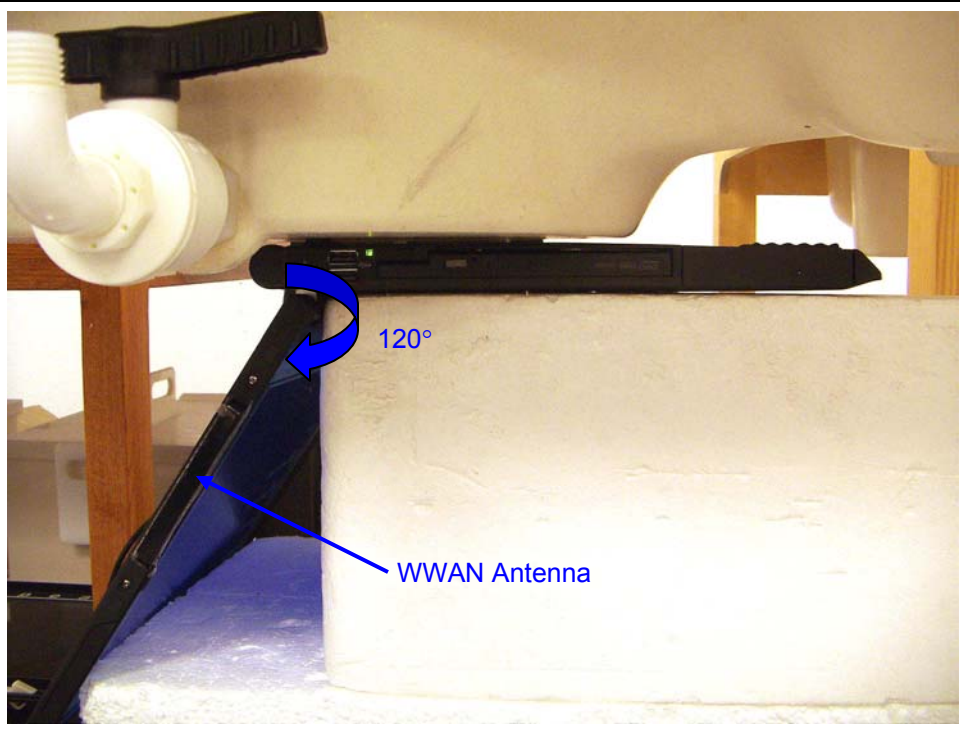
8.2   D NOTE14 INCH - GSM 1900

GSM 1900

Test Mode	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1] SAR 1g (mW/g)
GPRS	512	1850.20	0.069	0.000	0.069
	661	1880.00	0.133	0.000	**0.133**
	810	1909.80	0.084	0.000	0.084
	661[4]	1880.00	0.131	0.000	**0.131**
EGPRS	512	1850.20			0.000
	661	1880.00	0.068	0.000	0.068
	810	1909.80			0.000

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) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) Collocation with Gwinnette WLAN module FCC ID: PPD-AR5BXB6.

8.3   D NOTE15 INCH - GSM 850

Spot check tests are performed based on the worst case from 14" D Note laptop.
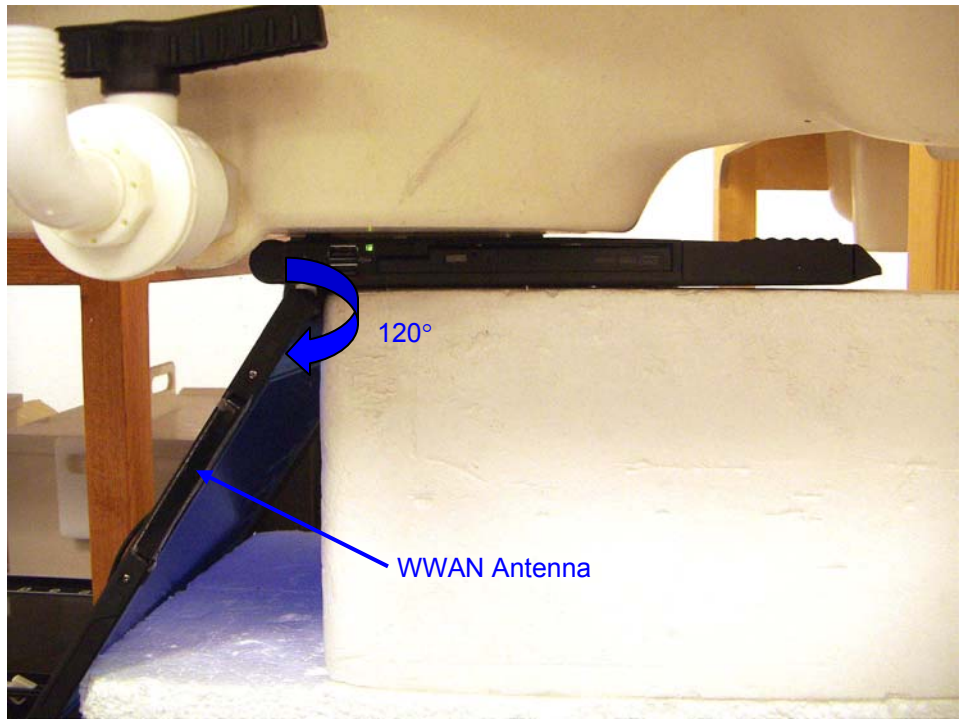

GSM 850

Test Mode	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1] SAR 1g (mW/g)
GPRS	128	824.2			
	192	837.0			
	251	848.8	0.0128	0.000	0.0128
	251[4]	848.8	0.0129	0.000	0.0129
EGPRS	128	824.2			
	192	837.0	0.0052	0.000	0.0052
	251	848.8			

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) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) Collocation with Gwinnette WLAN module FCC ID: PPD-AR5BXB6.

8.4   D NOTE15 INCH-GSM 1900

GSM 1900

Test Mode	Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1] SAR 1g (mW/g)
GPRS	512 661 810	1850.20 1880.00 1909.80	0.0170	0.0000	0.0170
	661[4]	1880.00	0.0257	-0.0217	0.0258
EGPRS	512 661 810	1850.20 1880.00 1909.80	0.0114	0.0000	0.0114

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) The SAR measured at the middle channel for this configuration is at least 3 dB lower (0.8 mW/g) than SAR limit (1.6 mW/g), thus testing at low & high channel is optional.
3) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.
4) Collocation with Gwinnette WLAN module FCC ID: PPD-AR5BXB6.

9   MEASURMENT UNCERTAINTY

9.1   MEASURMENT 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							

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10 EQUIPMENT LIST AND CALIBRATION

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
Thermometer	ERTCO	639-1S	1718	1/11/07
SAM Phantom (SAM1)	SPEAG	TP-1185	QD000P40CA	N/A
SAM Phantom (SAM2)	SPEAG	TP-1015	N/A	N/A
Data Acquisition Electronics	SPEAG	DAE4	558	1/20/07
System Validation Dipole	SPEAG	D835V2	4d002	1/23/08
System Validation Dipole	SPEAG	D1900V2	5d043	1/29/08
Signal Generator	R&S	SMP 04	DE34210	6/8/06
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	3/21/07
Simulating Liquid	CCS	M835	N/A	Within 24 hrs of first test
Simulating Liquid	CCS	M1900	N/A	Within 24 hrs of first test

11   EUT PHOTOS

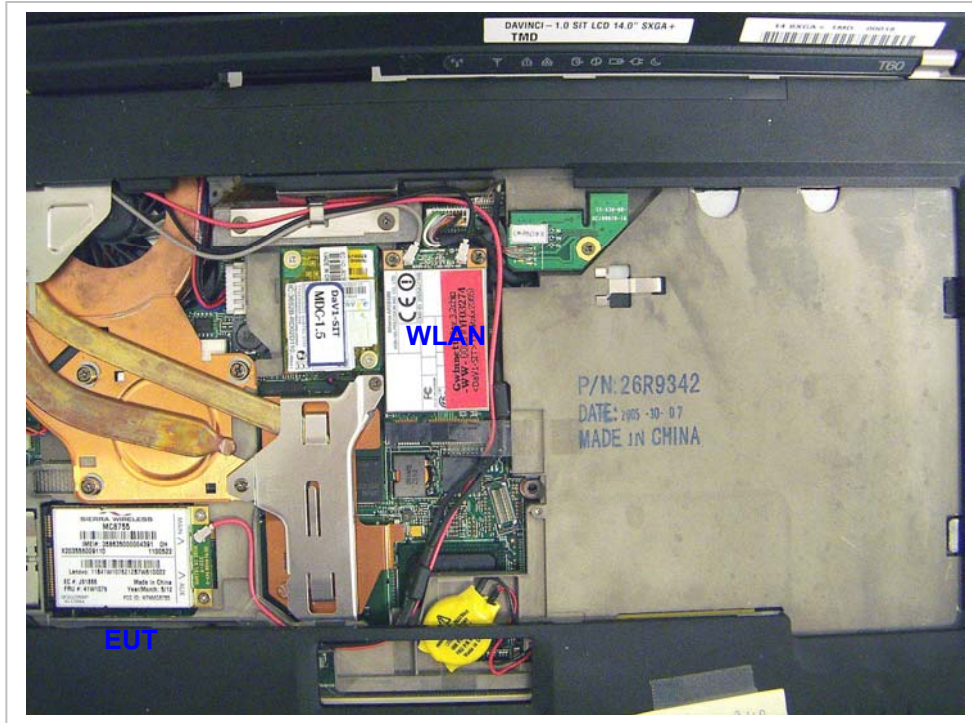850/900/1800/1900/2100 MHZ 5-BAND MINI CARD MODULE

D Note 14 inch
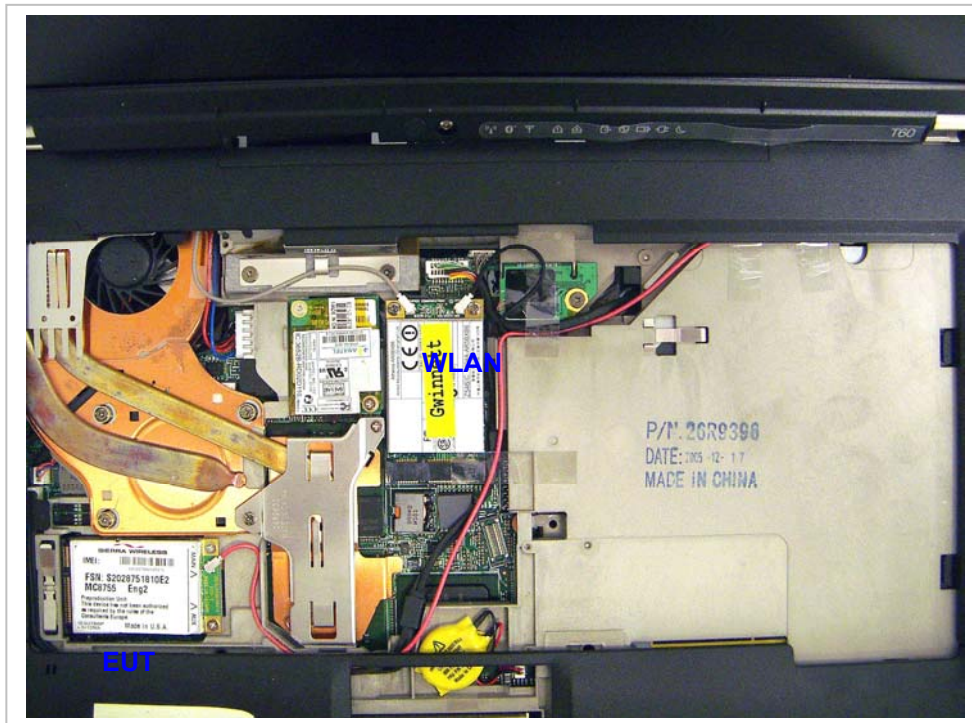

60 mm

D Note 15 inch

79 mm
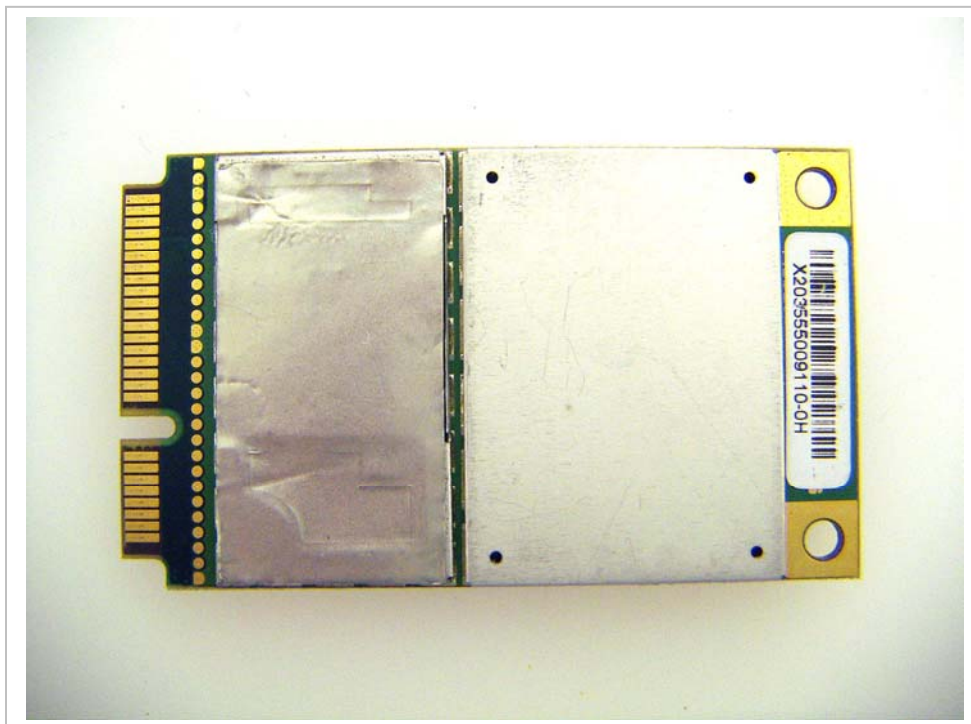
D Note 14 inch

D Note 14 inch

D Note 15 inch

12 ATTACHMENTS

No.	Contents	No. Of Pages
1	System Performance Check Plots	6
2-1	SAR Test Plots-14 inch	12
2-2	SAR Test Plots-15 inch	8
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

END OF REPORT