SAR Evaluation Report

IN ACCORDANCE WITH THE REQUIREMENTS OF
FCC OET BULLETIN 65 SUPPLEMENT C

FOR

CDMA CELL-PCS MODULE

MODEL: PA3547E-1HSD

FCC ID: CJ6UPA3547G3

REPORT NUMBER: 07U10847-3

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Prepared for

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issued date	Revisions	Revised By
--	February 26, 2007	Initial issue	HS

CERTIFICATE OF COMPLIANCE (SAR EVALUATION)

DATES OF TEST: February 22, 23, and 26 2007

APPLICANT:	TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY
ADDRESS:	OME COMPLEX, 2-9, SUEHIRO-CHO, TOKYO, 198-8710, JAPAN
FCC ID:	CJ6UPA3547G3
MODEL:	PA3547E-1HSD
DEVICE CATEGORY:	Portable Device
EXPOSURE CATEGORY:	General Population/Uncontrolled Exposure

CDMA Cell-PCS Module is installed in Toshiba Portege R400 Tablet.

Test Sample is a:	Production unit	
Host Laptop:	Toshiba Portege R400 Tablet	
Rule Parts	Frequency Range [MHz]	The Highest SAR Values [1g_mW/g]
FCC 22H	824.2 - 848.8	0.109
FCC 24E	1850.2 - 1909.8	0.376

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).

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.

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Tested By:

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EMC Engineer
Compliance Certification Services

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1 DEVICE UNDER TEST (DUT) DESCRIPTION

CDMA Cell-PCS Module is installed in Toshiba Portege R400 Tablet.	
Normal operation:	Lap-held position, and underarm position
Accessory:	N/A
Mobile Device Capabilities:	GPRS/EGPRS 1-4Slots Down / Sum of 5 Slots WCDMA and WCDMA + HSDPA
Duty cycle:	GPRS/EGPRS: 1 Slot: 12.5% 2 Slots: 25% 3.Slots: 37.5% 4 Slots: 50% WCDMA & WCDMA + HSDPA: 100%
Antenna(s)	TMZ005, Manufactured by Tyco Electronics.
Power supply:	Power supplied through the laptop computer (host device).

2 FACILITIES AND ACCREDITATION

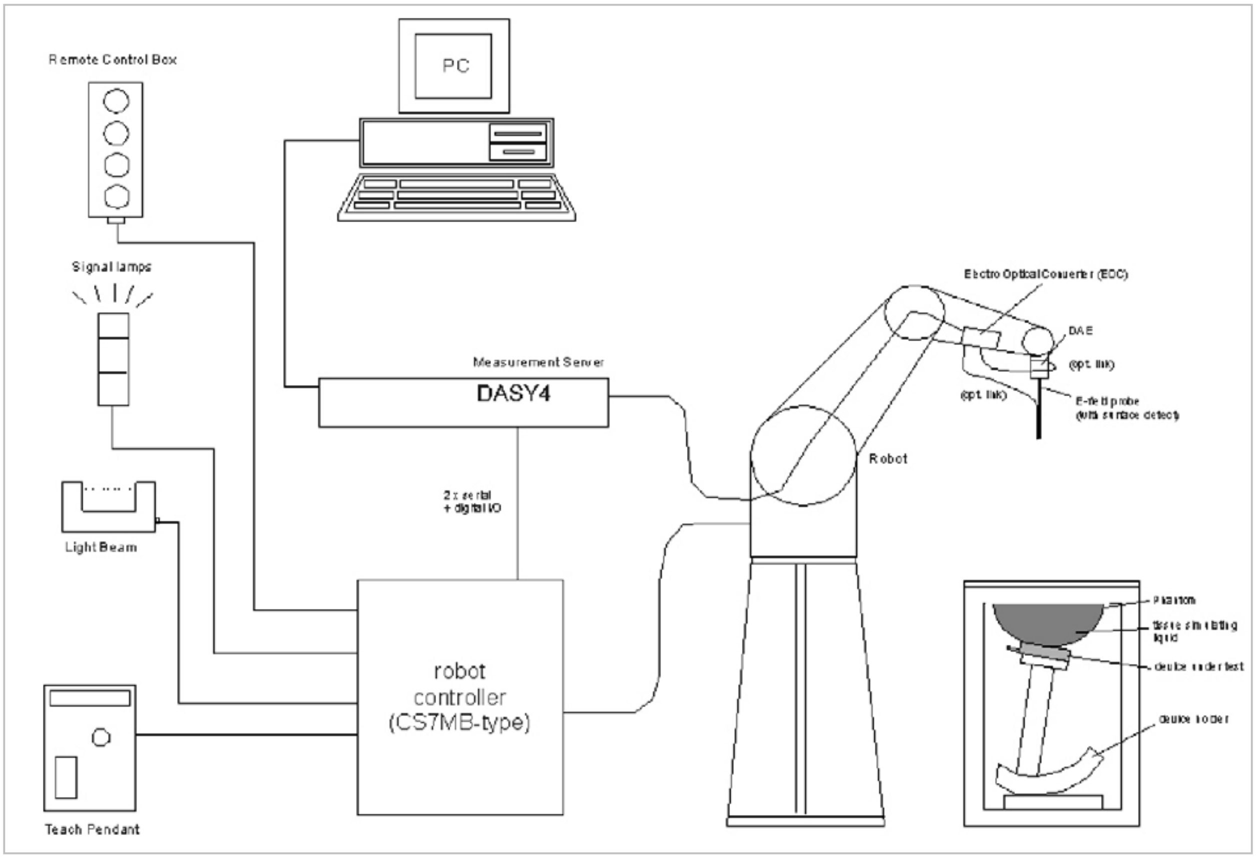
The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, CA 94538 USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, “Radio 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 LIQUIDS

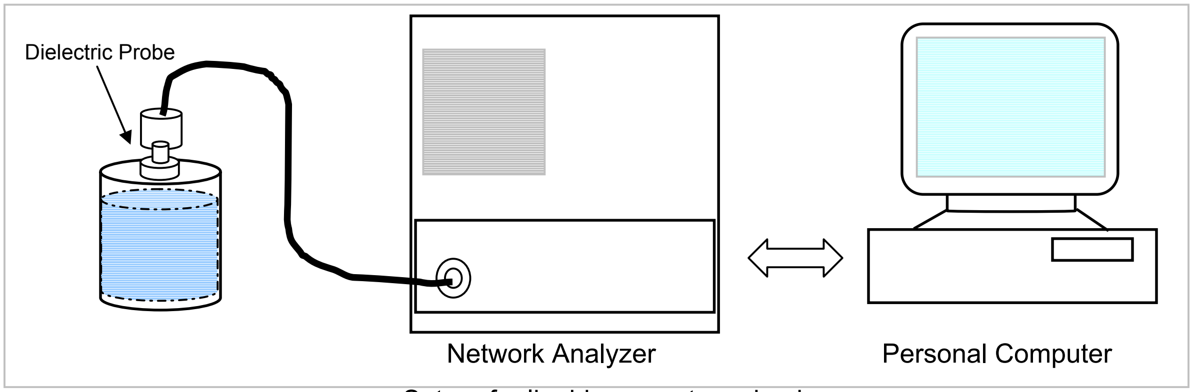
The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

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

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
835	21	15	e'	54.1917	Relative Permittivity (ε_r):	54.1917	55.2	-1.83	± 5
			e"	21.3643	Conductivity (σ):	0.99242	0.97	2.31	± 5

Liquid Check
Ambient temperature: 22.0 deg. C; Liquid temperature: 21.0 deg C
February 23, 2007 04:39 PM

Frequency	e'	e"
800000000.	54.4688	21.0908
805000000.	54.4431	21.1082
810000000.	54.4355	21.1414
815000000.	54.3890	21.1881
820000000.	54.3625	21.2551
825000000.	54.3366	21.3046
830000000.	54.2699	21.3296
835000000.	**54.1917**	**21.3643**
840000000.	54.1879	21.3275
845000000.	54.1642	21.2653
850000000.	54.1471	21.1901
855000000.	54.0960	21.1391
860000000.	54.0954	21.0479
865000000.	54.0458	20.9974
870000000.	53.9943	20.8838
875000000.	53.9692	20.7825
880000000.	53.9182	20.7238
885000000.	53.8696	20.6965
890000000.	53.8438	20.6712
895000000.	53.8640	20.6279
900000000.	53.7865	20.6806

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 835 MHz

Room Ambient Temperature = 22°C; Relative humidity = 45% Measured by: Ninous Davoudi

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
835	21	15	e'	53.5627	Relative Permittivity (ε_r):	53.5627	55.2	-2.97	± 5
			e"	20.9100	Conductivity (σ):	0.97131	0.97	0.14	± 5

Liquid Check
Ambient temperature: 22.0 deg. C; Liquid temperature: 21.0 deg C
February 26, 2007 09:12 AM

Frequency	e'	e"
800000000.	53.8444	20.8669
805000000.	53.7872	20.8534
810000000.	53.7536	20.8712
815000000.	53.7039	20.8720
820000000.	53.6857	20.8951
825000000.	53.6282	20.8986
830000000.	53.5968	20.9094
835000000.	**53.5627**	**20.9100**
840000000.	53.5296	20.9102
845000000.	53.5349	20.8635
850000000.	53.5023	20.8310
855000000.	53.4669	20.7888
860000000.	53.4795	20.7291
865000000.	53.4172	20.6977
870000000.	53.3827	20.6242
875000000.	53.3316	20.5894
880000000.	53.2848	20.5640
885000000.	53.2044	20.5307
890000000.	53.1702	20.5326
895000000.	53.1388	20.5125
900000000.	53.0575	20.5224

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 = 22°C; Relative humidity = 40% Measured by: Ninous Davoudi

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
1900	21	15	e'	55.3518	Relative Permittivity (ε_r):	55.3518	53.3	3.85	± 5
			e"	13.8092	Conductivity (σ):	1.45962	1.52	-3.97	± 5

Liquid Check
Ambient temperature: 22.0 deg. C; Liquid temperature: 21.0 deg C
February 22, 2007 09:26 AM

Frequency	e'	e"
1710000000.	56.1116	12.9729
1720000000.	56.0120	12.9632
1730000000.	55.8907	13.0075
1740000000.	55.7843	13.0698
1750000000.	55.7156	13.1332
1760000000.	55.6897	13.1661
1770000000.	55.7431	13.2627
1780000000.	55.7921	13.3514
1790000000.	55.8375	13.4124
1800000000.	55.8759	13.4263
1810000000.	55.8598	13.4000
1820000000.	55.8127	13.3992
1830000000.	55.7145	13.4022
1840000000.	55.5867	13.4116
1850000000.	55.4606	13.4283
1860000000.	55.3912	13.4783
1870000000.	55.3339	13.5813
1880000000.	55.3073	13.6588
1890000000.	55.2898	13.7466
1900000000.	**55.3518**	**13.8092**
1910000000.	55.4038	13.7905

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 = 22°C; Relative humidity = 35% Measured by: Ninous Davoudi

Simulating Liquid			Parameters			Measured	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)							
1900	21	15	e'	54.6468	Relative Permittivity (ϵ_r):	54.6468	53.3	2.53	± 5
			e''	14.0708	Conductivity (σ):	1.48728	1.52	-2.15	± 5

Liquid Check
Ambient temperature: 22.0 deg. C; Liquid temperature: 21.0 deg C
February 23, 2007 09:07 AM

Frequency	e'	e''
1710000000.	55.5013	13.1950
1720000000.	55.4117	13.1723
1730000000.	55.2676	13.2094
1740000000.	55.1696	13.2747
1750000000.	55.0748	13.3492
1760000000.	55.0345	13.4061
1770000000.	55.0754	13.5217
1780000000.	55.1092	13.6094
1790000000.	55.1572	13.6763
1800000000.	55.1810	13.6934
1810000000.	55.1962	13.6579
1820000000.	55.1433	13.6404
1830000000.	55.0678	13.6331
1840000000.	54.9320	13.6233
1850000000.	54.8152	13.6791
1860000000.	54.7193	13.7349
1870000000.	54.6450	13.8345
1880000000.	54.5992	13.9338
1890000000.	54.6051	14.0102
1900000000.	**54.6468**	**14.0708**
1910000000.	54.7152	14.0678

The conductivity (σ) can be given as:

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

where $f = \text{target } f * 10^6$

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

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: February 23, 2007

Room Ambient Temperature = 22°C; Relative humidity = 35% Measured by: Ninous Davoudi

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
835	21	15	1g	2.30	9.2	9.71	-5.25	± 10
			10g	1.52	6.08	6.38	-4.70	± 10

Date: February 26, 2007

Room Ambient Temperature = 22°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)						
835	21	15	1g	2.33	9.32	9.71	-4.02	± 10
			10g	1.53	6.12	6.38	-4.08	± 10

System Validation Dipole: D1900V2 SN:5d043

Date: February 22, 2007

Room Ambient Temperature = 22°C; Relative humidity = 40% Measured by: Ninous Davoudi

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	21	15	1g	9.33	37.32	39.8	-6.23	± 10
			10g	4.98	19.92	20.8	-4.23	± 10

Date: February 22, 2007

Room Ambient Temperature = 22°C; Relative humidity = 35% Measured by: Ninous Davoudi

Body Simulating Liquid			SAR (mW/g)		Normalized to 1 W	Target	Deviation (%)	Limit (%)
f (MHz)	Temp. (°C)	Depth (cm)						
1900	21	15	1g	9.54	38.16	39.8	-4.12	± 10
			10g	5.06	20.24	20.8	-2.69	± 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 DUT. The SAR at this point is measured at the start of the test, and then again at the end of the test.

b) The SAR distribution at the exposed flat section of the flat phantom is measured at a distance of 4 mm from the inner surface of the shell. The area covers the entire dimension of the DUT and the horizontal grid spacing is 15 mm x 15 mm. Based on this data, the area of the maximum absorption is determined by Spline interpolation. The first Area Scan covers the entire dimension of the DUT to ensure that the hotspot was correctly identified.

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

c) Around this point, a volume of X=Y= 30 and Z=21 mm is assessed by measuring 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=24 and Z=20 mm is assessed by measuring 7 x 7 x 9 mm points. On the basis of this data set, the spatial peak SAR value is evaluated with the following procedure:

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

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

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

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

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 7 x 7 x 9 points.

Step 4: Power drift measurement

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

Step 5: Z-Scan

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

7 PROCEDURE USED TO ESTABLISH TEST SIGNAL

The following setting is used to configure the CMU200 to establish the link for SAR testing.

GSM850/1900 GPRS & EGPRS Mode

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 (for GSM/GPRS modes) 27 dBm for GSM850 and 26 dBm for GSM1900 (for EGPRS mode)

RF Output Power Measurement Results

GSM850

Channel	Frequency (MHz)	GPRS			
		1 slot Power (dBm)	2 slots Power (dBm)	3 slots Power (dBm)	4 slots Power (dBm)
128	824.2	32.6	32.6	31.5	29.4
192	837.0	32.5	32.5	31.5	29.3
251	848.8	32.4	32.3	31.2	29.2

Channel	Frequency (MHz)	EGPRS			
		1 slot Power (dBm)	2 slots Power (dBm)	3 slots Power (dBm)	4 slots Power (dBm)
128	824.2	27.4	27.4	27.4	27.3
192	837.0	27.5	27.4	27.4	27.5
251	848.8	27.4	27.4	27.4	27.3

GSM1900

Channel	Frequency (MHz)	GPRS			
		1 slot Power (dBm)	2 slots Power (dBm)	3 slots Power (dBm)	4 slots Power (dBm)
512	1850.2	29.2	29.6	29.1	28.9
661	1880.0	29.2	29.5	29.1	29.0
810	1909.8	29.3	29.3	29.1	29.0

Channel	Frequency (MHz)	EGPRS			
		1 slot Power (dBm)	2 slots Power (dBm)	3 slots Power (dBm)	4 slots Power (dBm)
512	1850.2	26.4	26.4	26.3	26.2
661	1880.0	26.4	26.4	26.3	26.2
810	1909.8	26.5	26.5	26.4	26.3

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
WCDMA Mobile Test	A.09.06

WCDMA

- Call Setup > Shift & Preset
- Cell Parameters: PS Domain Information > Present
    - ATT (IMSI Attach) Flag State > Set
- Security Parameter - System Operations > None
- Channel Type:
    - RMC: 12.2k, 64k, 144k, or 384k
    - AMC: 12.2 UL / 64/ DL AM RMC, 12.2 UL / 144/ DL AM RMC, or 12.2 UL / 384/ DL AM RMC,

- Paging Service: RB Test Mode
- Channel (UARFCN) Parms:

	PCS band	Cell band
DL Channel:	9662 / 9800 / 9938	4357 / 4407 / 4458
UL Channel:	9262 / 9400 / 9538	4132 / 4182 / 4233

- DL DTCH Data: All Ones
- RLC Reestablish: Off
- Call Limit State: Off
- Call Drop Timer: Off
- SRB Config.: 13.6k DCCH
- UE Target Power: 25 dBm
- UL CL Power Ctrl Parameters
    - UL CL Power Ctrl Mode: All Up Bits

RF Output Power Measurement Results – for RMC Channel Type

Channel Type: 12.2K RMC

Cell Band

Channel	Frequency (MHz)	Ch Power (dBm)
4132	826.4	23.6
4182	836.4	23.8
4233	846.6	23.9

PCS Band

Channel	Frequency (MHz)	Ch Power (dBm)
9262	1852.4	24.5
9400	1880.0	23.7
9538	1907.6	23.9

Channel Type: 64k RMC

Cell Band

Channel	Frequency (MHz)	Ch Power (dBm)
4132	826.4	23.6
4182	836.4	23.8
4233	846.6	23.9

PCS Band

Channel	Frequency (MHz)	Ch Power (dBm)
9262	1852.4	24.5
9400	1880.0	23.7
9538	1907.6	23.8

Channel Type: 144k RMC

Cell Band

Channel	Frequency (MHz)	Ch Power (dBm)
4132	826.4	23.6
4182	836.4	23.8
4233	846.6	23.9

PCS Band

Channel	Frequency (MHz)	Ch Power (dBm)
9262	1852.4	24.5
9400	1880.0	23.7
9538	1907.6	23.6

Channel Type: 384k RMC

Cell Band

Channel	Frequency (MHz)	Ch Power (dBm)
4132	826.4	23.6
4182	836.4	23.7
4233	846.6	23.8

PCS Band

Channel	Frequency (MHz)	Ch Power (dBm)
9262	1852.4	24.5
9400	1880.0	23.6
9538	1907.6	23.6

RF Output Power Measurement Results - for AMC Channel Type

Channel Type: 12.2K UL / 64 DL AM RMC

Cell Band

Channel	Frequency (MHz)	Ch Power (dBm)
4132	826.4	23.7
4182	836.4	23.8
4233	846.6	23.9

PCS Band

Channel	Frequency (MHz)	Ch Power (dBm)
9262	1852.4	24.4
9400	1880.0	23.6
9538	1907.6	23.7

Channel Type: 12.2K UL / 144 DL AM RMC

Cell Band

Channel	Frequency (MHz)	Ch Power (dBm)
4132	826.4	23.7
4182	836.4	23.8
4233	846.6	23.9

PCS Band

Channel	Frequency (MHz)	Ch Power (dBm)
9262	1852.4	24.4
9400	1880.0	23.6
9538	1907.6	23.7

Channel Type: 12.2K UL / 384 DL AM RMC

Cell Band

Channel	Frequency (MHz)	Ch Power (dBm)
4132	826.4	23.7
4182	836.4	23.8
4233	846.6	23.9

PCS Band

Channel	Frequency (MHz)	Ch Power (dBm)
9262	1852.4	24.4
9400	1880.0	23.6
9538	1907.6	23.7

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
WCDMA Mobile Test	A.09.06

WCDMA + HSDPA

- Uplink Parameter:
    - UPLINK DPCH Bc / Bd Control: Manual
    - Manual Uplink DPCH Bc: 9
    - Manual Uplink DPCH Bd: 15
- Channel Type: 12.2k + HSDPA
- HSDPA Parameters:
    - HSDPA RB Test Mode Setup
        - HS–DSCH Configuration Type: FRC
        - FRC Type: <Selected H-set according to the UE category>

HS-DSCH category	Corresponding requirement
Category 1	H-Set 1
Category 2	H-Set 1
Category 3	H-Set 2
Category 4	H-Set 2
Category 5	H-Set 3
Category 6	**H-Set 3**
Category 7	H-Set 6 (Rel-6)
Category 8	H-Set 6 (Rel-6)
Category 10	H-Set 4
Category 11	H-Set 5

        - CN Domain: CS Domain
        - Uplink 64k DTCH for HSDPA Loopback State: On
        - HS-DSCH Data Pattern: All Ones
        - RLC Header on HS-DSCH: Present
    - HSDPA Uplink Parameters
        - DelatACK: 5
        - DeltaNACK: 5
        - DeltaCQI: 2

RF Output Power Measurement Results - for 12.2k RMC HSDPA Channel Type

12.2k RMC + HSDPA

Cell Band

Channel	Frequency (MHz)	Ch Power (dBm)
4132	826.4	23.8
4182	836.4	24.0
4233	846.6	24.0

PCS Band

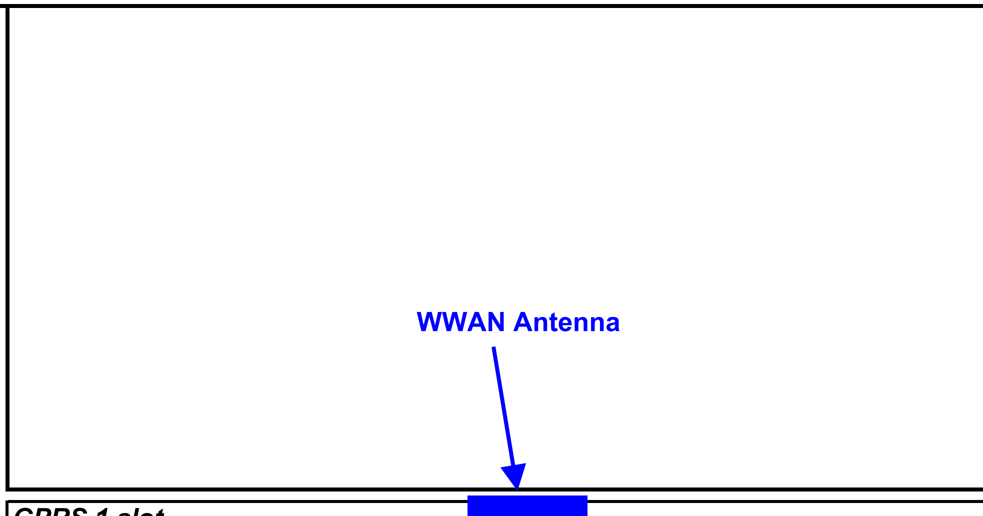
Channel	Frequency (MHz)	Ch Power (dBm)
9262	1852.4	23.4
9400	1880.0	22.8
9538	1907.6	22.6

8 SAR MEASURMENT RESULTS

8.1 CELL BAND

8.1.1 PRIMARY PORTRAIT

8.1.1.1 GPRS



GPRS 1 slot

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128	824.20			
192	837.00	0.041	-0.030	0.041
251	848.80			

GPRS 2 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128	824.20			
192	837.00	0.073	-0.220	0.077
251	848.80			

GPRS 3 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128	824.20	0.057	-0.028	0.057
192	837.00	0.083	0.000	0.083
251	**848.80**	**0.109**	**0.000**	**0.109**

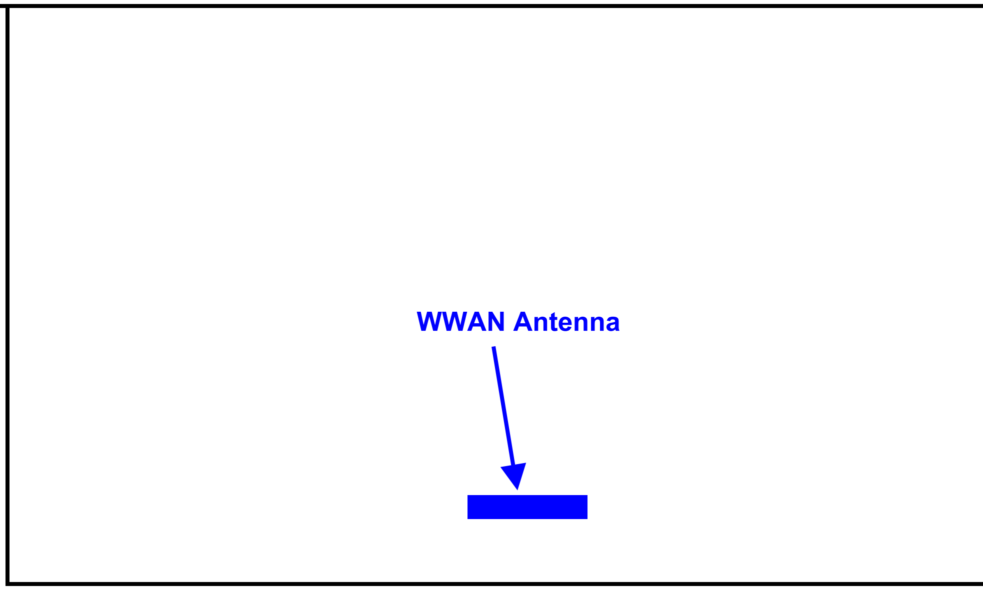
GPRS 4 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128	824.20			
192	837.00	0.072	-0.002	0.072
251	848.80			

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.

8.1.1.2 EGPRS, WCDMA, & WCDMA + HSDPA



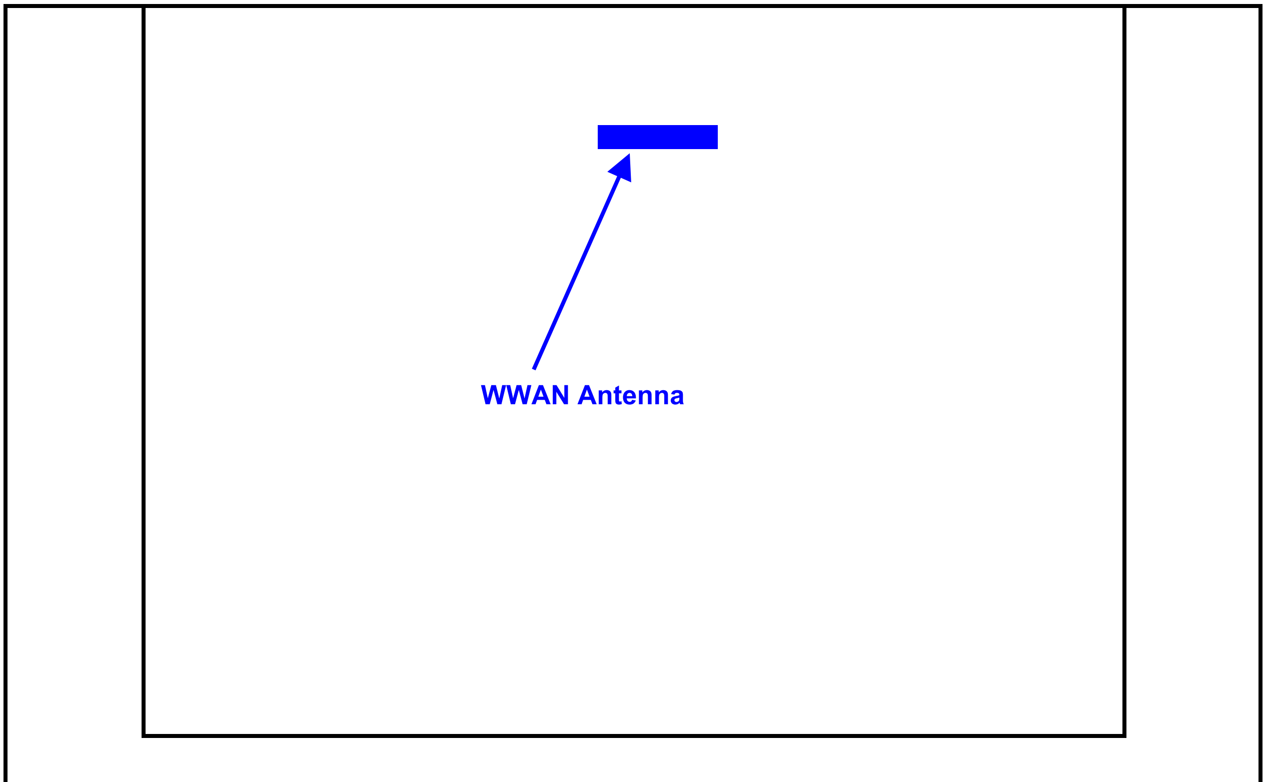
EGPRS 3 slots				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
128	824.20	0.037	0.103	0.036
192	837.00			
251	848.80			
WCDMA 12.2k RMC				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
4132	826.40	0.043	-0.215	0.045
4184	836.40			
4233	846.60			
WCDMA 12.2k RMC + HSDPA				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
4132	826.40	0.040	0.000	0.040
4184	836.40			
4233	846.60			

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 SECONDARY PORTRAIT

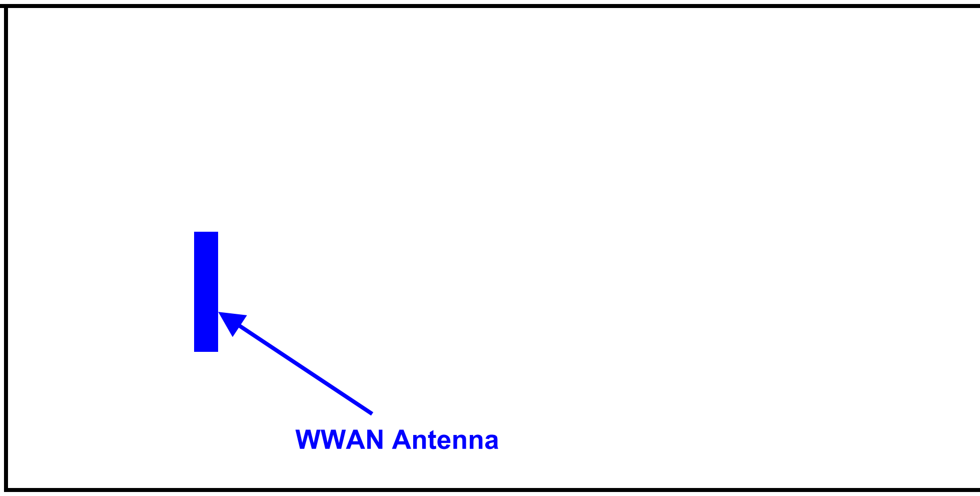
This position is skipped since the WWAN is disabled at this configuration by a Toshiba software tool.



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 PRIMARY LANDSCAPE



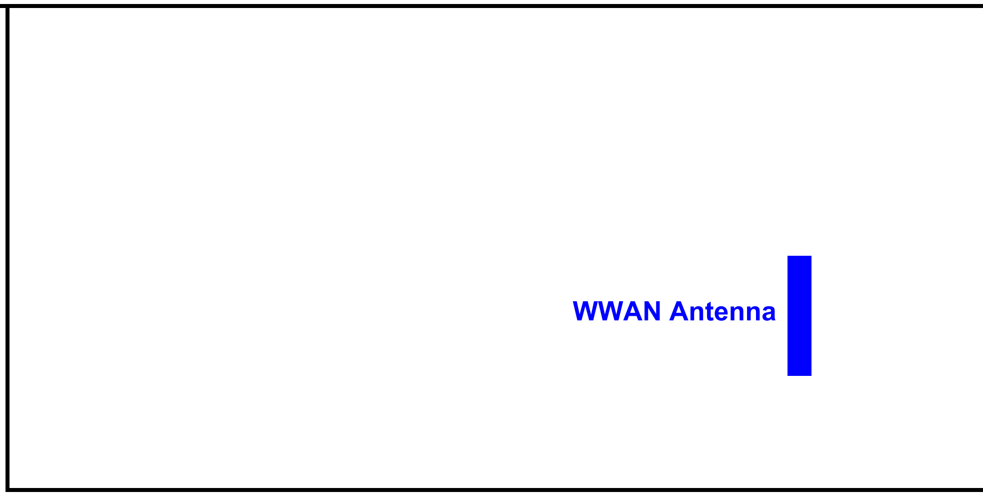
GPRS 3 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128	824.20	0.014	0.000	0.014
192	837.00			
251	848.80			

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.
3) EGPRS, WCDMA and WCDMA + HSDPA modes are skipped since SAR Values are too low.

8.1.4 SECONDARY LANDSCAPE



GPRS 3 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128	824.20	0.068	-0.154	0.070
192	837.00			
251	848.80			

EGPRS 3 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
128	824.20	0.037	0.000	0.037
192	837.00			
251	848.80			

WCDMA 12.2k RMC

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
4132	826.40	0.028	0.000	0.028
4184	836.40			
4233	846.60			

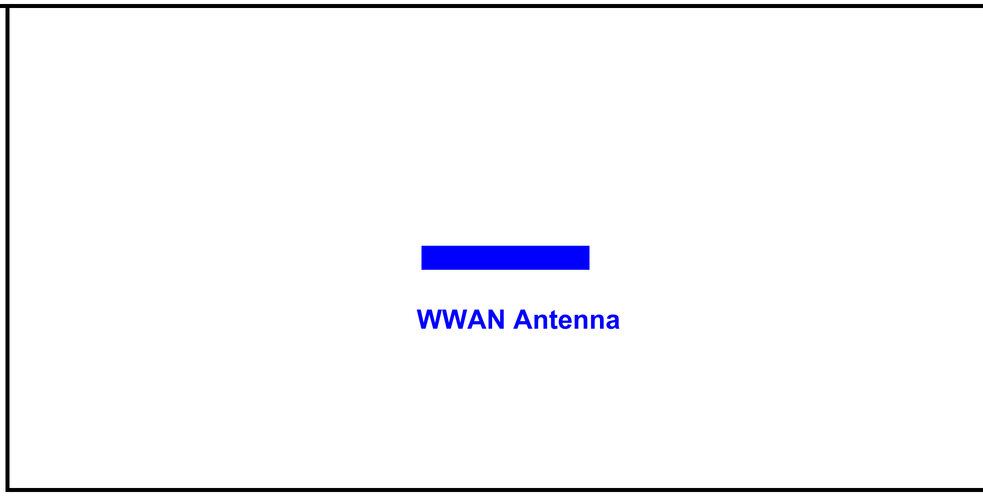
WCDMA 12.2k RMC + HSDPA

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
4132	826.40	0.027	0.000	0.027
4184	836.40			
4233	846.60			

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.

8.1.5 LAPHELD



GPRS 3 slots				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1)] SAR 1g (mW/g)**
128	824.20			
192	837.00	0.058	-0.132	0.059
251	848.80			

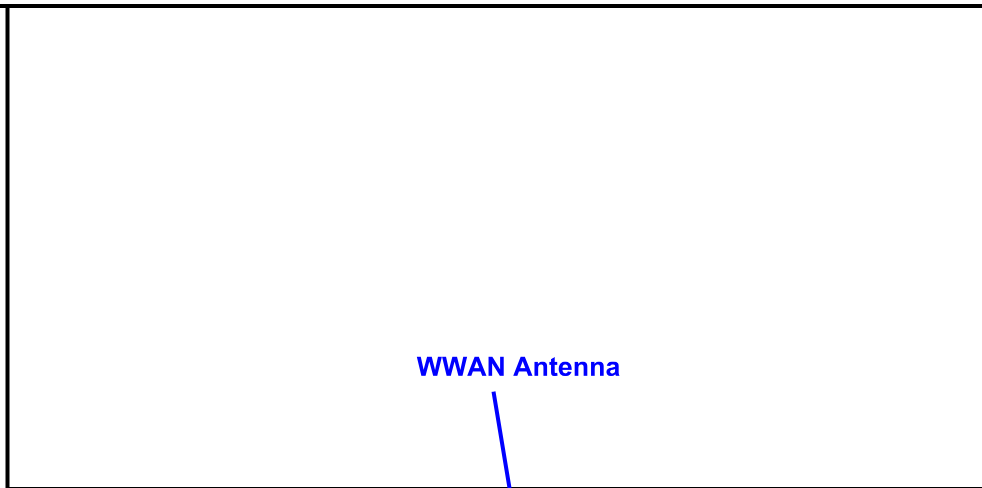
Notes:

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.
3) EGPRS, WCDMA and WCDMA + HSDPA modes are skipped since SAR Values are too low.

8.2 PCS BAND

8.2.1 PRIMARY PORTRAIT

8.2.1.1 GPRS



GPRS 1 slot				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
512 661 810	1850.20 1880.00 1909.80	0.086	0.000	0.086

GPRS 2 slots				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
512 661 810	1850.20 1880.00 1909.80	0.167	-0.167	0.174

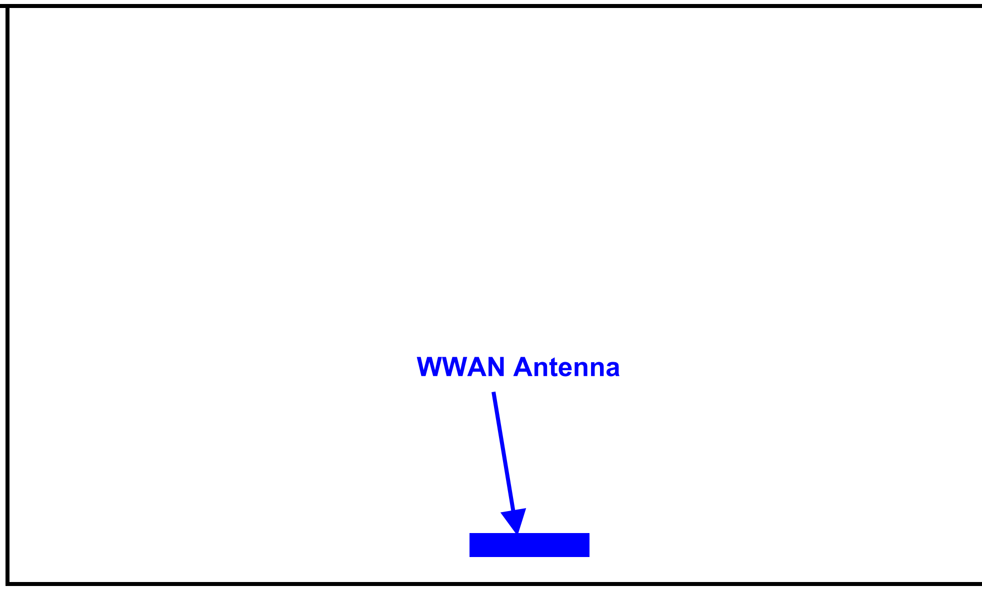
GPRS 3 slots				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
512 661 810	1850.20 1880.00 1909.80	0.236	-0.166	0.245

GPRS 4 slots				
Channel	**f (MHz)**	**Measured SAR 1g (mW/g)**	**Power Drift (dB)**	**Extrapolated[1] SAR 1g (mW/g)**
512	**1850.20**	**0.360**	**-0.190**	**0.376**
661	1880.00	0.313	-0.170	0.325
810	1909.80	0.236	-0.103	0.242

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.

8.2.1.2 EGPRS, WCDMA, & WCDMA + HSDPA



EGPRS 4 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512 661 810	1850.20 1880.00 1909.80	0.172	-0.166	0.179

WCDMA 12.2k RMC

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
9262 9400 9538	1852.40 1880.00 1907.60	0.086	-0.171	0.089

WCDMA 12.2k RMC + HSDPA

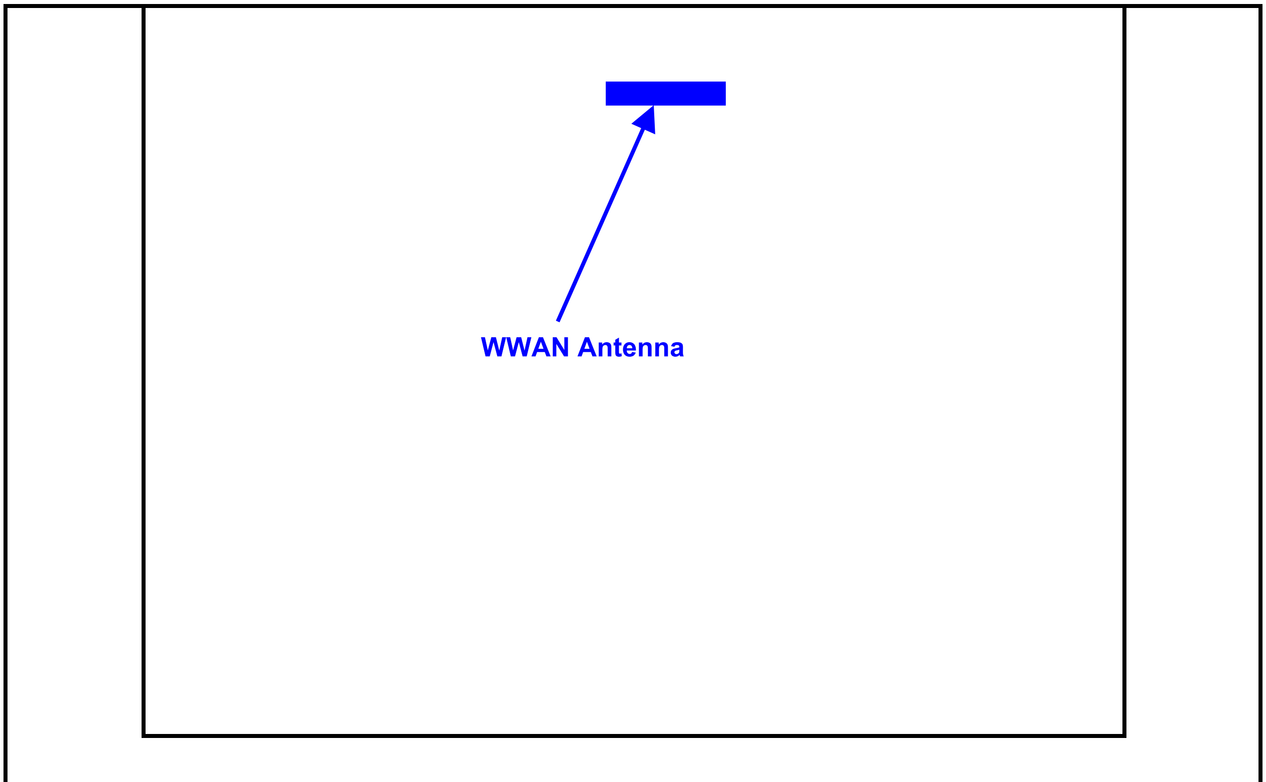
Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
9262 9400 9538	1852.40 1880.00 1907.60	0.024	-0.159	0.025

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 SECONDARY PORTRAIT

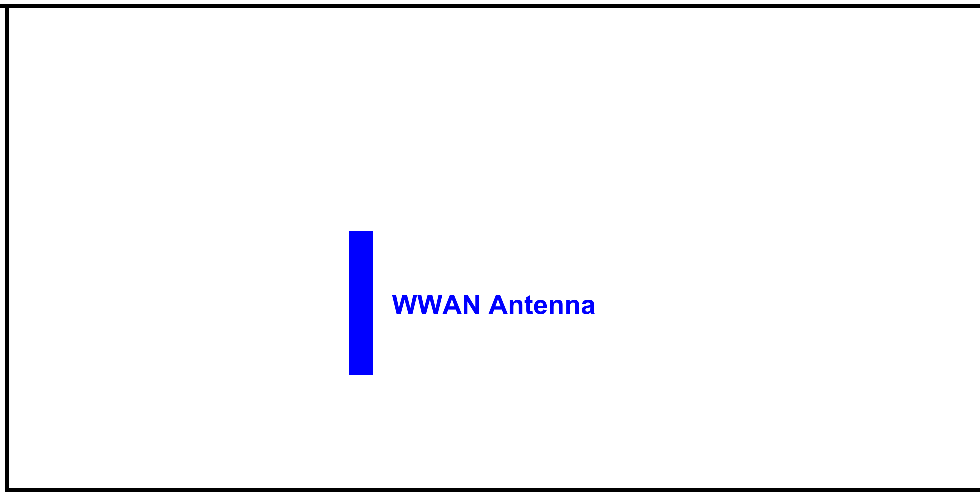
This position is skipped since the WWAN is disabled at this configuration by a Toshiba software tool.



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 PRIMARY LANDSCAPE



GPRS 4 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512 661 810	1850.20 1880.00 1909.80	0.051	0.000	0.051

EGPRS 4 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512 661 810	1850.20 1880.00 1909.80	0.027	0.000	0.027

WCDMA 12.2k RMC

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
9262 9400 9538	1852.40 1880.00 1907.60	0.012	0.000	0.012

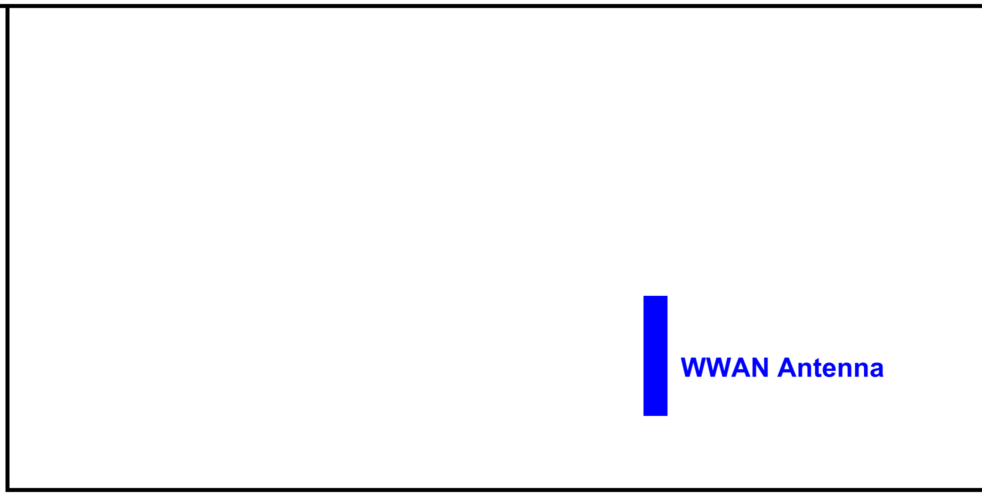
WCDMA 12.2k RMC + HSDPA

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
9262 9400 9538	1852.40 1880.00 1907.60	0.003	0.000	0.003

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 SECONDARY LANDSCAPE



GPRS 4 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512	1850.20			
661	1880.00	0.135	0.000	0.135
810	1909.80			

EGPRS 4 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512	1850.20			
661	1880.00	0.069	-0.084	0.070
810	1909.80			

WCDMA 12.2k RMC

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
9262	1852.40			
9400	1880.00	0.031	-0.120	0.032
9538	1907.60			

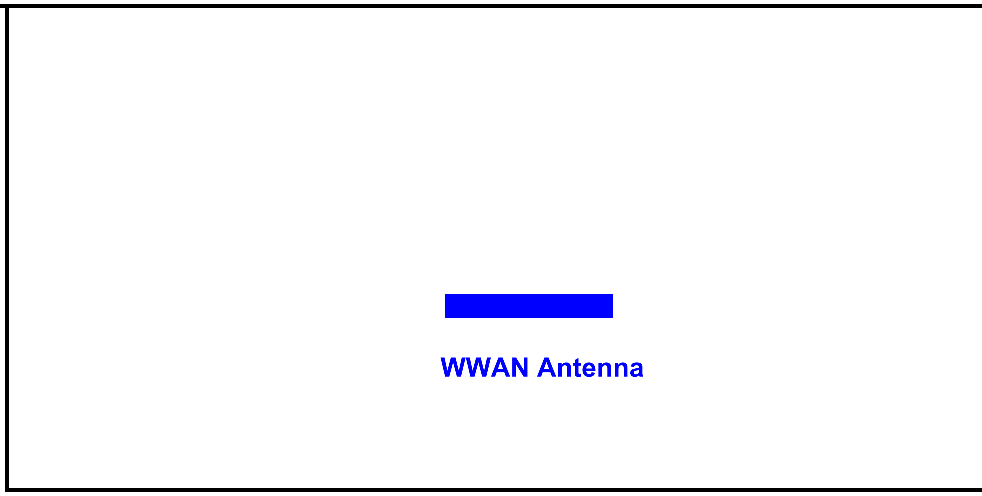
WCDMA 12.2k RMC + HSDPA

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
9262	1852.40			
9400	1880.00	0.008	0.000	0.008
9538	1907.60			

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.

8.2.5 LAPHELD



GPRS 4 slots

Channel	f (MHz)	Measured SAR 1g (mW/g)	Power Drift (dB)	Extrapolated[1)] SAR 1g (mW/g)
512	1850.20			
661	1880.00	0.037	0.000	0.037
810	1909.80			

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.
3) EGPRS, WCDMA and WCDMA + HSDPA modes are skipped since SAR Values are too low.

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		
				MM	DD	Year
Robot - Six Axes	Stäubli	RX90BL	N/A	N/A		
Robot Remote Control	Stäubli	CS7MB	3403-91535	N/A		
DASY4 Measurement Server	SPEAG	SEUMS001BA	1041	N/A		
Probe Alignment Unit	SPEAG	LB (V2)	261	N/A		
SAM Phantom (SAM1)	SPEAG	TP-1185	QD000P40CA	N/A		
SAM Phantom (SAM2)	SPEAG	TP-1015	N/A	N/A		
Electronic Probe kit	HP	85070C	N/A	N/A		
S-Parameter Network Analyzer	Agilent	8753ES-6	US39173569	2	14	2008
E-Field Probe	SPEAG	EX3DV4	3552	5	30	2007
Thermometer	ERTCO	639-1S	1718	11	7	2007
Data Acquisition Electronics	SPEAG	DAE3 V1	427	11	16	2007
System Validation Dipole	SPEAG	D835V2	4d002	1	23	2008
System Validation Dipole	SPEAG	D1900V2	5d043	1	29	2008
Power Meter	HP	438A	3513U04320	9	4	2007
Amplifier	Mini-Circuits	ZHL-42W	D072701-5	N/A		
Radio Communication Tester	R &S	CMU 200	838114/032	3	21	2007
Radio Communication Tester	Agilent	E5515C	GB46160222	6	29	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		

END OF REPORT