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 PC CARD

MODEL: AIRCARD 875

FCC ID: N7NAC875

REPORT NUMBER: 06U10399-7

ISSUE DATE: JULY 26, 2006

PREPARED FOR

SIERRA WIRELESS, INC.
13811 WIRELESS WAY
RICHMOND, BC V6V 3A4 CANADA

PREPARED BY

COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885

LAB CODE:200065-0

Revision History

Rev.	Issued date	Revisions	Revised By
--	July 26, 2006	Initial issue	HS

CERTIFICATE OF COMPLIANCE (SAR EVALUATION)

DATES OF TEST: July 25 and 26, 2006

APPLICANT: ADDRESS:	SIERRA WIRELESS, INC. 13811 WIRELESS WAY, RICHMOND, BC V6V 3A4 CANADA
FCC ID: MODEL:	N7NAC875 AIRCARD 875
DEVICE CATEGORY: EXPOSURE CATEGORY:	Portable Device General Population/Uncontrolled Exposure

850/900/1800/1900/2100MHz Quadband PC Card is installed in three host laptops. This device contains 900/1800/2100 MHz functions that are not operational in U.S. Territories.			
Test Sample is a:	Production unit		
Host Laptops:	1- HP, SKU-3 2- Sony, PCG-V505DC1P 3- Acer, ZF3		
Rule Parts	Frequency Range [MHz]	The Highest SAR Values [1g_mW/g]	
FCC 22H	824.2-848.8	1- HP 2- Sony 3- Acer	0.424 **0.679** 0.412
FCC 24E	1850.2-1909.8	4- HP 5- Sony 3- Acer	0.901 0.587 **0.970**

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:

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

850/900/1800/1900/2100MHz Quadband PC Card is installed in three host laptops. This device contains 900/1800/2100 MHz functions that are not operational in U.S. Territories.	
Normal operation:	Lap-held position
Module capabilities:	Class 12, sum of 5 slots, 1 to 4 slots for uplink
Earphone/Headset Jack:	JABRA headset
Duty cycle:	100% for WCDMA 50% for GPRS & EGPRS 4 slots
Host Device(s):	1- HP, SKU-3 2- Sony, PCG-V505DC1P 3- Acer, ZF3
Power supply:	Power supplied through the laptop computer (host device).

2 FACILITIES AND ACCREDITATION

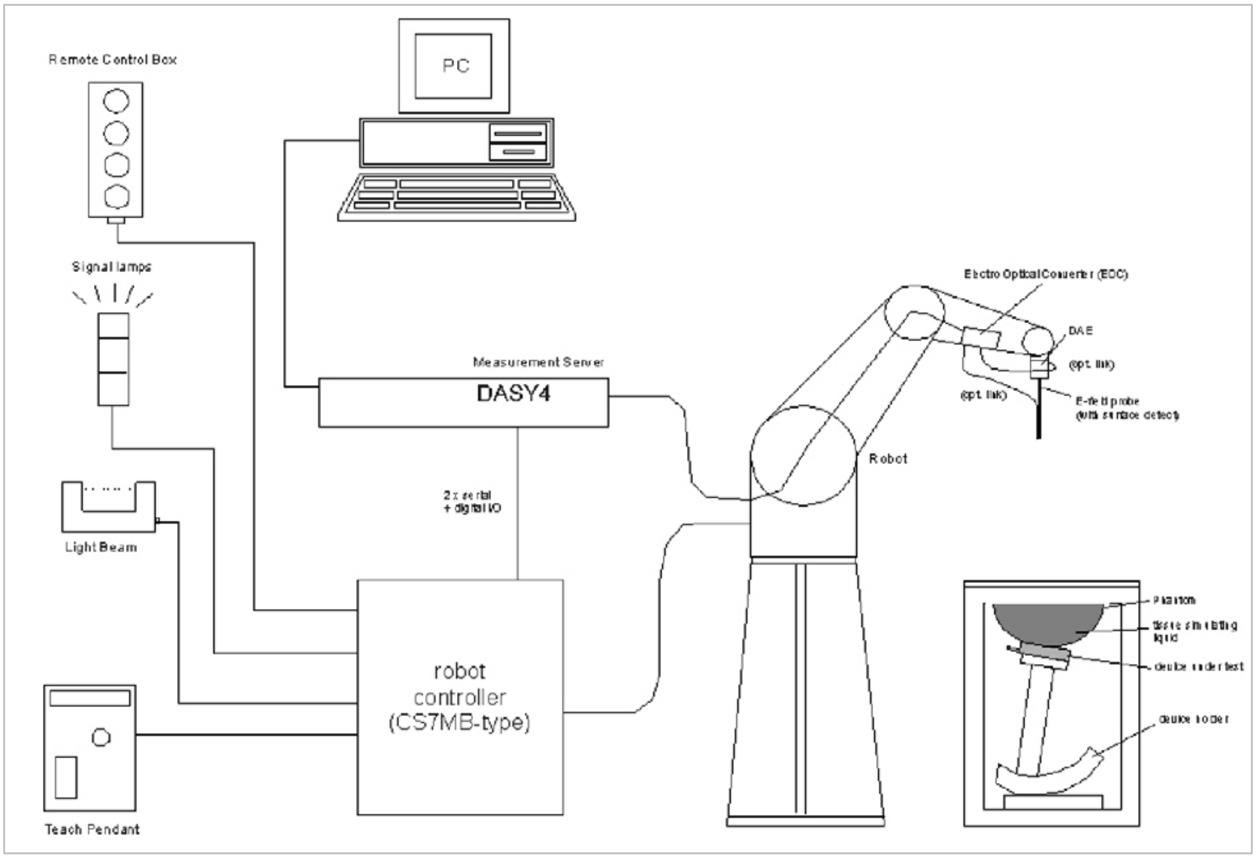
The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1,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

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 SIMULATIG LIQUIDS

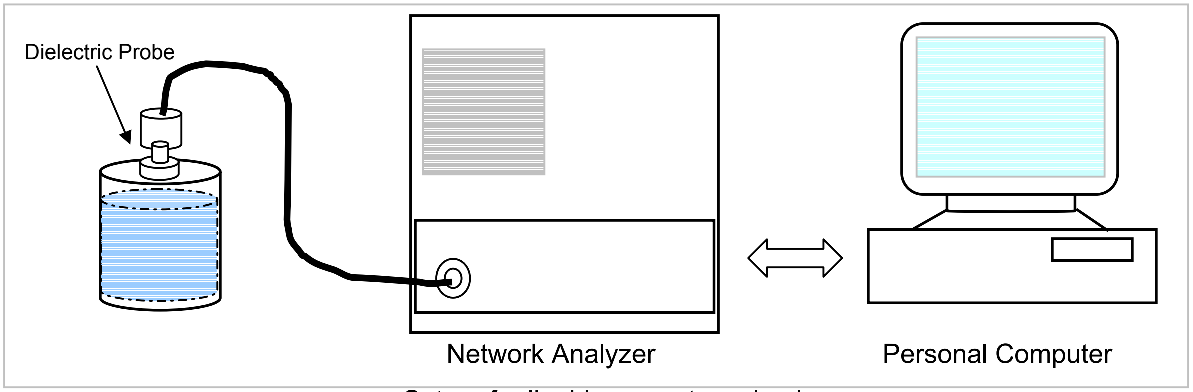
The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

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 = 23°C; Relative humidity = 50% Measured by: Ninous Davoudi

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
835	22	15	e'	54.6865	Relative Permittivity (ε_r):	54.6865	55.2	-0.93	± 5
			e"	20.6407	Conductivity (σ):	0.95880	0.97	-1.15	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 22.0 deg C
July 25, 2006 09:02 AM

Frequency	e'	e"
800000000.	55.0190	20.7812
805000000.	55.0001	20.7956
810000000.	54.9485	20.7481
815000000.	54.9069	20.7255
820000000.	54.8381	20.7019
825000000.	54.8119	20.6853
830000000.	54.7702	20.6689
835000000.	54.6865	20.6407
840000000.	54.6774	20.6620
845000000.	54.6284	20.6323
850000000.	54.5994	20.5954
855000000.	54.5332	20.5728
860000000.	54.4718	20.5596
865000000.	54.4230	20.5202
870000000.	54.3636	20.5068
875000000.	54.3017	20.4839
880000000.	54.2793	20.4779
885000000.	54.2302	20.4823
890000000.	54.1840	20.4645
895000000.	54.1442	20.4339
900000000.	54.1375	20.4322

The conductivity (σ) can be given as:

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

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

Simulating Liquid Dielectric Parameters Check Result @ Muscle 1900 MHz

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

Simulating Liquid			Parameters				Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)								
1900	22	15	e'	52.0527	Relative Permittivity (ε_r):		52.0527	53.3	-2.34	± 5
			e"	13.7582	Conductivity (σ):		1.45423	1.52	-4.33	± 5

Liquid Check
Ambient temperature: 23.0 deg. C; Liquid temperature: 22.0 deg C
July 26, 2006 08:22 AM

Frequency	e'	e"
1710000000.	52.7134	13.0877
1720000000.	52.6757	13.1088
1730000000.	52.6520	13.1401
1740000000.	52.6073	13.1960
1750000000.	52.5701	13.2494
1760000000.	52.5273	13.2932
1770000000.	52.4884	13.3304
1780000000.	52.4381	13.3559
1790000000.	52.4127	13.3999
1800000000.	52.3840	13.4291
1810000000.	52.3609	13.4750
1820000000.	52.3166	13.4856
1830000000.	52.2745	13.5089
1840000000.	52.2503	13.5384
1850000000.	52.2111	13.5811
1860000000.	52.1637	13.6242
1870000000.	52.1312	13.6617
1880000000.	52.0849	13.6974
1890000000.	52.0698	13.7339
1900000000.	52.0527	13.7582
1910000000.	52.0039	13.8043

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 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: July 25, 2006

Room Ambient Temperature = 23°C; Relative humidity = 50% Measured by: Ninous Davoudi

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
835	22	15	1g	2.46	9.84	9.71	1.34	± 10
			10g	1.62	6.48	6.38	1.57	± 10

System Validation Dipole: D1900V2 SN:5d043

Date: July 26, 2006

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

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	22	15	1g	9.41	37.64	39.8	-5.43	± 10
			10g	5.01	20.04	20.8	-3.65	± 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.

6.2 DASY4 MULTIBAND 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: Volume Scan Job

Volume Scans are used to assess peak SAR and averaged SAR measurement in largely extended 3-deimensional volumes within any phantom. This measurement does not need any previous area scan. The grid can be anchored to a user specific point or to the current probe location. The steps in horizontal and vertical directions are 15mm.

Step 3: 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.

Step 5: Multiband Data Extractions

After SAR measurements in each liquid, SEMCAD tool is used to evaluate the combined SAR from different bands.

7 PROCEDURE USED TO ESTABLISH TEST SIGNAL

The following procedures had been used to prepare the EUT for the SAR test.
The following setting is used to configure the CMU200 to establish the link for SAR testing.

Service selection ➔ Test Mode A – Auto Slot Config. ➔ off
Main Service ➔ Packet Data
Network Support ➔ GSM+GPRS
Slot Config ➔ 33 dBm for GSM850 and 30 dBm for GSM1900

Conducted power:

GSM850

Channel	Frequency (MHz)	GPRS				EGPRS
		1 slot Power (dBm)	2 slots Power (dBm)	3 slots Power (dBm)	4 slots Power (dBm)	1-4 slot Power (dBm)
128	824.2	31.8	29.7	28.2	27.2	27.0
192	837.0	31.9	29.9	28.3	27.3	27.1
251	848.8	31.9	29.9	28.4	27.3	27.1

GSM1900

Channel	Frequency (MHz)	GPRS				EGPRS
		1 slot Power (dBm)	2 slots Power (dBm)	3 slots Power (dBm)	4 slots Power (dBm)	1-4 slot Power (dBm)
512	1850.2	29.6	26.9	25.5	24.5	26.7
661	1880.0	29.3	27.1	25.6	24.6	25.6
810	1909.8	29.5	27.7	26.2	25.2	26.6

The following settings were used to configure the Wireless Communications Test Set, Agilent 8960 Series 10, E5515C.

Instrument information: (by press SYSTEM CONFIG)

Application: WCDMA Lap App C
E6703C C.03.11
Format: WCDMA

Call Control: (by press CALL SETUP)

2 of 4 Cell Parameters: PS Domain Information > Present
ATT (IMSI Attach) Flag State > Set
4 of 4 Security Info: Security Parameter - System Operations > None

Call Parms: (by press CALL SETUP)
1 of 3
Channel Type: 12.2k RMC
Paging Service: RB Test Mode

HSDPA Parameters:
1 of 2
HSDPA RB Test Mode Setup
FRC Type > H-Set 5 QPSK
CN Domain > PS Domain
Uplink 64k DTCH for HSDPA Loopback State > On
HS-DSCH Data Pattern > CCITT PRBS15
RLC Header on HS-DSCH > Present

Channel (UARFCN) Parms: DL Channel: 4357 / 4407 / 4458
UL Channel: 4132 / 4182 / 4233
UL Sep (Band) > 400MHz (Band 4)
Freq Bnad Ind > On
2 of 3
DL DTCH Data: CCITT PRBS15
RLC Reestablish: Off
Call Limit State: Off
Call Drop Timer: Off
SRB Config.: 13.6k DCCH
3 of 3
UE Target Power: -5 dBm
UL CL Pwr Ctrl Parms: Active bits (Select “All Up bits” after linked to get maximum power)

DL Channel: 9662 / 9800 / 9938 / 4357 / 4407 / 4458

UL Channel: 9262 / 9400 / 9538 / 4132 / 4182 / 4233

Conducted power:

UMTS850

Channel	Frequency (MHz)	WCDMA Power (dBm)
4132	826.2	22.4
4182	836.4	22.9
4233	846.6	23.0

UMTS1900

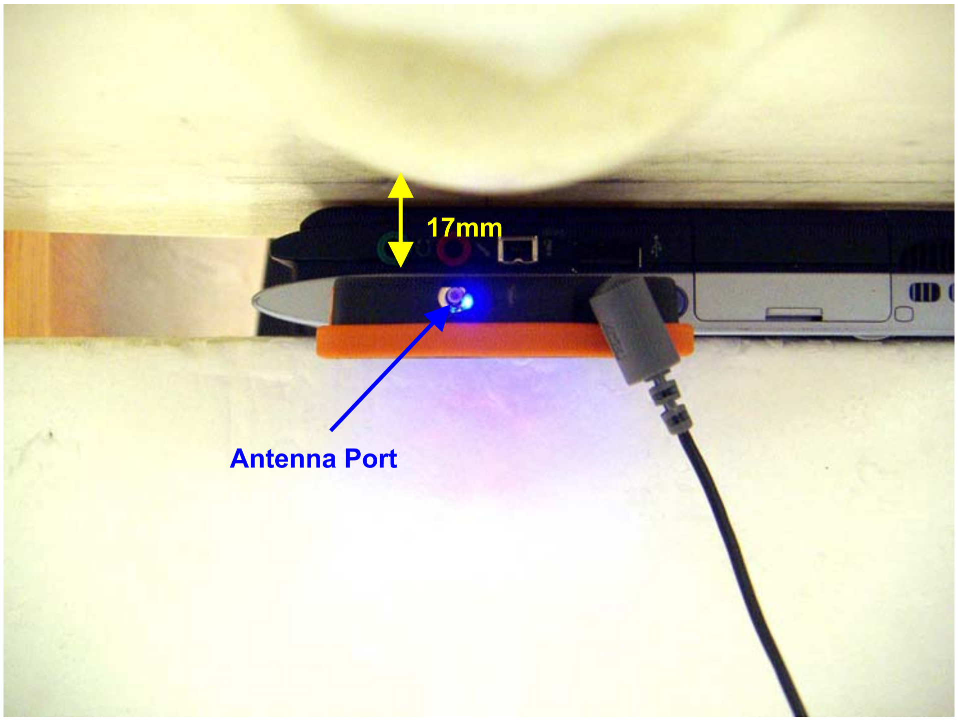
Channel	Frequency (MHz)	WCDMA Power (dBm)
9262	1852.4	23.3
9400	1880.0	23.0
9538	1907.6	23.2

8 SAR MEASURMENT RESULTS

8.1 CELL BAND

8.1.1 SONY, PCG-V505DC1P

A preliminary test is performed to determine which mode of GPRS (single or 4 slots for uplink) produces worse SAR.

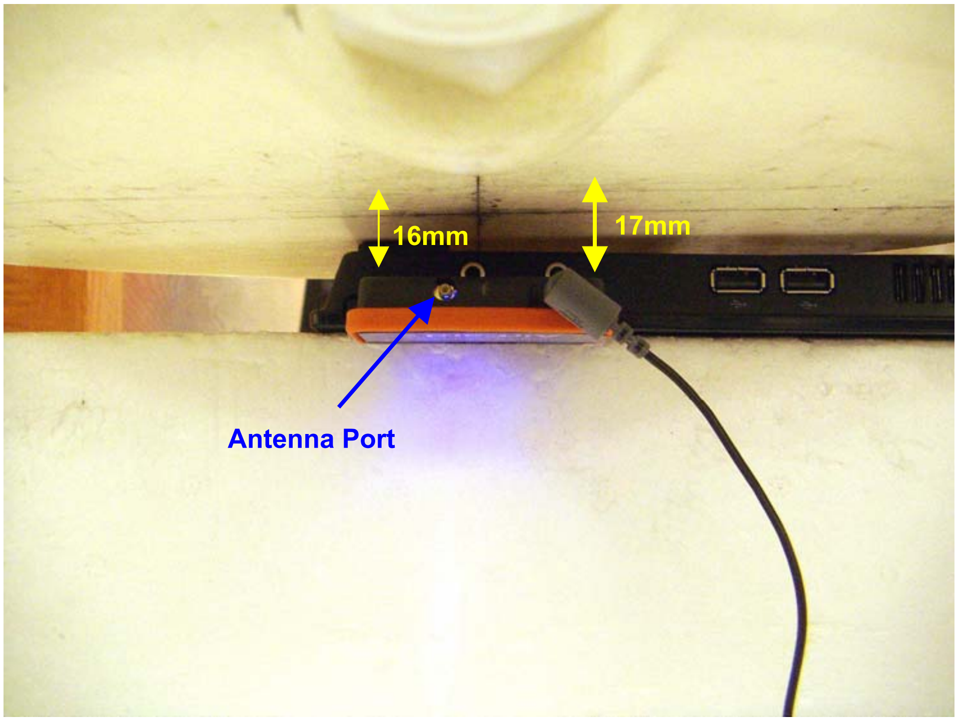


GPRS Single slot				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128 192 251	824.2 837.0 848.8	0.489	0.000	0.489
GPRS 4 slots				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128 192 251	824.2 837.0 848.8	0.671	0.000	0.671

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.

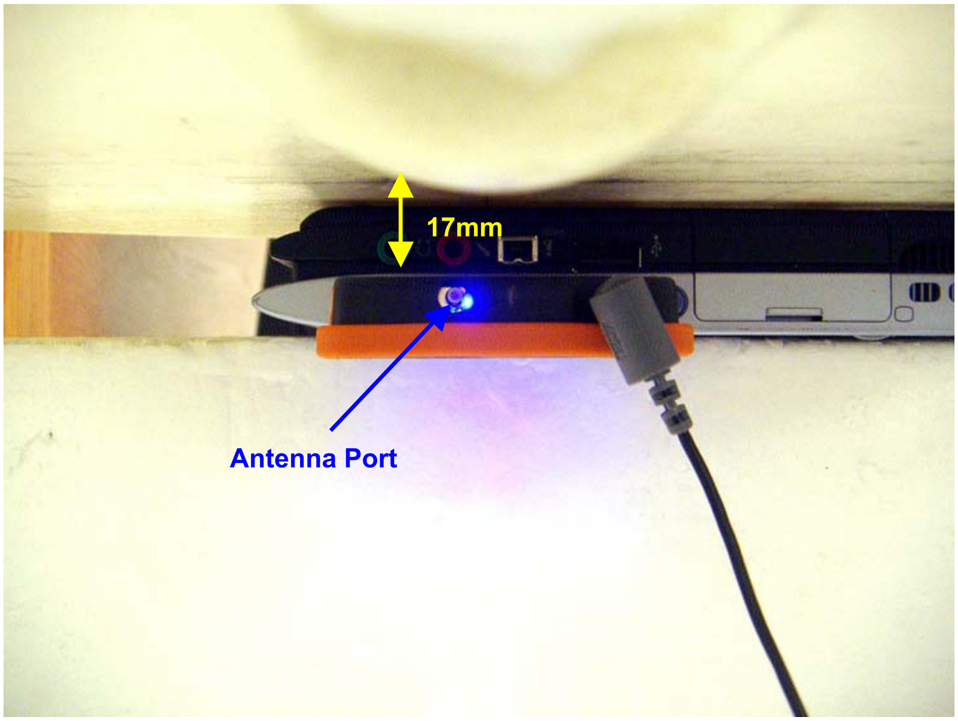
8.1.2 HP, SKU-3



GPRS				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128 192 251	824.2 837.0 848.8	0.414	-0.100	**0.424**
EGPRS				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128 192 251	824.2 837.0 848.8	0.380	0.000	0.380
WCDMA				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
4132 4182 4233	826.4 836.4 846.6	0.332	0.000	0.332

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.

8.1.3 SONY, PCG-V505DC1P



GPRS

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128	824.2			
192	837.0	0.538	0.000	0.538
251	848.8			

EGPRS

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128	824.2	0.560	0.000	0.560
192	837.0	0.531	-0.096	0.543
251	848.8	0.679	0.000	**0.679**

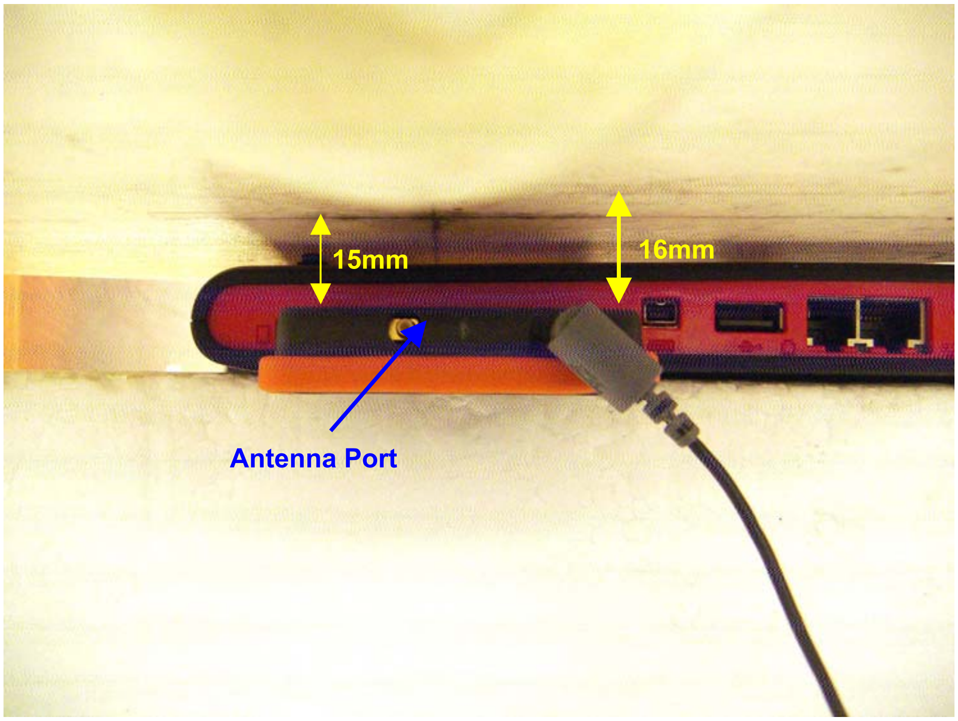
WCDMA

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
4132	826.4			
4182	836.4	0.397	0.000	0.397
4233	846.6			

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 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.

8.1.4 ACER, ZF3



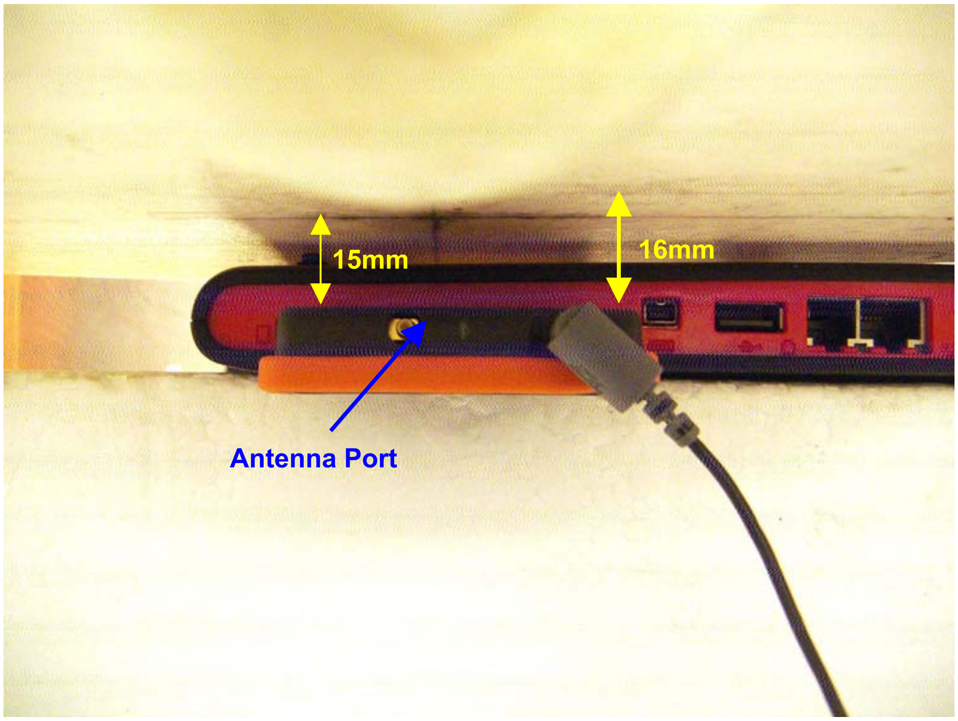
GPRS				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128 192 251	824.2 837.0 848.8	0.352	0.000	0.352
EGPRS				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128 192 251	824.2 837.0 848.8	0.412	0.000	**0.412**
WCDMA				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
4132 4182 4233	826.4 836.4 846.6	0.272	0.000	0.272

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.

8.2 PCS BAND

8.2.1 ACER, ZF3

A preliminary test is performed to determine which mode of GPRS (single or 4 slots for uplink) produces worse SAR.

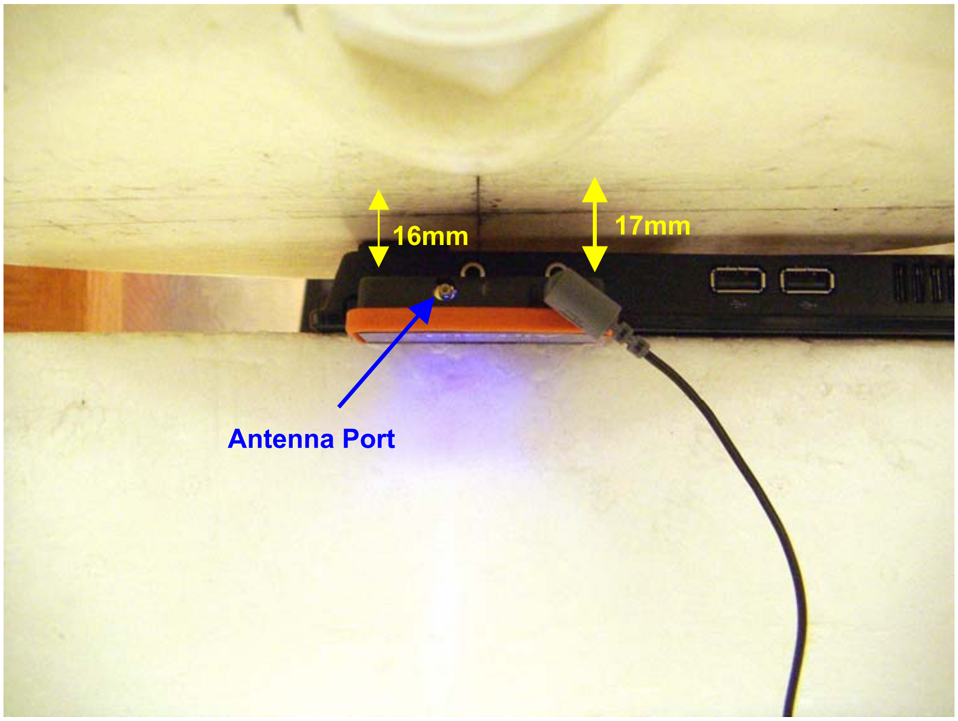


Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
GPRS Single Slot				
512	1850.2	0.382	0.000	0.382
661	1880.0			
810	1909.8			
GPRS 4 Slots				
512	1850.2	0.634	-0.055	0.642
661	1880.0			
810	1909.8			

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) Please see attachments for the detailed measurement data and plots showing the maximum SAR location of the EUT.

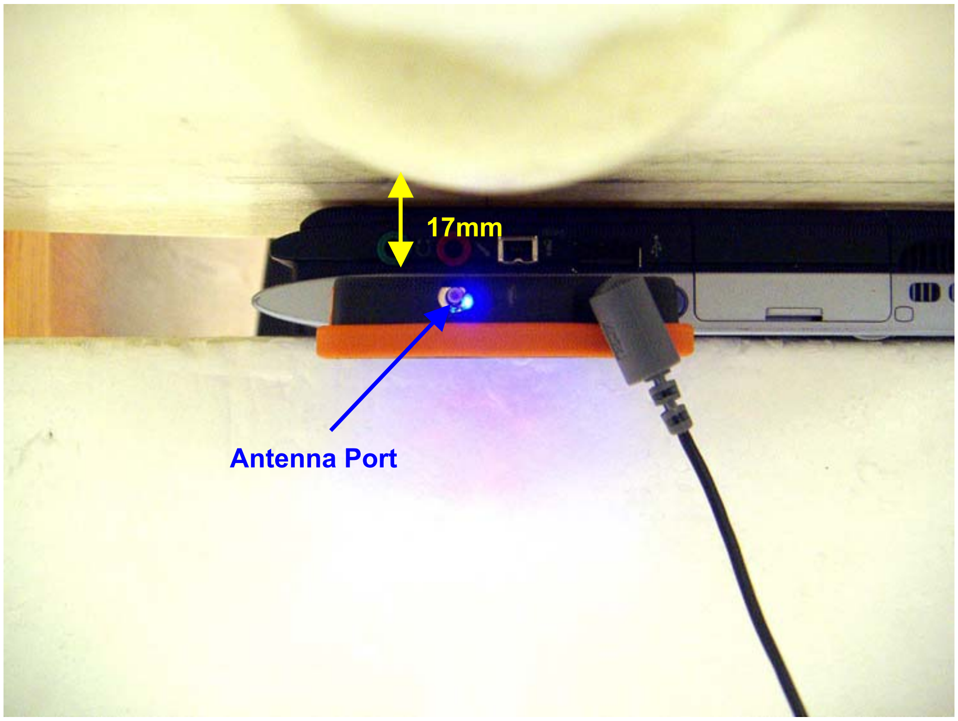
8.2.2 HP, SKU-3



GPRS				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512 661 810	1850.2 1880.0 1909.8	0.603	0.000	0.603
EGPRS				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512	1850.2	0.740	0.000	0.740
661	1880.0	0.886	-0.072	**0.901**
810	1909.8	0.885	0.000	0.885
WCDMA				
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
9262 9400 9538	1852.4 1880.0 1907.6	0.540	0.000	0.540

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.

8.2.3 SONY, PCG-V505DC1P



GPRS

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512 661 810	1850.2 1880.0 1909.8	0.413	-0.124	0.425

EGPRS

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512 661 810	1850.2 1880.0 1909.8	0.587	0.000	**0.587**

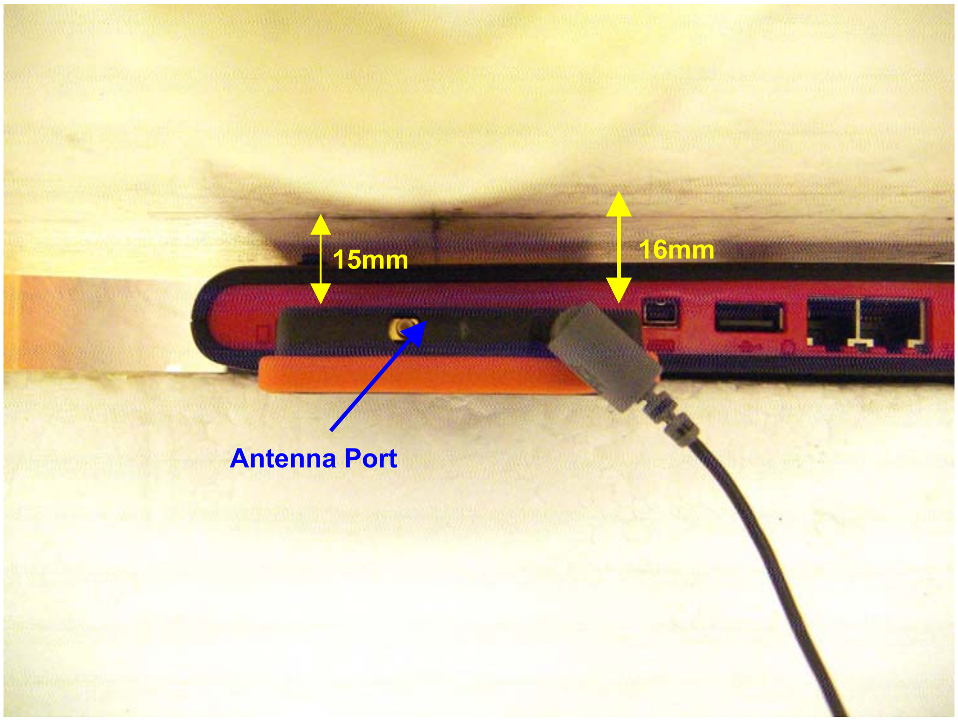
WCDMA

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
9262 9400 9538	1852.4 1880.0 1907.6	0.375	0.000	0.375

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.

8.2.4 ACER, ZF3



GPRS

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512	1850.2			
661	1880.0	0.634	-0.055	0.642
810	1909.8			

EGPRS

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512	1850.2	0.692	0.000	0.692
661	1880.0	0.911	-0.042	0.920
810	1909.8	0.970	0.000	**0.970**

WCDMA

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
9262	1852.4			
9400	1880.0	0.544	-0.001	0.544
9538	1907.6			

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 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.

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

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	EX3DV4	3552	5/30/07
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
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
Wireless Communications Test Set	Agilent	8960	GB44300138	2/22/2007
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 PHOTOS

850/900/1800/1900/2100MHZ QUADBAND PC CARD

HP, SKU-3

Sony, PCG-V505DC1P

Acer, ZF3

12 ATTACHMENTS

No.	Contents	No. Of Pages
1	System Performance Check Plots	4
2-1	SAR Test Plots-Cell Band	14
2-2	SAR Test Plots-PCS Band	16
3	Certificate of E-Field Probe - EXDV4SN3552	9
4	Certificate of System Validation Dipole - D835V2 SN:4d002	9
5	Certificate of System Validation Dipole - D1900V2 SN:5d043	9

END OF REPORT