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Issue Date : December 27, 2012

TEST REPORT (SAR EVALUATION)

Applicant	:	Sharp Corporation, Communication Systems Group
Address	:	2-13-1, Iida, Hachihonmatsu, Higashi-Hiroshima City, Hiroshima, 739-0192, Japan
Products	:	Cellular Phone
Model No.	:	202SHe
Serial No.	:	004401/11/466107/3
FCC ID	:	APYHRO00183
Test Standard	:	FCC/OET Bulletin 65 Supplement C (Edition 01-01)
Test Results	:	**Passed**
Date of Test	:	December 13, 2012

Lab Accreditation
VLAC-001-2

Kousei Shibata
Manager
Japan Quality Assurance Organization
KITA-KANSAI Testing Center
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan, National Institute of Information and Communications Technology (NICT) of Japan , and Laboratory for EMF and Microwave Electronics at the Swiss Federal Institute of Technology (ETH) in Zürich, Switzerland.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
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- VLAC does not approve, certify or warrant the product by this test report.

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1 Description of the Device Under Test (DUT)

1.	Manufacturer	:	Sharp Corporation, Communication Systems Group 2-13-1, Iida, Hachihonmatsu, Higashi-Hiroshima City, Hiroshima, 739-0192, Japan
2.	Products	:	Cellular Phone
3.	Model No.	:	202SHe
4.	Serial No.	:	004401/11/466107/3
5.	Product Type	:	Pre-production
6.	Date of Manufacture	:	November, 2012
7.	Transmitting Frequency	:	1850.2 MHz – 1909.8 MHz (PCS 1900) 2402 MHz – 2480 MHz (Bluetooth)
8.	Battery Option	:	Lithium-ion Battery Pack SHBCU1 (770mAh)
9.	Power Rating	:	4.0VDC
10.	EUT Grounding	:	None
11.	Device Category	:	Portable Device (§2.1093)
12.	Exposure Category	:	General Population/Uncontrolled Exposure
13.	FCC Rule Part(s)	:	24(E), 15.247
14.	EUT Authorization	:	Certification
15.	Received Date of DUT	:	December 7, 2012

2 Summary of Test Results

Applied Standard : FCC/OET Bulletin 65 Supplement C (Edition 01-01)
Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields
Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions

Band	Test Configuration	Reported 1 g SAR (W/kg)	Limit (W/kg)
PCS 1900	Head	0.27	1.6
	Body	0.23	
Simultaneous transmission condition		0.38	

The test results are passed for exposure limits specified in ANSI/IEEE Std. C95.1–1991.

In the approval of test results,
- Determining compliance with the limits in this report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- No deviations were employed from the applied standard.
- No modifications were conducted by JQA to achieve compliance to the limitations.

Reviewed by:

Shigeru Kinoshita
Deputy Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

Tested by:

Yasuhisa Sakai
Deputy Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

3 Test Procedure

The tests documented in this report were performed in accordance with FCC/OET Bulletin 65 Supplement C (Edition 01-01), IEEE Std.1528–2003 and the following KDB Procedures.

447498 D01 General RF Exposure Guidance v05
648474 D04 SAR Handsets Multi Xmiter and Ant v01
865664 D01 SAR measurement 100 MHz to 6 GHz v01
865664 D02 SAR Reporting v01
941225 D03 SAR Test Reduction GSM GPRS EDGE v01

4 Test Location

Japan Quality Assurance Organization (JQA)
KITA-KANSAI Testing Center
7-7, Ishimaru, 1-chome, Minoh-shi, Osaka, 562-0027, Japan
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

5 Recognition of Test Laboratory

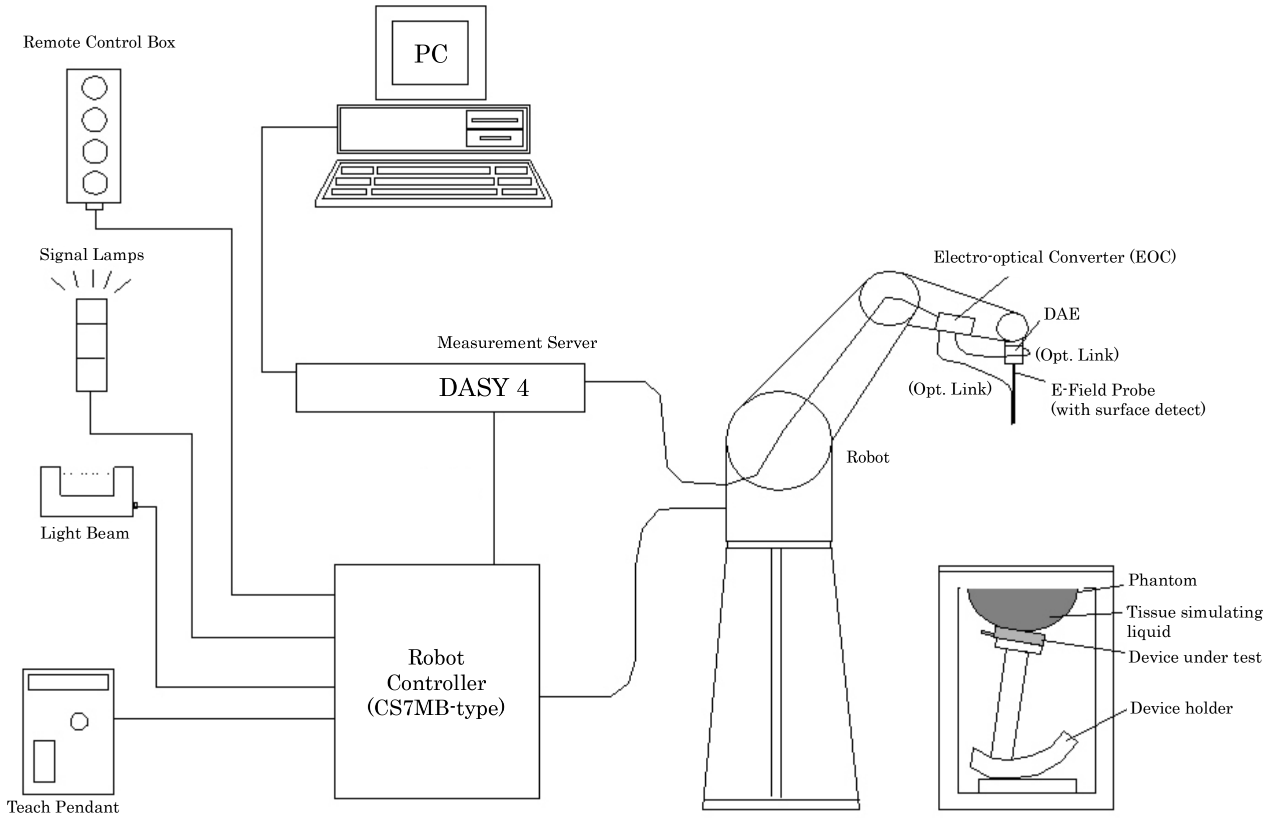
JQA KITA-KANSAI Testing Center SAITO EMC Branch is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility is registered by the following bodies.

VLAC Accreditation No.	:	VLAC-001-2 (Expiry date : March 30, 2014)
VCCI Registration No.	:	A-0002 (Expiry date : March 30, 2014)
BSMI Registration No.	:	SL2-IN-E-6006, SL2-A1-E-6006 (Expiry date : September 14, 2013)
IC Registration No.	:	2079E-3, 2079E-4 (Expiry date : July 20, 2014)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI.
(Expiry date : February 22, 2013)

6 Measurement System Diagram

These measurements are performed using the DASY4 automated dosimetric assessment system (manufactured by Schmid & Partner Engineering AG (SPEAG) in Zürich, Switzerland). It consists of high precision robotics system, cell controller system, DASY4 measurement server, personal computer with DASY4 software, data acquisition electronic (DAE) circuit, the Electro-optical converter (EOC), near-field probe, and the twin SAM phantom containing the equivalent tissue. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF).
The Robot is connected to the cell controller to allow software manipulation of the robot. The DAE is connected to the EOC. The DAE performs the signal amplification, signal multiplexing, A/D conversion, offset measurements, mechanical surface detection, collision detection, etc. The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the DASY4 measurement server.



7 System Components

7.1 Probe Specification ET3DV6

Construction : Symmetrical design with triangular core
Built-in optical fiber for surface detection system
Built-in shielding against static changes
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)

Calibration : In air form 10 MHz to 2.3 GHz
In head tissue simulating liquid (HSL) and
muscle tissue simulating liquid
835 MHz (accuracy ± 12.0%; k=2)
900 MHz (accuracy ± 12.0%; k=2)
1450 MHz (accuracy ± 12.0%; k=2)
1750 MHz (accuracy ± 12.0%; k=2)
1900 MHz (accuracy ± 12.0%; k=2)
1950 MHz (accuracy ± 12.0%; k=2)

Frequency : 10 MHz to 2.3 GHz
Linearity: ± 0.2 dB (30 MHz to 2.3 GHz)

Directivity : ± 0.2 dB in HSL (rotation around probe axis)
± 0.4 dB in HSL (rotation normal to probe axis)

Dynamic Range : 5 µW/g to >100 mW/g; Linearity: ± 0.2 dB

Surface Detection : ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces

Dimensions : Overall length 337 mm
Tip length 16 mm
Body diameter 12 mm
Tip diameter 6.8 mm
Distance from probe tip to dipole centers 2.7 mm

7.2 Probe Specification EX3DV4

Construction	:	Symmetrical design with triangular core Built-in shielding against static changes PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	:	In air form 10 MHz to 6 GHz In head tissue simulating liquid (HSL) and muscle tissue simulating liquid 2450 MHz (accuracy ± 12.0%; k=2) 2600 MHz (accuracy ± 12.0%; k=2) 5200 MHz (accuracy ± 13.1%; k=2) 5300 MHz (accuracy ± 13.1%; k=2) 5500 MHz (accuracy ± 13.1%; k=2) 5600 MHz (accuracy ± 13.1%; k=2) 5800 MHz (accuracy ± 13.1%; k=2)
Frequency	:	10 MHz to 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	:	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	:	10 μW/g to >100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 μW/g)
Dimensions	:	Overall length 337 mm Tip length 20 mm Body diameter 12 mm Tip diameter 2.5 mm Distance from probe tip to dipole centers 1 mm

7.3 Twin SAM Phantom

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Shell Thickness	:	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	:	Volume Approx. 25 liters
Dimensions	:	810 × 1000 × 500 mm (H × L × W)

7.4 ELI4 Flat Phantom

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

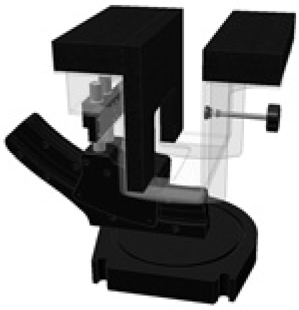
Shell Thickness	:	2 ± 0.2 mm (sagging: <1%)
Filling Volume	:	Volume Approx. 30 liters
Dimensions	:	Major ellipse axis : 600 mm
		Minor axis : 400 mm

7.5 Mounting Device for Transmitters

In combination with the Twin SAM Phantom V4.0/V4.0c or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat point).

7.6 Laptop Extensions Kit for Mounting Device

Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.) It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI4 and SAM v6.0 Phantoms.



7.7 Typical Composition of Ingredients for Liquid Tissue

Ingredients (% by weight)	Frequency (MHz)					
	835		1900		2450	
	Head	Body	Head	Body	Head	Body
Water	41.45	52.40	54.90	40.40	62.70	73.20
Salt (NaCl)	1.45	1.40	0.18	0.50	0.50	0.04
Sugar	56.00	45.00	0.00	58.00	0.00	0.00
HEC	1.00	1.00	0.00	1.00	0.00	0.00
Bactericide	0.10	0.10	0.00	0.10	0.00	0.00
Triton X-100	0.00	0.00	0.00	0.00	36.80	0.00
DGBE	0.00	0.00	44.92	0.00	0.00	26.70

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-tetramethylbuthyl)phenyl]ether

The composition of ingredients is according to FCC/OET Bulletin 65 Supplement C.

8 Measurement Process

Step 1 : Power Reference Measurement

The power reference job measures the field at a specified reference position, at a selectable distance from the phantom surface. The reference position can be either the selected section's grid reference point or a user point in this section. The reference job projects the selected point onto the phantom surface, orients the probe perpendicularly to the surface, and approaches the surface using the selected detection method. The minimum distance of probe sensors to surface set to 4 mm for an ET3DV6 probe, or 2 mm for EX3DV4 probe. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

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 DASY software can find the maximum locations 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. If only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maxima within 2 dB of the maximum SAR value 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 points specified in standards within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure.

Step 4 : 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 : Power Drift Measurement

The power drift measurement measures the field at the same location as the most recent power reference measurement job 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. The power reference measurement and power drift measurement are for monitoring the power drift of the device under test in the batch process.

9 Measurement Uncertainties

9.1 300 MHz to 3 GHz

Uncertainty Component	Tol. (± %)	Prob. Dist.	Div.	c_i (1g)	c_i (10g)	Std. Unc. (± %) 1g	Std. Unc. (± %) 10g	v_i
Measurement System								
Probe calibration	6.0	N	1	1	1	6.0	6.0	∞
Axial isotropy	4.7	R	√3	0.7	0.7	1.9	1.9	∞
Hemispherical isotropy	9.6	R	√3	0.7	0.7	3.9	3.9	∞
Boundary effect	1.0	R	√3	1	1	0.6	0.6	∞
Linearity	4.7	R	√3	1	1	2.7	2.7	∞
System detection limits	1.0	R	√3	1	1	0.6	0.6	∞
Readout electronics	0.3	N	1	1	1	0.3	0.3	∞
Response time	0.8	R	√3	1	1	0.5	0.5	∞
Integration time	2.6	R	√3	1	1	1.5	1.5	∞
RF ambient conditions – noise	3.0	R	√3	1	1	1.7	1.7	∞
RF ambient conditions – reflections	3.0	R	√3	1	1	1.7	1.7	∞
Probe positioner mechanical tolerance	0.4	R	√3	1	1	0.2	0.2	∞
Probe positioning with respect to phantom shell	2.9	R	√3	1	1	1.7	1.7	∞
Extrapolation, interpolation and integration algorithms for max. SAR evaluation	1.0	R	√3	1	1	0.6	0.6	∞
Test Sample Related								
Test sample positioning	3.4	N	1	1	1	3.4	3.4	23
Device holder uncertainty	2.9	N	1	1	1	2.9	2.9	5
Output power variation – SAR drift measurement	5.0	R	√3	1	1	2.9	2.9	∞
Phantom and Tissue Parameters								
Phantom uncertainty	4.0	R	√3	1	1	2.3	2.3	∞
Liquid conductivity – deviation from target	5.0	R	√3	0.64	0.43	1.8	1.2	∞
Liquid Conductivity – measurement uncertainty	3.2	N	1	0.64	0.43	2.0	1.4	5
Liquid Permittivity – deviation from target	5.0	R	√3	0.6	0.49	1.7	1.4	∞
Liquid Permittivity – measurement uncertainty	3.0	N	1	0.6	0.49	1.8	1.5	5
Combined Standard Uncertainty		RSS				11.0	10.8	
Expanded Uncertainty (95% Confidence Interval)		k=2				**22.1**	**21.5**	

NOTES
1. Tol. : tolerance in influence quantity
2. Prob. Dist. : probability distributions
3. N, R : normal, rectanglar
4. Div. : divisor used to obtain standard uncertainty
5. c_i : sensitivity coefficient
6. Std. Unc. : standard uncertainty
7. Measurement uncertainties are according to IEEE Std. 1528 and IEC 62209-1.

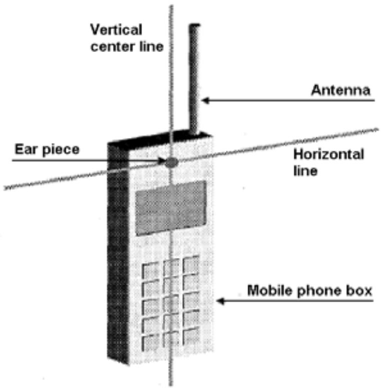
9.2 3 GHz to 6 GHz

Uncertainty Component	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i (1g)**	**c_i (10g)**	**Std. Unc. (± %)**		**v_i**
						1g	**10g**	
Measurement System								
Probe calibration	6.6	N	1	1	1	6.6	6.6	∞
Axial isotropy	4.7	R	√3	0.7	0.7	1.9	1.9	∞
Hemispherical isotropy	9.6	R	√3	0.7	0.7	3.9	3.9	∞
Boundary effect	2.0	R	√3	1	1	1.2	1.2	∞
Linearity	4.7	R	√3	1	1	2.7	2.7	∞
System detection limits	1.0	R	√3	1	1	0.6	0.6	∞
Readout electronics	0.3	N	1	1	1	0.3	0.3	∞
Response time	0.8	R	√3	1	1	0.5	0.5	∞
Integration time	2.6	R	√3	1	1	1.5	1.5	∞
RF ambient conditions – noise	3.0	R	√3	1	1	1.7	1.7	∞
RF ambient conditions – reflections	3.0	R	√3	1	1	1.7	1.7	∞
Probe positioner mechanical tolerance	0.8	R	√3	1	1	0.5	0.5	∞
Probe positioning with respect to phantom shell	9.9	R	√3	1	1	5.7	5.7	∞
Extrapolation, interpolation and integration algorithms for max. SAR evaluation	4.0	R	√3	1	1	2.3	2.3	∞
Test Sample Related								
Test sample positioning	3.4	N	1	1	1	3.4	3.4	23
Device holder uncertainty	2.9	N	1	1	1	2.9	2.9	5
Output power variation – SAR drift measurement	5.0	R	√3	1	1	2.9	2.9	∞
Phantom and Tissue Parameters								
Phantom uncertainty	4.0	R	√3	1	1	2.3	2.3	∞
Liquid conductivity – deviation from target	5.0	R	√3	0.64	0.43	1.8	1.2	∞
Liquid Conductivity – measurement uncertainty	3.2	N	1	0.64	0.43	2.0	1.4	5
Liquid Permittivity – deviation from target	5.0	R	√3	0.6	0.49	1.7	1.4	∞
Liquid Permittivity – measurement uncertainty	3.0	N	1	0.6	0.49	1.8	1.5	5
Combined Standard Uncertainty		RSS				12.8	12.6	
Expanded Uncertainty (95% Confidence Interval)		k=2				**25.7**	**25.2**	

NOTES
1. Tol. : tolerance in influence quantity
2. Prob. Dist. : probability distributions
3. N, R : normal, rectanglar
4. Div. : divisor used to obtain standard uncertainty
5. c_i : sensitivity coefficient
6. Std. Unc. : standard uncertainty
7. Measurement uncertainties are according to IEEE Std. 1528 and IEC 62209-1.

10 Test Arrangement

10.1 Cheek-Touch Position



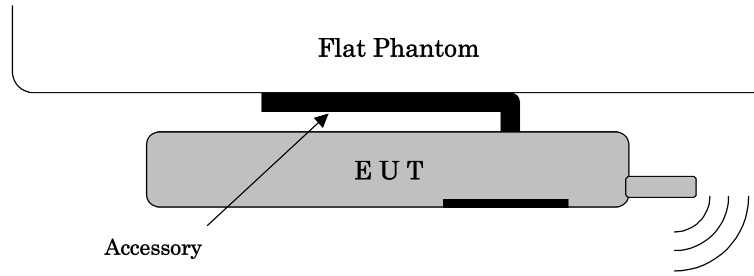
1. Position the device with the vertical center line of the body of the device and the horizontal line crossing the center of the ear piece in a plane parallel to the sagittal plane of the phantom.
2. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference points (M, RE and LE) and align the center of the ear piece with the line RE-LE.
3. Translate the mobile phone box towards the phantom with the ear piece aligned with the line RE-LE until the phone touches the ear.
4. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the box until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

10.2 Ear-Tilt Position

1. Position the device in the "Cheek-Touch Position".
2. While maintaining the device in the reference plane and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.

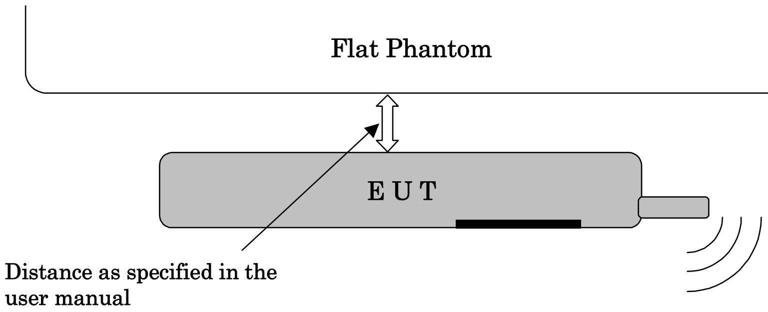
10.3 Body-worn Configuration

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. Both the physical spacing to the body of the user as dictated by the accessory and the materials used in an accessory affect the SAR produced by the transmitting device. For purpose of determining test requirements, accessories may be divided into two categories: those that do not contain metallic components and those that do.



When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only the accessory that dictates the closest spacing to the body must be tested.

Body-worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. A separation distance of 1.5 cm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances. Other separation distances may be used, but they should not exceed 2.5 cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.

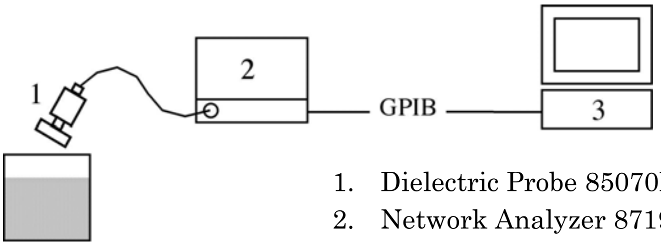


Lap-held device (e.g. laptop computer)
SAR is tested for a lap-held position with the bottom of the computer in direct contact against a flat phantom.

11 Tissue Verification

11.1 Tissue Verification Measurement Condition

The tissue dielectric parameters of the tissue medium at the middle of a device transmission band should be within ±5% of the parameters specified at that target frequency. It is verified by using the dielectric probe and the network analyzer.



1. Dielectric Probe 85070D
2. Network Analyzer 8719ET
3. Personal Computer

11.2 Tissue Verification Results

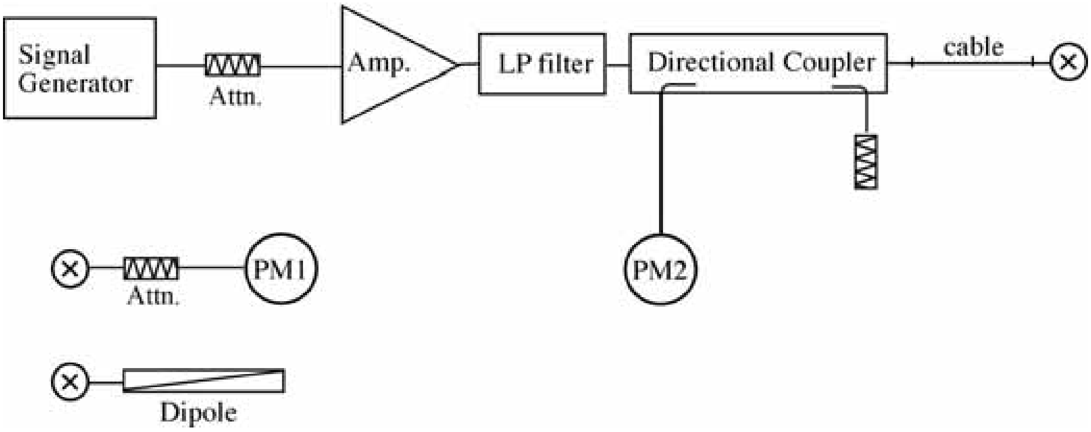
Date	Frequency [MHz]	Parameters	Target	Measured	Deviation [%]	Limit [%]
12/13/2012	Head 1900	Permittivity (ε_r)	40.0	40.09	+0.23	± 5
		Conductivity (σ)	1.40	1.398	-0.14	± 5
12/13/2012	Body 1900	Permittivity (ε_r)	53.3	52.38	-1.73	± 5
		Conductivity (σ)	1.52	1.526	+0.39	± 5

12 System Validation

12.1 System Validation Measurement Condition

The power meter PM1 (including Attenuator) measures the forward power at the location of the validation dipole connector. The signal generator is adjusted for 250 mW at the dipole connector and the power meter PM2 is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2.

The dipole antenna is matched to be used near flat phantom filled with tissue simulating solution. A specific distance holder is used in the positioning of the antenna to ensure correct spacing between the phantom and the dipole.



12.2 System Validation Results

Date	System Dipole		Liquid	Measured SAR [W/kg] (Normalized to 1 W)		Target	Deviation [%]	Limit [%]
	Type	Serial						
12/13/2012	D1900V2	5d112	Head	1 g	39.16	39.6	-1.11	± 10
				10 g	20.64	20.9	-1.24	± 10
12/13/2012	D1900V2	5d112	Body	1 g	39.16	40.5	-3.31	± 10
				10 g	20.92	21.5	-2.70	± 10

13 RF Output Power Measurements

13.1 PCS 1900

To setup the desire channel frequency and the maximum output power, a Radio Communication Tester was used to program the DUT.

GSM/GPRS Settings

Settings	Mode	Parameter
General Settings	Band Indicator	PCS 1900
	Power Control Level	0 (30 dBm)
GPRS Specific Settings	Connection Type	Test Mode A
	Multi Slot Class	10 (4 down / 2 up / 5 sum)
	Coding Scheme	CS1 (GMSK)

Conducted power measurement results

Mode		Conducted Power (dBm)		
		512 ch (1850.2 MHz)	661 ch (1880.0 MHz)	810 ch (1909.8 MHz)
GSM	Burst Avg.	29.05	28.87	28.83
	Frame Avg.	20.02	19.84	19.80
GPRS (1 slot)	Burst Avg.	29.05	28.87	28.83
	Frame Avg.	20.02	19.84	19.80
GPRS (2 slot)	Burst Avg.	27.07	27.11	26.97
	Frame Avg.	21.05	21.09	20.95

Note(s):
KDB 941225 D03 – The worst-case configuration for SAR testing is determined to be as follows.

1. Body : GPRS mode with 2 time slots, based on the output power above
2. Head : GSM voice mode (VoIP not applicable)

13.2 Bluetooth

For the Bluetooth operation, the client supplied a special driving program to program the DUT to continually transmit the specified maximum power.

Modulation type : Frequency Hopping Spread Spectrum (FHSS)
Transmitting Frequency : 2402 MHz (0 ch) – 2480 MHz (78 ch)
RF Output Power : Max. 2.5 mW (Class 2)

13.3 Standalone SAR Test Exclusion Considerations (KDB 447498 D01)

The 1 g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by;
[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0, where

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz.
- Power and distance are rounded to the nearest mW and mm before calculation.
- The result is rounded to one decimal place for comparison.
- When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied.

Band	Frequency (MHz)	Max. Power		Test Position	Distance (mm)	Threshold	Test Exclusion
		(dBm)	(mW)				
Bluetooth	2441	4.0	2.5	Head	< 5	0.8	YES
				Body	15	0.3	YES

14 SAR Measurements

14.1 PCS 1900

14.1.1 Head

GSM Voice – Duty Cycle 12.0%							
Test Position	Ch#	Frequency [MHz]	Power [dBm]		1 g SAR [W/kg]		Note
			Tune-up Limit	Measured	Measured	Scaled	
Left Touched	512	1850.2	29.8	29.05			1
	661	1880.0	29.8	28.87	0.196	0.243	
	810	1909.8	29.8	28.83			1
Left Tilted	512	1850.2	29.8	29.05			1
	661	1880.0	29.8	28.87	0.074	0.092	
	810	1909.8	29.8	28.83			1
Right Touched	512	1850.2	29.8	29.05			1
	661	1880.0	29.8	28.87	0.220	0.273	
	810	1909.8	29.8	28.83			1
Right Tilted	512	1850.2	29.8	29.05			1
	661	1880.0	29.8	28.87	0.083	0.103	
	810	1909.8	29.8	28.83			1

NOTE(S) :

1. KDB 447498 D01 – Testing of other required channels within the operating mode of a frequency band is not required when the reported 1 g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg when the transmission band is ≥ 200 MHz

14.1.2 Body w/ 1.5 cm (body-worn accessory mode)

GPRS 2 slot (CS1) – Duty Cycle 24.0%							
Test Position	Ch#	Frequency [MHz]	Power [dBm]		1 g SAR [W/kg]		Note
			Tune-up Limit	Measured	Measured	Scaled	
Front Side	512	1850.2	27.8	27.07			1
	661	1880.0	27.8	27.11	0.189	0.222	
	810	1909.8	27.8	26.97			1
Rear Side	512	1850.2	27.8	27.07			1
	661	1880.0	27.8	27.11	0.196	0.230	
	810	1909.8	27.8	26.97			1

NOTE(S) :

1. KDB 447498 D01 – Testing of other required channels within the operating mode of a frequency band is not required when the reported 1 g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg when the transmission band is ≥ 200 MHz
2. KDB 648474 D04 – When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band is repeated for that body-worn accessory with a headset attached to the handset.

14.2 Simultaneous Transmission SAR Analysis (KDB 447498 D01)

14.2.1 Simultaneous Transmission Condition

WWAN can transmit simultaneously with Bluetooth.

No.	Conditions
1	PCS 1900 + Bluetooth

14.2.2 Antenna Separation Distances

WWAN to Bluetooth : 80 mm

14.2.3 Standalone SAR Estimation

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
[(*max. power of channel, including tune-up tolerance, mW*) / (*min. test separation distance, mm*)] · [$\sqrt{f_{(GHz)}}$ / 7.5] W/kg for 1 g SAR, *test separation distances* ≤ 50 mm
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied.

Band	Frequency (MHz)	Max. Power		Test Position	Distance (mm)	Estimated SAR (W/kg)
		(dBm)	(mW)			
Bluetooth	2441	4.0	2.5	Head	< 5	0.104
				Body	15	0.035

14.2.4 Sum of the SAR for WWAN + Bluetooth

14.2.4.1 Head

Sum of the SAR with Measured Values

Test Position	Highest 1 g SAR (W/kg)			Σ 1 g SAR (W/kg)
	WWAN		Bluetooth	
Left Touched	PCS1900	0.243	0.104	0.347
Left Tilted	PCS1900	0.092	0.104	0.196
Right Touched	PCS1900	0.273	0.104	0.377
Right Tilted	PCS1900	0.103	0.104	0.207

SAR to Peak Location Separation Ratio (SPLSR)

As the sum of the 1 g SAR is < 1.6 W/kg, SPLSR assessment is not required.

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1 g SAR is < 1.6 W/kg.

14.2.4.2 Body w/ 1.5 cm (body-worn accessory mode)

Sum of the SAR with Measured Values

Test Position	Highest 1 g SAR (W/kg)			Σ 1 g SAR (W/kg)
	WWAN		Bluetooth	
Front Side	PCS1900	0.222	0.035	0.257
Rear Side	PCS1900	0.230	0.035	0.265

SAR to Peak Location Separation Ratio (SPLSR)

As the sum of the 1 g SAR is < 1.6 W/kg, SPLSR assessment is not required.

Conclusion:

Simultaneous transmission SAR measurement (Volume Scan) is not required because the sum of the 1 g SAR is < 1.6 W/kg.

16 Test Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
E-Field Probe	ET3DV6	SPEAG	S-2	2012/8	1 Year
DAE	DAE4	SPEAG	S-3	2012/11	1 Year
Robot	RX60L	SPEAG	S-7	------	N/A
Probe Alignment Unit	LB1RX60L	SPEAG	S-13	------	N/A
Network Analyzer	8719ET	Agilent	B-53	2012/9	1 Year
Dielectric Probe Kit	85070D	Agilent	B-54	------	N/A
1900MHz Dipole	D1900V2	SPEAG	S-25	2012/8	1 Year
Signal Generator	MG3681A	Anritsu	B-3	2012/9	1 Year
RF Power Amplifier	A0840-3833-R	R&K	A-34	------	N/A
Directional Coupler	4226-20	narda	D-87	------	N/A
Low Pass Filter	LSM2200-4BA	LARK	D-91	2012/11	1 Year
Radio Communication Analyzer	MT8820C	Anritsu	B-5	2012/2	1 Year
Power Meter	E4417A	Agilent	B-51	2012/6	1 Year
Power Sensor	E9323A	Agilent	B-59	2012/6	1 Year
Attenuator	2-20	Weinschel	D-36	2012/9	1 Year

17 Appendix

Exhibit	Contents	No. of page(s)
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