SAR TEST REPORT

HCT CO., LTD

EUT Type:	Slide GSM/UMTS Phone with Bluetooth
FCC ID:	APYNAR0068

Model:	STX-2	Trade Name	SHARP CORPORATION

Date of Issue:	Jan.05, 2010
Test report No.:	HCTA1001FS01
Test Laboratory:	HCT CO., LTD. SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI, KYOUNGKI-DO, 467-701, KOREA TEL: +82 31 639 8565 FAX: +82 31 639 8525
Applicant :	SHARP CORPORATION 22-22 Nagaike-cho, Abeno-ku, Osaka 545-8522 Japan TEL: +81 743 55 4091 FAX: +81 743 55 2553
Testing has been carried out in accordance with:	47CFR §2.1093 FCC OET Bulletin 65(Edition 97-01), Supplement C (Edition 01-01) ANSI/ IEEE C95.1 – 2005 IEEE 1528-2003
Test result:	The tested device complies with the requirements in respect of all parameters subject to the test. The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.

Signature	Report prepared by
	 : Sun-Hee Kim
	  Test Engineer of SAR Part Approved by
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1. INTRODUCTION

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-2005 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative of the incremental electromagnetic energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (r). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body.

$$S\,A\,R \;=\; \frac{d}{d\,t}\left(\frac{d\,U}{d\,m}\right) \;=\; \frac{d}{d\,t}\left(\frac{d\,U}{\rho\,d\,v}\right)$$

Figure 2. SAR Mathematical Equation

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR \;=\; \sigma E^2 / \rho$$

where:

σ = conductivity of the tissue-simulant material (S/m)
ρ = mass density of the tissue-simulant material (kg/m^3)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

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2. DESCRIPTION OF DEVICE

Environmental evaluation measurements of specific absorption rate (SAR) distributions in emulated human head and body tissues exposed to radio frequency (RF) radiation from wireless portable devices for compliance with the rules and regulations of the U.S. Federal Communications Commission (FCC).

EUT Type	Slide GSM/UMTS Phone with Bluetooth
FCC ID	APYNAR0068
Model(s)	STX-2
Trade Name	SHARP CORPORATION
Serial Number(s)	#1
Application Type	Certification
Modulation(s)	GSM850/GSM1900/WCDMA850/WCDMA1900
Tx Frequency	824.20 - 848.80 MHz (GSM850) 1 850.20 – 1 909.80 MHz (GSM1900) 826.4~846.6 MHz (WCDMA850) 1 852.4 – 1 907.6 MHz (WCDMA1900)
Rx Frequency	869.20 - 893.80 MHz (GSM850) 1 930.20 – 1 989.80 MHz (GSM1900) 871.4 - 891.6 MHz (WCDMA850) 1 932.4 – 1 987.6 MHz (WCDMA1900)
FCC Classification	Licensed Portable Transmitter Held to Ear (PCE)
Production Unit or Identical Prototype	Production Unit
Max SAR	0.468 W/kg GSM850 Head SAR / 1.18 W/kg GSM850 Body SAR 0.365 W/kg GSM1900 Head SAR / 0.433 W/kg GSM1900 Body SAR 0.294 W/kg WCDMA850 Head SAR / 0.407 W/kg WCDMA850 Body SAR 0.455 W/kg WCDMA1900 Head SAR / 0.289 W/kg WCDMA1900 Body SAR
Date(s) of Tests	Jan. 3, 2010 ~ Jan. 4, 2010
Antenna Type	Intenna

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3. DESCRIPTION OF TEST EQUIPMENT

3.1 SAR MEASUREMENT SETUP

These measurements are performed using the DASY4 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Staubli), robot controller, Pentium III computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure.3.1).

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC consists of the HP Pentium IV 3.0 GHz computer with Windows XP system and SAR Measurement Software DASY4, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.
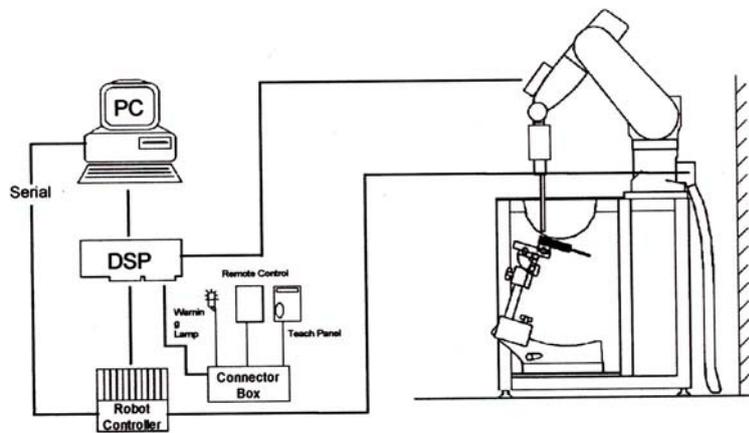
Figure 3.1 HCT SAR Lab. Test Measurement Set-up

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

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3.2 DASY E-FIELD PROBE SYSTEM

3.2.1 ET3DV6 Probe Specification

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection System Built-in shielding against static charges
Calibration	In air from 10 MHz to 2.5 GHz In brain and muscle simulating tissue at Frequencies of 450 MHz, 900 MHz and 1.8 GHz (accuracy: 8 %)
Frequency	10 MHz to > 6 GHz; Linearity: $\pm$ 0.2 dB (30 MHz to 3 GHz)
Directivity	$\pm$ 0.2 dB in brain tissue (rotation around probe axis) $\pm$ 0.4 dB in brain tissue (rotation normal probe axis)
Dynamic	5 μW/g to > 100 mW/g;
Range Linearity:	$\pm$ 0.2 dB
Surface Detection	$\pm$ 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces.
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dissymmetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

Figure 3.2 Photograph of the probe and the Phantom
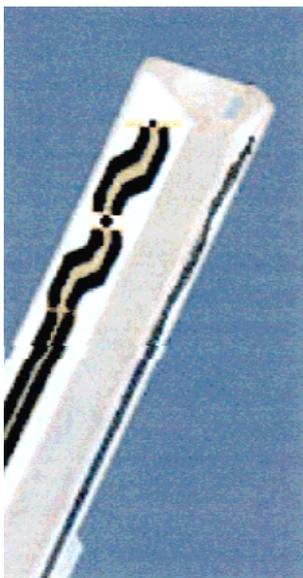
Figure 3.3 ET3DV6 E-field Probe

The SAR measurements were conducted with the dosimetric probe ET3DV6, designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches a maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped at reaching the maximum.

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3.3 PROBE CALIBRATION PROCESS

3.3.1 E-Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with an accuracy better than $\pm$ 10 %. The spherical isotropy was evaluated with the proper procedure and found to be better than $\pm$ 0.25 dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a waveguide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

where:

Δt = exposure time (30 seconds),

C = heat capacity of tissue (brain or muscle),

ΔT = temperature increase due to RF exposure.

SAR is proportional to $\Delta T/\Delta t$, the initial rate of tissue heating, before thermal diffusion takes place. Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E- field;

$$SAR = \frac{|E|^2 \cdot \sigma}{\rho}$$

where:

σ = simulated tissue conductivity,

ρ = Tissue density (1.25 g/cm^3 for brain tissue)

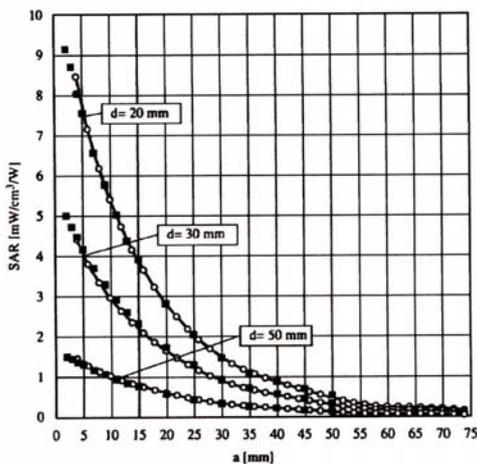Figure 3.4 E-Field and Temperature measurements at 900 MHz
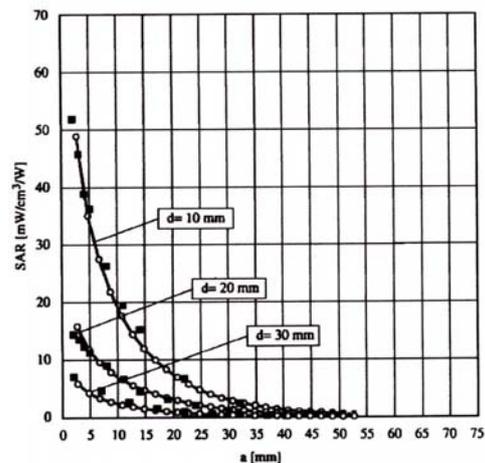
Figure 3.5 E-Field and temperature measurements at 1.8 GHz

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3.3.2 Data Extrapolation

The DASY4 software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given like below;

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

with
V_i = compensated signal of channel i (i=x,y,z)
U_i = input signal of channel i (i=x,y,z)
cf = crest factor of exciting field (DASY parameter)
dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes:

$$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

with
V_i = compensated signal of channel i (i = x,y,z)
$Norm_i$ = sensor sensitivity of channel i (i = x,y,z)
$\mu V/(V/m)^2$ for E-field probes
ConvF = sensitivity of enhancement in solution
E_i = electric field strength of channel i in V/m

The RSS value of the field components gives the total field strength (Hermetian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

with
SAR = local specific absorption rate in W/g
E_{tot} = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm³

The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = \frac{E_{tot}^2}{3770}$$

with
P_{pwe} = equivalent power density of a plane wave in W/cm²
E_{tot} = total electric field strength in V/m

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3.4 SAM Phantom

The SAM Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90 % of all users. 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 the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.
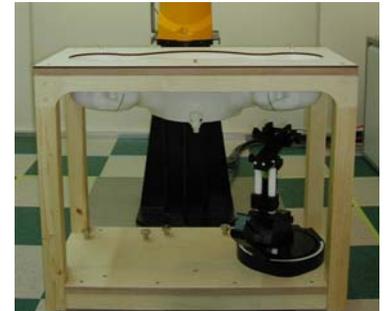
Figure 3.6 SAM Phantom

Shell Thickness	2.0 mm
Filling Volume	about 30 L
Dimensions	810 mm x 1 000 mm x 500 mm (H x L x W)

3.5 Device Holder for Transmitters

In combination with the SAM Phantom V 4.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatable positioned according to the FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produced infinite number of configurations. To produce the Worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Figure 3.7 Device Holder

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3.6 Brain & Muscle Simulating Mixture Characterization

The brain and muscle mixtures consist of a viscous gel using hydrox-ethyl cellulose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bacteriacide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Hartsgrove.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1 900		2 450	
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

Salt:	99 % Pure Sodium Chloride	Sugar:	98 % Pure Sucrose
Water:	De-ionized, 16M 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		

Table 3.1 Composition of the Tissue Equivalent Matter

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3.7 SAR TEST EQUIPMENT

Manufacturer	Type / Model	S/N	Calib. Date	Calib.Interval	Calib.Due
SPEAG	SAM Phantom	-	N/A	N/A	N/A
Staubli	Robot RX90L	F01/5K09A1/A/01	N/A	N/A	N/A
Staubli	Robot ControllerCS7MB	F99/5A82A1/C/01	N/A	N/A	N/A
HP	Pavilion t000_puffer	KRJ51201TV	N/A	N/A	N/A
SPEAG	Light Alignment Sensor	265	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D221340.01	N/A	N/A	N/A
SPEAG	DAE3	446	May 22, 2009	Annual	May 22, 2010
SPEAG	DAE3	466	July 21, 2009	Annual	July 21, 2010
SPEAG	E-Field Probe ET3DV6	1631	Jun. 24, 2009	Annual	Jun. 24, 2010
SPEAG	E-Field Probe ET3DV6	1609	Mar. 17, 2009	Annual	Mar. 17, 2010
SPEAG	Validation Dipole D450V2	1007	July 15, 2008	Biennial	July 15, 2010
SPEAG	Validation Dipole D835V2	441	May 25, 2009	Annual	May 25, 2010
SPEAG	Validation Dipole D1800V2	2d007	May 20, 2008	Biennial	May 20, 2010
SPEAG	Validation Dipole D1900V2	5d032	July 20, 2009	Annual	July 20, 2010
SPEAG	Validation Dipole D2450V2	743	Aug. 27, 2008	Biennial	Aug. 27, 2010
Agilent	Power Meter(F) E4419B	MY41291386	Nov. 05, 2009	Annual	Nov. 05, 2010
Agilent	Power Sensor(G) 8481	MY41090870	Nov. 05, 2009	Annual	Nov. 05, 2010
HP	Dielectric Probe Kit 85070C	00721521	N/A	N/A	N/A
HP	Dual Directional Coupler	16072	Nov. 05, 2009	Annual	Nov. 05, 2010
R&S	Base Station CMU200	110740	July 26, 2009	Annual	July 26, 2010
Agilent	Base Station E5515C	GB44400269	Feb. 10, 2009	Annual	Feb. 10, 2010
HP	Signal Generator E4438C	MY42082646	Dec. 24, 2009	Annual	Dec. 24, 2010
HP	Network Analyzer 8753C	3310J01394	Dec. 04, 2009	Annual	Dec. 04, 2010
Tescom	TC-3000/ Bluetooth	3000A490112	Jan. 09, 2009	Annual	Jan. 09, 2010

NOTE:

The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Validation measurement is performed by HCT Lab. before each test. The brain simulating material is calibrated by HCT using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain-equivalent material.

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4. SAR MEASUREMENT PROCEDURE

The evaluation was performed with the following procedure:

1. The SAR value at a fixed location above the ear point was measured and was used as a reference value for assessing the power drop.

2. The SAR distribution at the exposed side of the head was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 20 mm x 20 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.

3. Around this point, a volume of 32 mm x 32 mm x 34 mm was assessed by measuring 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

   a. The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

   b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were 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 directions. The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

4. The SAR value, at the same location as procedure #1, was re-measured. If the value changed by more than 5 %, the evaluation is repeated.
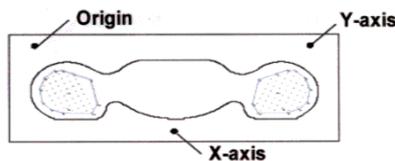
Figure 4.1 SAR Measurement Point in Area Scan

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5. DESCRIPTION OF TEST POSITION

5.1 HEAD POSITION

The device was placed in a normal operating position with the Point A on the device, as illustrated in following drawing, aligned with the location of the RE(ERP) on the phantom. With the ear-piece pressed against the head, the vertical center line of the body of the handset was aligned with an imaginary plane consisting of the RE, LE and M. While maintaining these alignments, the body of the handset was gradually moved towards the cheek until any point on the mouth-piece or keypad contacted the cheek. This is a cheek/touch position. For ear/tilt position, while maintain the device aligned with the BM and FN lines, the device was pivot against ERP back for 15⁰ or until the device antenna touch the phantom. Please refer to IEEE 1528-2003 illustration below.

Figure 5.1 Side view of the phantom

Figure 5.2 Handset vertical and horizontal reference lines

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5.2 Body Holster/Belt Clip Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. A device with a headset output is tested with a headset connected to the device. Body dielectric parameters are used.

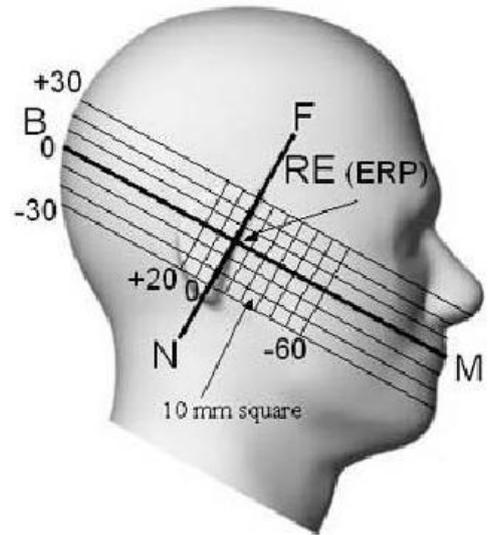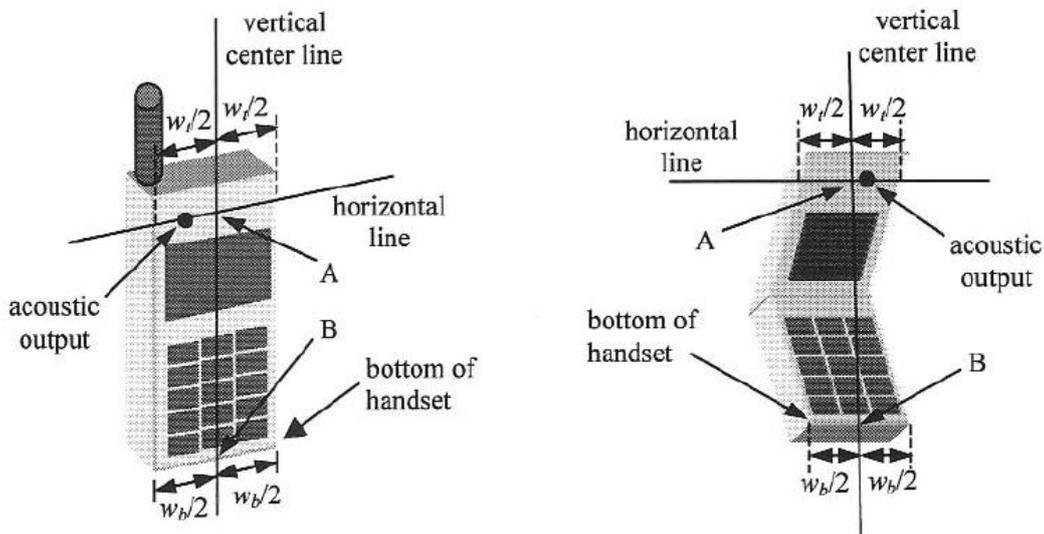Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with each accessory. If multiple accessory share an identical metallic component (i.e. 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 is tested.

Body-worn accessories may not always be supplied or available as options for some Devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used.

Since this EUT does not supply any body worn accessory to the end user a distance of 2.0 cm from the EUT back surface to the liquid interface is configured for the generic test.

"See the Test SET-UP Photo"

Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessory(ies), Including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

In all cases SAR measurements are performed to investigate the worst-case positioning. Worstcase positioning is then documented and used to perform Body SAR testing.

6. MEASUREMENT UNCERTAINTY

Measurement uncertainties in SAR measurements are difficult to quantify due to several variables including biological, physiological, and environmental. However, we estimate the measurement uncertainties in SAR to be less than 15 % - 25 %.

According to ANSI/IEEE C95.3, the overall uncertainties are difficult to assess and will vary with the type of meter and usage situation. However, accuracy's of 1 dB to $\pm$ 3 dB can be expected in practice, with greater uncertainties in near-field situations and at higher frequencies (shorter wavelengths), or areas where large reflecting objects are present. Under optimum measurement conditions, SAR measurement uncertainties of at least $\pm$ 2 dB can be expected.

According to CENELEC, typical worst-case uncertainty of field measurements is 5 dB. For well-defined modulation characteristics the uncertainty can be reduced to $\pm$ 3 dB.

Error Description	Uncertainty value [%]	Probability Distribution	Divisor	c_i	c_i^2	Standard Uncertainty [%]	Stand Uncert^2	(Stand Uncert^2) X (c_i^2)	Vi & $Veff$
1. Measurement System									
Probe Calibration	5.5	Normal	1.00	1	1	5.50	30.25	30.25	∞
Axial Isotropy	4.7	Rectangular	1.73	0.7	0.49	2.71	7.36	3.61	∞
Hemispherical Isotropy	9.6	Rectangular	1.73	0.7	0.49	5.54	30.72	15.05	∞
Linearity	4.7	Rectangular	1.73	1	1	2.71	7.36	7.36	∞
System Detection limits	1.0	Rectangular	1.73	1	1	0.58	0.33	0.33	∞
Boundary effect	1.0	Rectangular	1.73	1	1	0.58	0.33	0.33	∞
Response time	0.8	Rectangular	1.73	1	1	0.46	0.21	0.21	∞
RF Ambient conditions	3.0	Rectangular	1.73	1	1	1.73	3.00	3.00	∞
Readout Electronics	0.3	Normal	1.00	1	1	0.30	0.09	0.09	∞
Integration time	2.6	Rectangular	1.73	1	1	1.50	2.25	2.25	∞
Probe positioner	0.4	Rectangular	1.73	1	1	0.23	0.05	0.05	∞
Probe positionering	2.9	Rectangular	1.73	1	1	1.67	2.80	2.80	∞
Maximum SAR evaluation	1.0	Rectangular	1.73	1	1	0.58	0.33	0.33	∞
2.Test Sample Related						Sub Total		65.69	
Device Positioning	1.8	Normal	1.00	1	1	1.81	3.28	3.28	9
Device Holder	3.6	Normal	1.00	1	1	3.60	12.96	12.96	∞
Power Drift	5.0	Rectangular	1.73	1	1	2.89	8.33	8.33	∞
3. Phantom and Setup						Sub Total		24.57	
Phantom Uncertainty	4.0	Rectangular	1.73	1	1	2.31	5.33	5.33	∞
Liquid conductivity (target)	5.0	Rectangular	1.73	0.5	0.25	2.89	8.33	2.08	∞
Liquid conductivity (measurement error)	2.5	Normal	1.00	0.5	0.25	2.50	6.25	1.56	∞
Liquid permittivity (target)	5.0	Rectangular	1.73	0.5	0.25	2.89	8.33	2.08	∞
Liquid permittivity (measurement error)	2.5	Normal	1.00	0.5	0.25	2.50	6.25	1.56	∞
						Sub Total		12.63	
Combined standard uncertainty [%]						**10.14**		102.88	–
Expanded uncertainty [k=2, approximately confidence level 95 %]								$\pm$ **20.28 %**	

Table 6.1 Breakdown of Errors

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7. ANSI/ IEEE C95.1 - 2005 RF EXPOSURE LIMITS

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT Occupational (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Brain)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.00

Table 7.1 Safety Limits for Partial Body Exposure

NOTES:

* The Spatial Peak value of the SAR averaged over any 1 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

** The Spatial Average value of the SAR averaged over the whole-body.

*** The Spatial Peak value of the SAR averaged over any 10 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e.as a result of employment or occupation).

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8. SYSTEM VERIFICATION

8.1 Tissue Verification

Freq. [MHz]	Date	Liquid	Liquid Temp.[°C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
835	Jan.03, 2010	Head	21.4	ε r	41.5	42.5	+ 2.41	± 5
				σ	0.90	0.9	0.00	± 5
835	Jan.03, 2010	Body	21.4	ε r	55.2	54.94	- 0.47	± 5
				σ	0.97	0.99	+ 2.06	± 5
1 900	Jan.04, 2010	Head	21.1	ε r	40.0	39.4	- 1.50	± 5
				σ	1.40	1.42	+ 1.43	± 5
1 900	Jan.04, 2010	Body	21.1	ε r	53.3	51.44	- 3.49	± 5
				σ	1.52	1.57	+ 3.29	± 5

8.2 System Validation

Prior to assessment, the system is verified to the ± 10 % of the specifications at 835 MHz / 1900 MHz by using the system validation kit. (Graphic Plots Attached)

[*] Input Power: 100 mW

Freq. [MHz]	Date	Liquid	Liquid Temp. [°C]	SAR Average	Target Value (SPEAG) (mW/g)	Measured Value (mW/g)	Deviation [%]	Limit [%]
835	Jan.03, 2010	Head	21.4	1 g	9.56	0.960	+ 0.42	± 10
1 900	Jan.04, 2010	Head	21.1	1 g	40.5	4.1	+ 1.23	± 10

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9. RF CONDUCTED POWER

Power measurements were performed using a base station simulator under digital average power

9.1 Procedures Used to Establish RF Signal for SAR

The handset was placed into a simulated call using a base station simulator in a shielded chamber. Such test signals offer a consistent means for testing SAR and are recommended for evaluation SAR[4] SAR measurements were taken with a fully charged battery. In order to verify that the device was tested and maintained at full power, this was configured with the base station simulator. The SAR measurement Software calculates a reference point at the start and end of the test to check for power drifts. If conducted Power deviations of more then 5 % occurred, the tests were repeated.

Band	Channel	Voice	GPRS Data		EDGE Data	
		GSM (dBm)	GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)	EDGE 1 TX Slot (dBm)	EDGE 2 TX Slot (dBm)
GSM 850	128	31.45	31.43	31.41	27.15	27.13
	190	31.48	31.46	31.43	27.17	27.16
	251	31.53	31.51	31.48	27.23	27.21
GSM 1900	512	29.53	29.50	29.44	26.17	26.13
	661	29.42	29.40	29.34	26.08	26.04
	810	29.37	29.35	29.28	26.01	25.98

Table 9.1 GSM Conducted output powers

Band	Channel	HSDPA INACTIVE		HSDPA ACTIVE
		12.2kbps RMC (dBm)	12.2kbps ARM (dBm)	12.2kbps RMC (dBm)
WCDMA 850	4132	23.73	23.69	23.55
	4183	23.67	23.62	23.43
	4233	23.56	23.55	23.47
WCDMA 1900	9262	23.77	23.75	23.57
	9400	23.68	23.66	23.45
	9538	23.54	23.54	23.27

Table 9.2 WCDMA Conducted output powers

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10. SAR TEST DATA SUMMARY

10.1 Measurement Results (GSM850 Head SAR Touch)

Frequency		Modulation	Conducted Power (dBm)		Battery	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
836.6	190 (Mid)	GSM850	31.48	30.83	Standard	Left Ear	Intenna	0.456
836.6	190 (Mid)	GSM850	31.48	31.40	Standard	Right Ear	Intenna	0.468
ANSI/ IEEE C95.1 2005 – Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**						**Head** **1.6 W/kg (mW/g)** Averaged over 1 gram		

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
2 All modes of operation were investigated and the worst-case are reported.
3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
4 Tissue parameters and temperatures are listed on the SAR plot.
5 Battery Type   ☒ Standard   ☐ Extended   ☐ Slim
     Batteries are fully charged for all readings.
6 Test Signal Call Mode   ☐ Manual Test cord   ☒ Base Station Simulator
7 Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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10.2 Measurement Results (GSM850 Head SAR Tilt)

Frequency		Modulation	Conducted Power (dBm)		Battery	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
836.6	190 (Mid)	GSM850	31.48	31.47	Standard	Left Tilt 15°	Intenna	0.252
836.6	190 (Mid)	GSM850	31.48	31.36	Standard	Right Tilt 15°	Intenna	0.287
ANSI/ IEEE C95.1 2005 – Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**						**Head** **1.6 W/kg (mW/g)** Averaged over 1 gram		

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
2 All modes of operation were investigated and the worst-case are reported.
3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
4 Tissue parameters and temperatures are listed on the SAR plot.
5 Battery Type ☒ Standard ☐ Extended ☐ Slim
 Batteries are fully charged for all readings.
6 Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
7 Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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10.3 Measurement Results (GSM1900 Head SAR Touch)

Frequency		Modulation	Conducted Power (dBm)		Battery	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
1 880.0	661 (Mid)	GSM1900	29.42	29.43	Standard	Left Ear	Intenna	0.238
1 880.0	661 (Mid)	GSM1900	29.42	29.40	Standard	Right Ear	Intenna	0.365

ANSI/ IEEE C95.1 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population	Head 1.6 W/kg (mW/g) Averaged over 1 gram

NOTES:

1   The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
2   All modes of operation were investigated and the worst-case are reported.
3   Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
4   Tissue parameters and temperatures are listed on the SAR plot.
5   Battery Type   ☒ Standard   ☐ Extended   ☐ Slim
      Batteries are fully charged for all readings.
6   Test Signal Call Mode   ☐ Manual Test cord   ☒ Base Station Simulator
7   Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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10.4 Measurement Results (GSM1900 Head SAR Tilt)

Frequency		Modulation	Conducted Power (dBm)		Battery	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
1 880.0	661 (Mid)	GSM1900	29.42	29.29	Standard	Left Tilt 15°	Intenna	0.201
1 880.0	661 (Mid)	GSM1900	29.42	29.41	Standard	Right Tilt 15°	Intenna	0.175
ANSI/ IEEE C95.1 2005 – Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**					**Head** **1.6 W/kg (mW/g)** Averaged over 1 gram			

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].

2 All modes of operation were investigated and the worst-case are reported.

3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.

4 Tissue parameters and temperatures are listed on the SAR plot.

5 Battery Type   ☒ Standard   ☐ Extended   ☐ Slim
   Batteries are fully charged for all readings.

6 Test Signal Call Mode   ☐ Manual Test cord   ☒ Base Station Simulator

7 Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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10.5 Measurement Results (WCDMA850 Head SAR Touch)

Frequency		Modulation	Conducted Power (dBm)		Battery	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
836.6	4183 (Mid)	WCDMA850	23.67	23.64	Standard	Left Ear	Intenna	0.281
836.6	4183 (Mid)	WCDMA850	23.67	23.53	Standard	Right Ear	Intenna	0.294
ANSI/ IEEE C95.1 2005 – Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**						**Head** **1.6 W/kg (mW/g)** Averaged over 1 gram		

NOTES:

1   The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].

2   All modes of operation were investigated and the worst-case are reported.

3   Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.

4   Tissue parameters and temperatures are listed on the SAR plot.

5   Battery Type   ☒ Standard   ☐ Extended   ☐ Slim
    Batteries are fully charged for all readings.

6   Test Signal Call Mode   ☐ Manual Test cord   ☒ Base Station Simulator

7   WCDMA Mode was tested under RMC 12.2 kbps and HSPA Inactive.

8   Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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10.6 Measurement Results (WCDMA850 Head SAR Tilt)

Frequency		Modulation	Conducted Power (dBm)		Battery	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
836.6	4183 (Mid)	WCDMA850	23.67	23.81	Standard	Left Tilt 15°	Intenna	0.211
836.6	4183 (Mid)	WCDMA850	23.67	23.74	Standard	Right Tilt 15°	Intenna	0.190

ANSI/ IEEE C95.1 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population	Head 1.6 W/kg (mW/g) Averaged over 1 gram

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].

2 All modes of operation were investigated and the worst-case are reported.

3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.

4 Tissue parameters and temperatures are listed on the SAR plot.

5 Battery Type   ☒ Standard   ☐ Extended   ☐ Slim
    Batteries are fully charged for all readings.

6 Test Signal Call Mode   ☐ Manual Test cord   ☒ Base Station Simulator

7 WCDMA Mode was tested under RMC 12.2 kbps and HSPA Inactive.

8 Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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10.7 Measurement Results (WCDMA1900 Head SAR Touch)

Frequency		Modulation	Conducted Power (dBm)		Battery	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
1 880.0	9400 (Mid)	WCDMA1900	23.68	23.64	Standard	Left Ear	Intenna	0.294
1 880.0	9400 (Mid)	WCDMA1900	23.68	23.53	Standard	Left Ear	Intenna	0.455

ANSI/ IEEE C95.1 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population	Head 1.6 W/kg (mW/g) Averaged over 1 gram

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
2 All modes of operation were investigated and the worst-case are reported.
3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
4 Tissue parameters and temperatures are listed on the SAR plot.
5 Battery Type   ⊠ Standard   ☐ Extended   ☐ Slim
    Batteries are fully charged for all readings.
6 Test Signal Call Mode   ☐ Manual Test cord   ⊠ Base Station Simulator
7 WCDMA Mode was tested under RMC 12.2 kbps and HSPA Inactive.
8 Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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10.8 Measurement Results (WCDMA1900 Head SAR Tilt)

Frequency		Modulation	Conducted Power (dBm)		Battery	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
1 880.0	9400 (Mid)	WCDMA1900	23.68	23.66	Standard	Left Tilt 15°	Intenna	0.222
1 880.0	9400 (Mid)	WCDMA1900	23.68	23.72	Standard	Right Tilt 15°	Intenna	0.237
ANSI/ IEEE C95.1 2005 – Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**						**Head** **1.6 W/kg (mW/g)** Averaged over 1 gram		

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].

2 All modes of operation were investigated and the worst-case are reported.

3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.

4 Tissue parameters and temperatures are listed on the SAR plot.

5 Battery Type   ☒ Standard   ☐ Extended   ☐ Slim
   Batteries are fully charged for all readings.

6 Test Signal Call Mode   ☐ Manual Test cord   ☒ Base Station Simulator

7 WCDMA Mode was tested under RMC 12.2 kbps and HSPA Inactive.

8 Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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10.9 Measurement Results (GSM850 Body SAR)

Frequency		Modulation	Conducted Power (dBm)		Configuration	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
824.2	128 (Low)	GPRS 2Tx	31.41	31.34	Rear	2.0 cm without Holster	Intenna	0.554
836.6	190 (Mid)	GPRS 2Tx	31.43	31.38	Rear	2.0 cm without Holster	Intenna	0.922
848.8	251 (High)	GPRS 2Tx	31.48	31.43	Rear	2.0 cm without Holster	Intenna	1.18
848.8	251 (High)	GPRS 1Tx	31.51	31.43	Rear	2.0 cm without Holster	Intenna	0.629
848.8	251 (High)	GPRS 2Tx	31.48	31.39	Front	2.0 cm without Holster	Intenna	0.767
848.8	251 (High)	GSM850	31.53	31.47	Rear	2.0 cm without Holster	Intenna	0.630
ANSI/ IEEE C95.1 2005 – Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**						**Body** **1.6 W/kg (mW/g)** Averaged over 1 gram		

NOTES:

1   The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
2   All modes of operation were investigated and the worst-case are reported.
3   Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
4   Tissue parameters and temperatures are listed on the SAR plot.
5   Battery Type   ☒ Standard   ☐ Extended   ☐ Slim
                           Batteries are fully charged for all readings.
6   Test Signal Call Mode   ☐ Manual Test cord   ☒ Base Station Simulator
7   Both side of the phone were tested and the worst-case side is reported.
8   HEADSET was connected.
9   Test Configuration   ☐ With Holster   ☒ Without Holster

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10.10 Measurement Results (GSM1900 Body SAR)

Frequency		Modulation	Conducted Power (dBm)		Configuration	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
1 880.0	661 (Mid)	GPRS 1Tx	29.40	29.47	Rear	2.0 cm without Holster	Intenna	0.232
1 880.0	661 (Mid)	GPRS 2Tx	29.34	29.21	Rear	2.0 cm without Holster	Intenna	0.433
1 880.0	661 (Mid)	GPRS 2Tx	39.34	39.32	Front	2.0 cm without Holster	Intenna	0.303
1 880.0	661 (Mid)	GSM1900	29.42	29.36	Rear	2.0 cm without Holster	Intenna	0.219
ANSI/ IEEE C95.1 2005 – Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**						**Body** **1.6 W/kg (mW/g)** Averaged over 1 gram		

NOTES:

1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
2 All modes of operation were investigated and the worst-case are reported.
3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
4 Tissue parameters and temperatures are listed on the SAR plot.
5 Battery Type   ☒ Standard   ☐ Extended   ☐ Slim
     Batteries are fully charged for all readings.
6 Test Signal Call Mode   ☐ Manual Test cord   ☒ Base Station Simulator
7 Both side of the phone were tested and the worst-case side is reported.
8 HEADSET was connected.
9 Test Configuration   ☐ With Holster   ☒ Without Holster
10 Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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10.11 Measurement Results (WCDMA850 Body SAR)

Frequency		Modulation	Conducted Power (dBm)		Configuration	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
836.6	4183 (Mid)	WCDMA850	23.67	23.63	Rear	2.0 cm without Holster	Intenna	0.407
836.6	4183 (Mid)	WCDMA850	23.67	23.60	Front	2.0 cm without Holster	Intenna	0.253
ANSI/ IEEE C95.1 2005 – Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**						**Body** **1.6 W/kg (mW/g)** Averaged over 1 gram		

NOTES:

1   The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
2   All modes of operation were investigated and the worst-case are reported.
3   Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
4   Tissue parameters and temperatures are listed on the SAR plot.
5   Battery Type   ☒ Standard   ☐ Extended   ☐ Slim
      Batteries are fully charged for all readings.
6   Test Signal Call Mode   ☐ Manual Test cord   ☒ Base Station Simulator
7   Both side of the phone were tested and the worst-case side is reported.
8   HEADSET was connected.
9   Test Configuration   ☐ With Holster   ☒ Without Holster
10   Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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10.12 Measurement Results (WCDMA1900 Body SAR)

Frequency		Modulation	Conducted Power (dBm)		Configuration	Phantom Position	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
1 880.0	9400 (Mid)	WCDMA1900	23.68	23.78	Rear	2.0 cm without Holster	Intenna	0.289
1 880.0	9400 (Mid)	WCDMA1900	23.68	23.86	Front	2.0 cm without Holster	Intenna	0.204
ANSI/ IEEE C95.1 2005 – Safety Limit **Spatial Peak** **Uncontrolled Exposure/ General Population**						**Body** **1.6 W/kg (mW/g)** Averaged over 1 gram		

NOTES:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
2. All modes of operation were investigated and the worst-case are reported.
3. Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
4. Tissue parameters and temperatures are listed on the SAR plot.
5. Battery Type ☒ Standard ☐ Extended ☐ Slim
   Batteries are fully charged for all readings.
6. Test Signal Call Mode ☐ Manual Test cord ☒ Base Station Simulator
7. Both side of the phone were tested and the worst-case side is reported.
8. HEADSET was connected.
9. Test Configuration ☐ With Holster ☒ Without Holster
10. Justification for reduced test configurations: per FCC/OET Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (Left, right, cheek/touch, tilt/ear, extended and retracted) is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

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11. CONCLUSION

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/ IEEE C95.1 2005.

These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests.

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12.REFERENCES

[1] Federal Communications Commission, OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01), Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields, July 2001.

[2] IEEE Standards Coordinating Committee 34 – IEEE Std. 1528-2003, IEE Recommended Practice or Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body from Wireless Communications Devices.

[3] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio frequency Radiation, Aug. 1996.

[4] ANSI/IEEE C95.1 - 1991, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 kHz to 100 GHz, New York: IEEE, Aug. 1992

[5] ANSI/IEEE C95.3 - 1991, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: IEEE, 1992.

[6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.

[7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.

[8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 120-124.

[9]K. Pokoviº, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.

[10] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.

[11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Head Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.

[12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300 MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[13] G. Hartsgrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectro magnetics, Canada: 1987, pp. 29-36.

[14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.

[15] W. Gander, Computer mathematick, Birkhaeuser, Basel, 1992.

[16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recepies in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.

[17] Federal Communications Commission, OET Bulletin 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. Supplement C, Dec. 1997.

[18] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[19] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10 kHz-300 GHz, Jan. 1995.

[20] Prof. Dr. Niels Kuster, ETH, EidgenØssische Technische Hoschschule Zòrich, Dosimetric Evaluation of the Cellular Phone.

[21] Mobile and Portable Device RF Exposure Equipment Authorization Procedures #447498.

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Attachment 1. – SAR Test Plots

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.4 ℃
Ambient Temperature:	21.6 ℃
Test Date:	Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.901 mho/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Left touch 190/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.474 mW/g

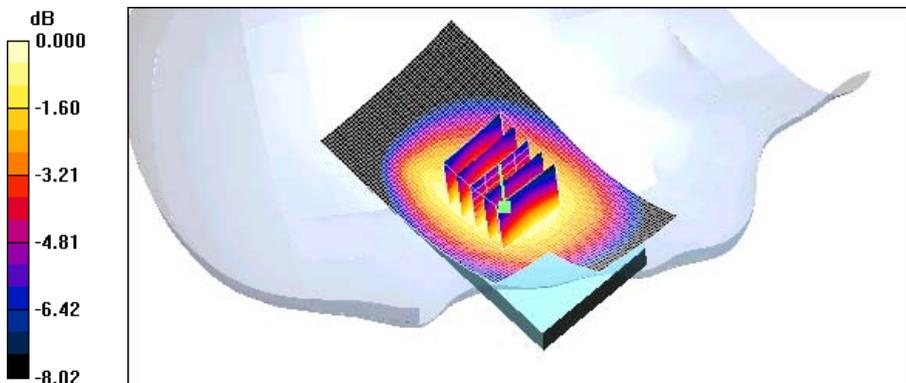**Left touch 190/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.69 V/m; Power Drift = -0.065 dB
Peak SAR (extrapolated) = 0.541 W/kg
SAR(1 g) = 0.456 mW/g; SAR(10 g) = 0.349 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.483 mW/g

0 dB = 0.483mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

Test Date: Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.901 mho/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Right touch 190/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.506 mW/g

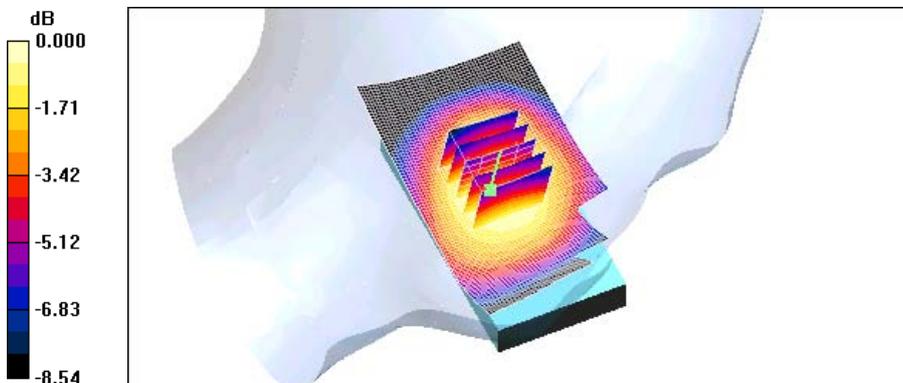**Right touch 190/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = -0.078 dB
Peak SAR (extrapolated) = 0.549 W/kg
SAR(1 g) = 0.468 mW/g; SAR(10 g) = 0.365 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.486 mW/g

0 dB = 0.486mW/g

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Test Laboratory:	HCT CO., LTD
Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.4 ℃
Ambient Temperature:	21.6 ℃
Test Date:	Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.901 mho/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Left tilt 190/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.269 mW/g

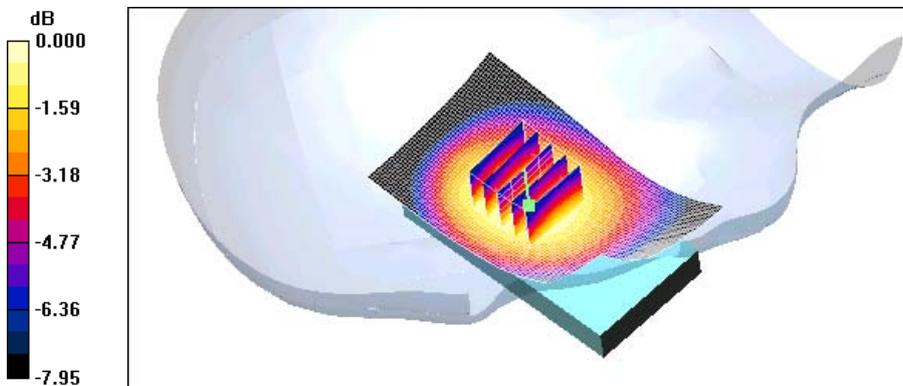**Left tilt 190/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.4 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 0.300 W/kg
SAR(1 g) = 0.252 mW/g; SAR(10 g) = 0.194 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.267 mW/g

0 dB = 0.267mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

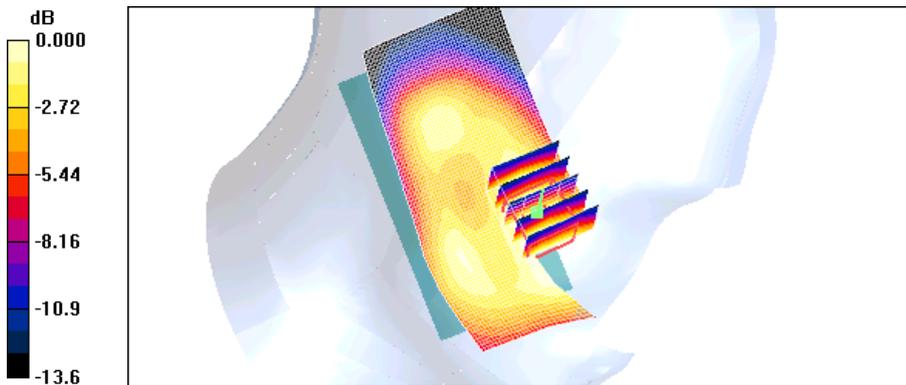Test Date: Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.901 mho/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Right tilt 190/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.301 mW/g

Right tilt 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.5 V/m; Power Drift = -0.117 dB
Peak SAR (extrapolated) = 0.340 W/kg
SAR(1 g) = 0.287 mW/g; SAR(10 g) = 0.220 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.300 mW/g

0 dB = 0.300mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.1 ℃

Ambient Temperature: 21.3 ℃

Test Date: Jan.04, 2010
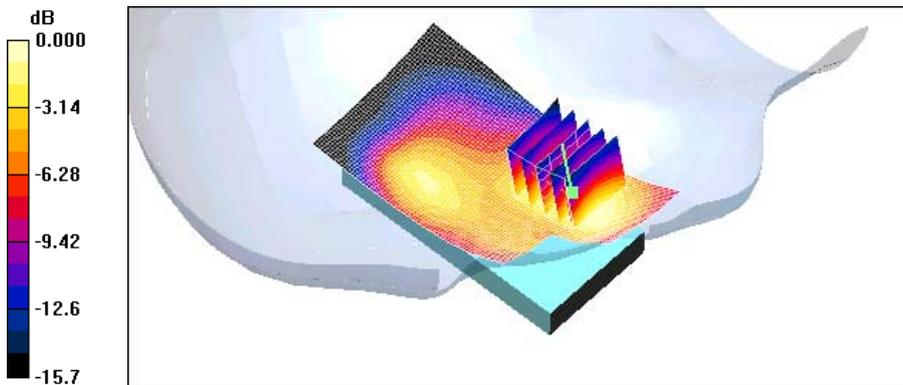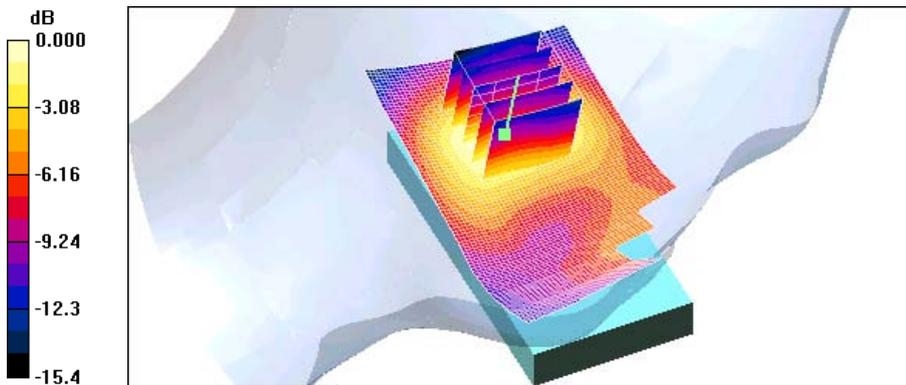
DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; $ε_r$ = 39.4; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.251 mW/g

Left touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.52 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 0.314 W/kg
SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.150 mW/g
Maximum value of SAR (measured) = 0.258 mW/g

0 dB = 0.258mW/g

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Test Laboratory:	HCT CO., LTD
Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.396 mW/g

Right touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.13 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.510 W/kg
SAR(1 g) = 0.365 mW/g; SAR(10 g) = 0.219 mW/g
Maximum value of SAR (measured) = 0.415 mW/g

0 dB = 0.415mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.1 ℃

Ambient Temperature: 21.3 ℃

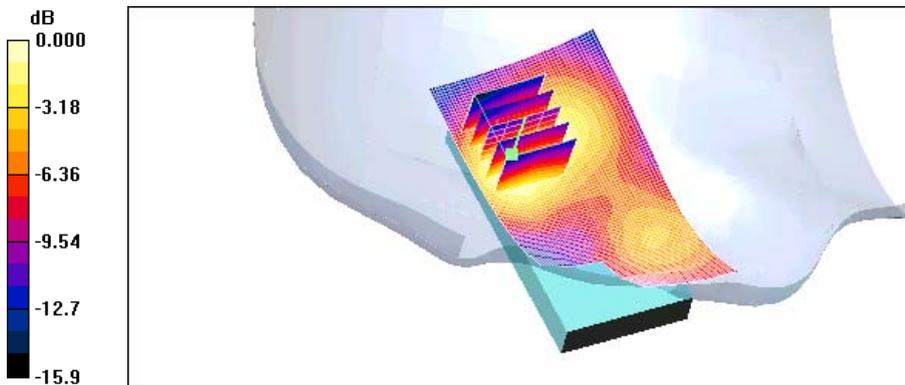Test Date: Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.221 mW/g

Left tilt 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = -0.132 dB
Peak SAR (extrapolated) = 0.268 W/kg
SAR(1 g) = 0.201 mW/g; SAR(10 g) = 0.125 mW/g
Maximum value of SAR (measured) = 0.223 mW/g

0 dB = 0.223mW/g

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.209 mW/g

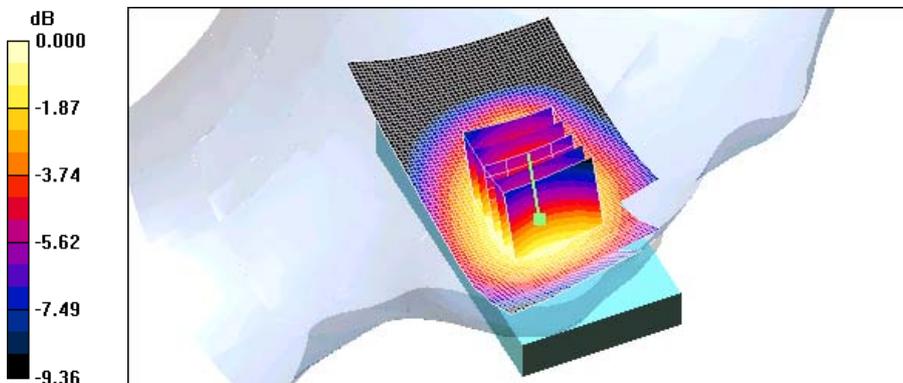**Right tilt 661/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.27 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 0.243 W/kg
SAR(1 g) = 0.175 mW/g; SAR(10 g) = 0.110 mW/g
Maximum value of SAR (measured) = 0.192 mW/g

0 dB = 0.192mW/g

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.4 ℃
Ambient Temperature:	21.6 ℃
Test Date:	Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.901 mho/m; $ε_r$ = 42.5; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Left touch 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.295 mW/g

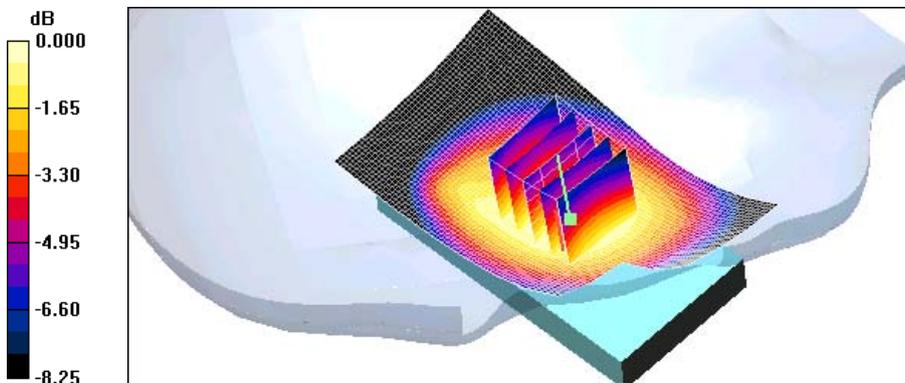**Left touch 4183/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.36 V/m; Power Drift = -0.026 dB
Peak SAR (extrapolated) = 0.327 W/kg
SAR(1 g) = 0.281 mW/g; SAR(10 g) = 0.217 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.299 mW/g

0 dB = 0.299mW/g

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.4 ℃
Ambient Temperature:	21.6 ℃
Test Date:	Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.901 mho/m; $ε_r$ = 42.5; ρ = 1000 kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Right touch 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.315 mW/g

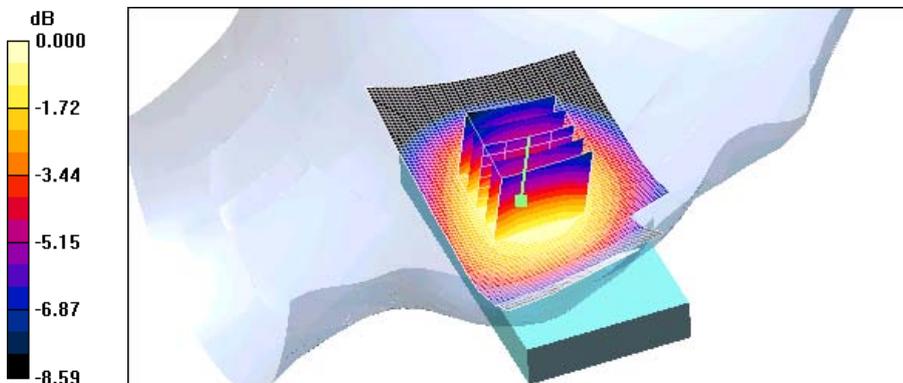**Right touch 4183/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.68 V/m; Power Drift = -0.137 dB
Peak SAR (extrapolated) = 0.344 W/kg
SAR(1 g) = 0.294 mW/g; SAR(10 g) = 0.228 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.304 mW/g

0 dB = 0.304mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

Test Date: Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.901 mho/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Left tilt 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.223 mW/g

**Left tilt 4183/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = 0.136 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.211 mW/g; SAR(10 g) = 0.162 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.224 mW/g

0 dB = 0.224mW/g

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.4 ℃
Ambient Temperature:	21.6 ℃
Test Date:	Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.901 mho/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Right tilt 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.201 mW/g

Right tilt 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.0 V/m; Power Drift = 0.074 dB
Peak SAR (extrapolated) = 0.225 W/kg
SAR(1 g) = 0.190 mW/g; SAR(10 g) = 0.146 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.198 mW/g
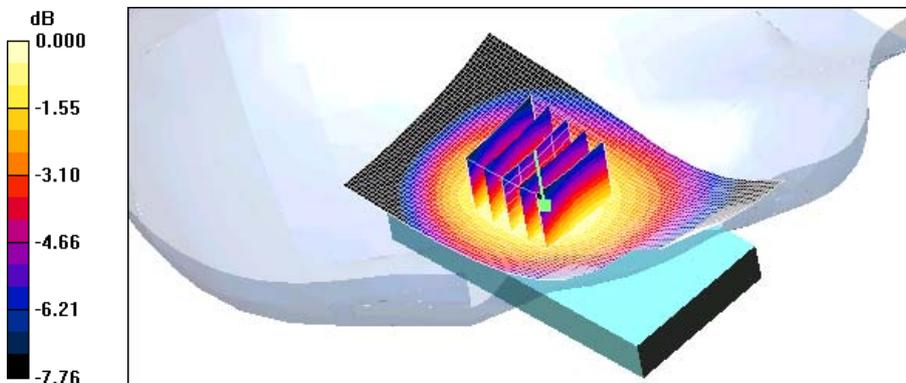
0 dB = 0.198mW/g

Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.1 ℃

Ambient Temperature: 21.3 ℃

Test Date: Jan.04, 2010
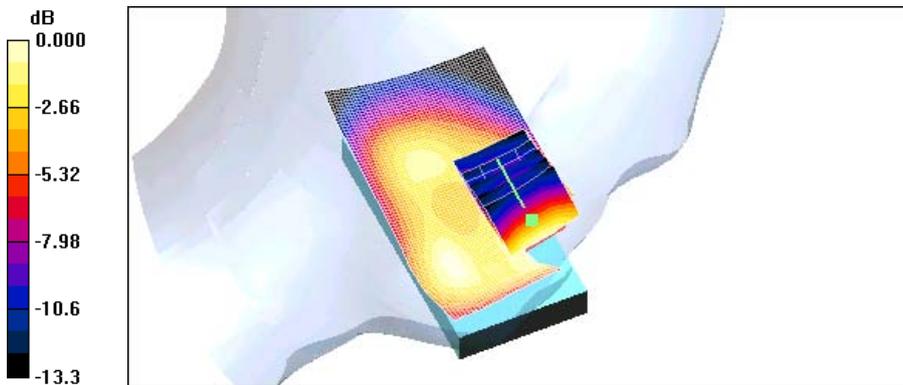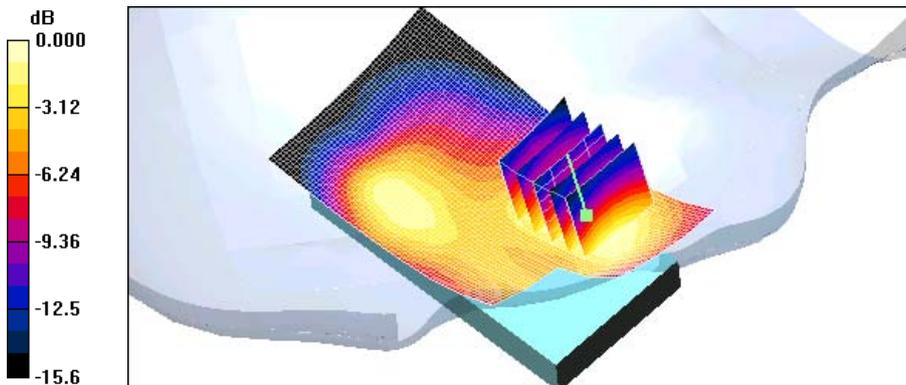
DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Left touch 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.308 mW/g

Left touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.70 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.391 W/kg
SAR(1 g) = 0.294 mW/g; SAR(10 g) = 0.184 mW/g
Maximum value of SAR (measured) = 0.321 mW/g

0 dB = 0.321mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.1 ℃

Ambient Temperature: 21.3 ℃

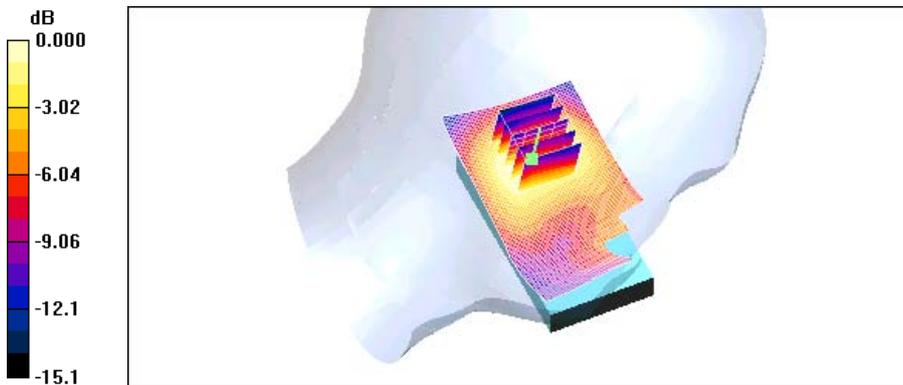Test Date: Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8
Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.504 mW/g

Right touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.09 V/m; Power Drift = -0.149 dB
Peak SAR (extrapolated) = 0.625 W/kg
SAR(1 g) = 0.455 mW/g; SAR(10 g) = 0.276 mW/g
Maximum value of SAR (measured) = 0.510 mW/g

0 dB = 0.510mW/g

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Left tilt 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.237 mW/g

Left tilt 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.8 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 0.284 W/kg
SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.143 mW/g
Maximum value of SAR (measured) = 0.242 mW/g

0 dB = 0.242mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.1 ℃

Ambient Temperature: 21.3 ℃

Test Date: Jan.04, 2010
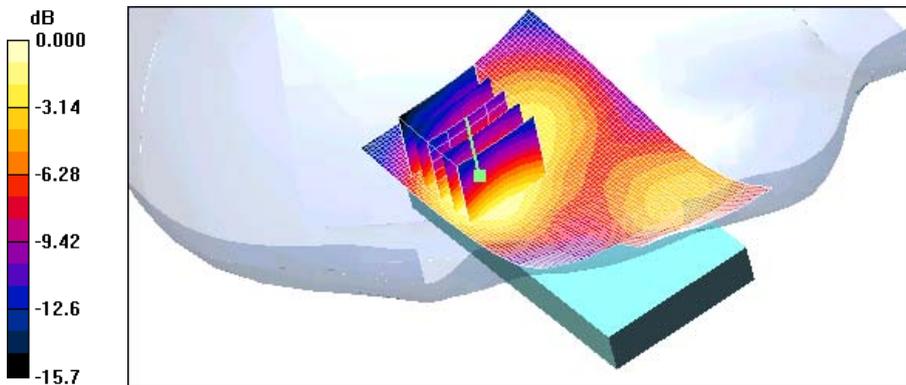
DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Right tilt 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.280 mW/g

Right tilt 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = 0.036 dB
Peak SAR (extrapolated) = 0.334 W/kg
SAR(1 g) = 0.237 mW/g; SAR(10 g) = 0.147 mW/g
Maximum value of SAR (measured) = 0.258 mW/g

0 dB = 0.258mW/g

Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

Test Date: Jan.03, 2010
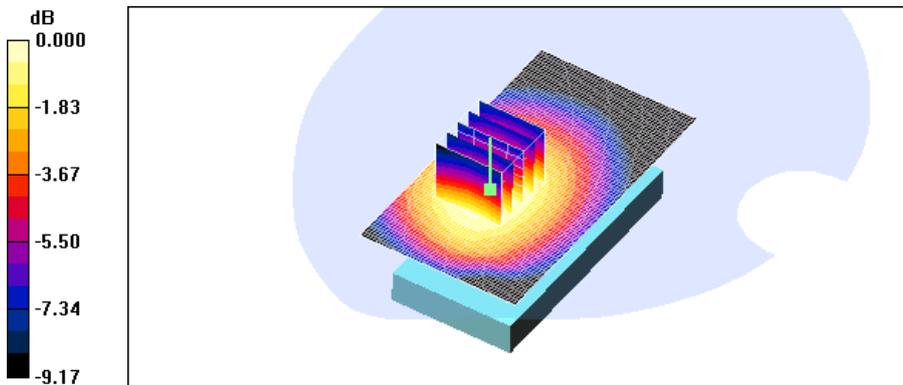
DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 825 MHz; σ = 0.981 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Body 128/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.579 mW/g

Body 128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = -0.074 dB
Peak SAR (extrapolated) = 0.707 W/kg
SAR(1 g) = 0.554 mW/g; SAR(10 g) = 0.406 mW/g
Maximum value of SAR (measured) = 0.590 mW/g

0 dB = 0.590mW/g

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.4 ℃
Ambient Temperature:	21.6 ℃
Test Date:	Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.994 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Body 190/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.953 mW/g

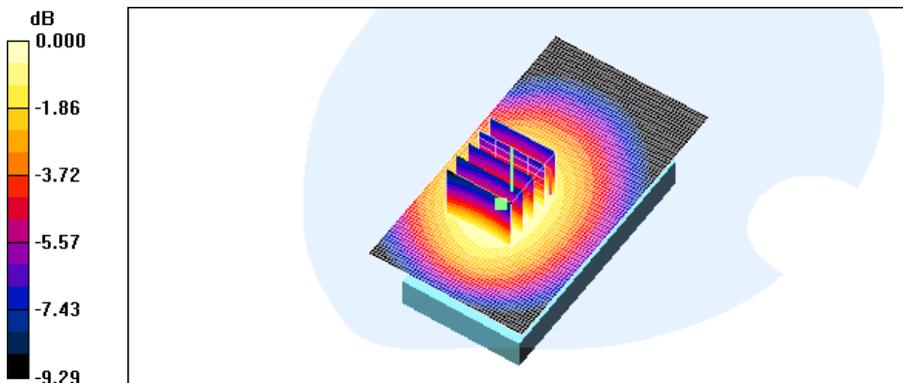**Body 190/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.7 V/m; Power Drift = -0.050 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.922 mW/g; SAR(10 g) = 0.666 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.957 mW/g

0 dB = 0.957mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

Test Date: Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:4.15
Medium parameters used (interpolated): f = 848.8 MHz; σ = 1.01 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8
Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Body 251/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.22 mW/g

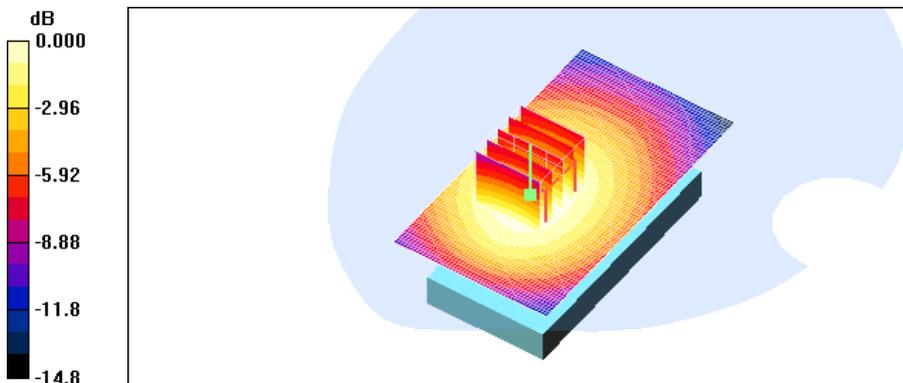**Body 251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.865 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.24 mW/g

0 dB = 1.24mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

Test Date: Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 848.8 MHz; σ = 1.01 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Body 251/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.655 mW/g

Body 251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
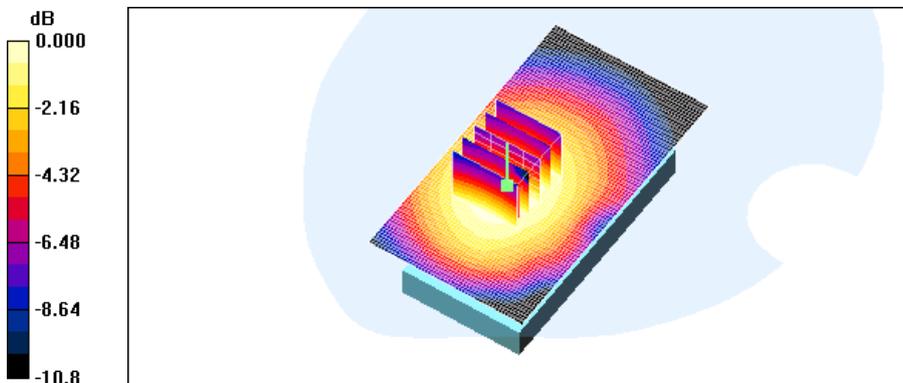Reference Value = 12.0 V/m; Power Drift = -0.075 dB
Peak SAR (extrapolated) = 0.798 W/kg
SAR(1 g) = 0.629 mW/g; SAR(10 g) = 0.464 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.665 mW/g

0 dB = 0.665mW/g

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.4 ℃
Ambient Temperature:	21.6 ℃
Test Date:	Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:4.15
Medium parameters used (interpolated): f = 848.8 MHz; σ = 1.01 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Body 251/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.799 mW/g

Body 251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
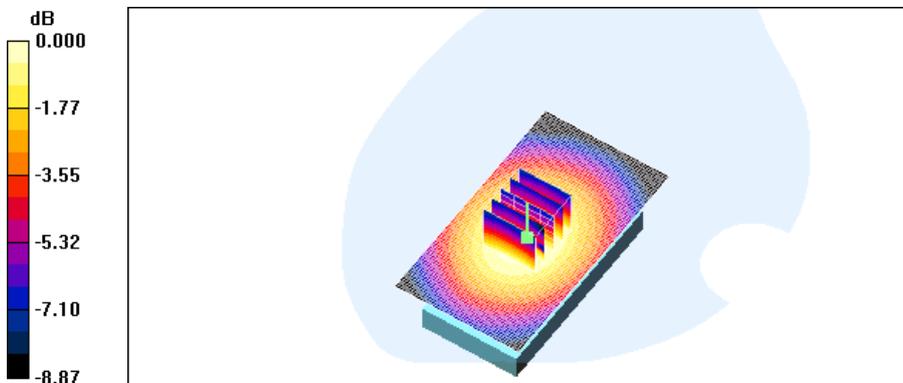Reference Value = 17.0 V/m; Power Drift = -0.086 dB
Peak SAR (extrapolated) = 0.925 W/kg
SAR(1 g) = 0.767 mW/g; SAR(10 g) = 0.573 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.817 mW/g

0 dB = 0.817mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

Test Date: Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 848.8 MHz; σ = 1.01 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Body 251/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.651 mW/g

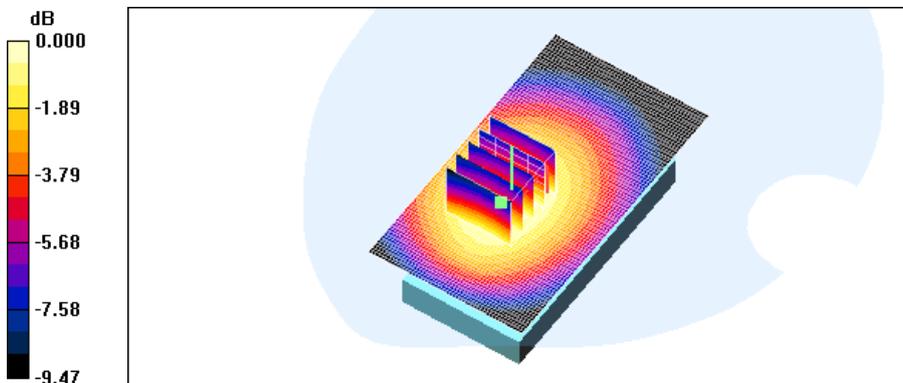**Body 251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.0 V/m; Power Drift = -0.056 dB
Peak SAR (extrapolated) = 0.788 W/kg
SAR(1 g) = 0.630 mW/g; SAR(10 g) = 0.464 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.666 mW/g

0 dB = 0.666mW/g

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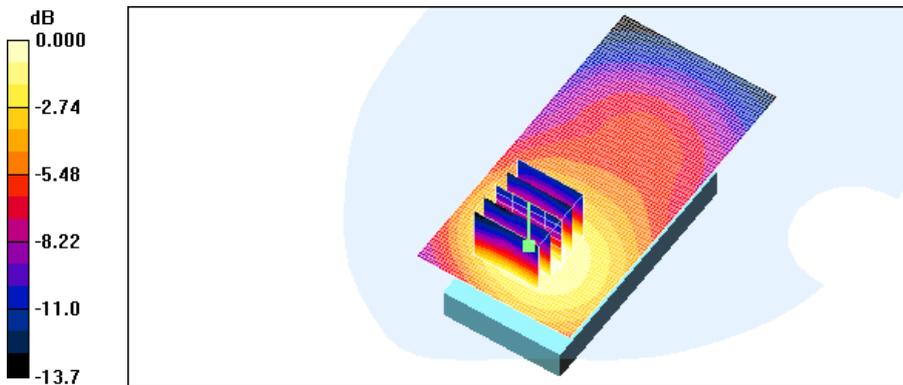|	
Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Body 661/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.248 mW/g

Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.78 V/m; Power Drift = 0.074 dB
Peak SAR (extrapolated) = 0.318 W/kg
SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.145 mW/g
Maximum value of SAR (measured) = 0.252 mW/g

0 dB = 0.252mW/g

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Body 661/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.470 mW/g

Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.54 V/m; Power Drift = -0.131 dB
Peak SAR (extrapolated) = 0.608 W/kg
SAR(1 g) = 0.433 mW/g; SAR(10 g) = 0.268 mW/g
Maximum value of SAR (measured) = 0.474 mW/g

0 dB = 0.474mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.1 ℃

Ambient Temperature: 21.3 ℃

Test Date: Jan.04, 2010
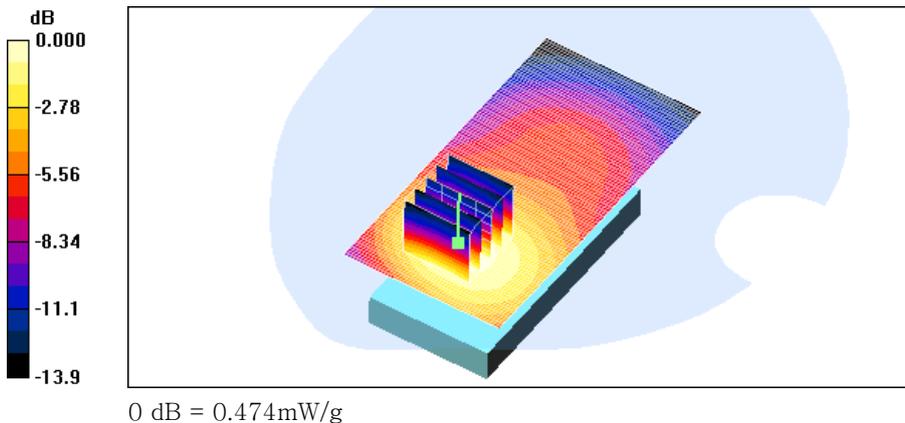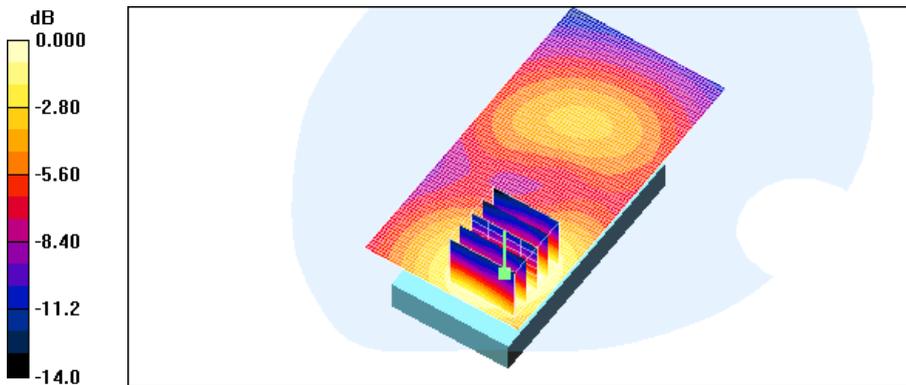
DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15

Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3

Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Body 661/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.336 mW/g

Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.6 V/m; Power Drift = -0.0210 dB

Peak SAR (extrapolated) = 0.398 W/kg

SAR(1 g) = 0.303 mW/g; SAR(10 g) = 0.192 mW/g

Maximum value of SAR (measured) = 0.332 mW/g

0 dB = 0.332mW/g

Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.1 ℃

Ambient Temperature: 21.3 ℃

Test Date: Jan.04, 2010
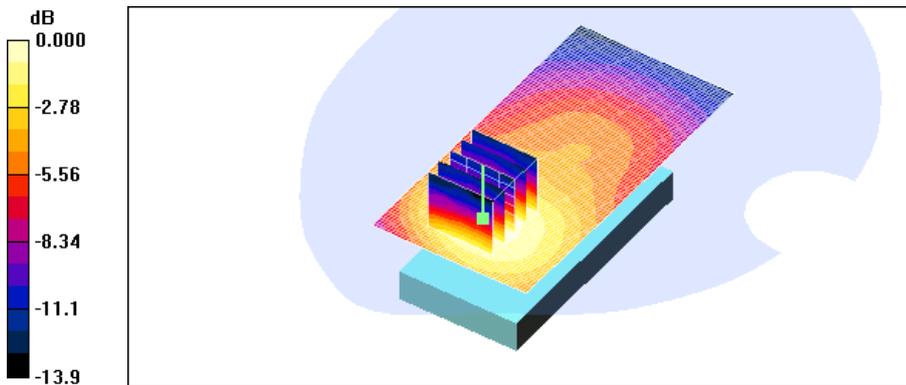
DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Body 661/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.240 mW/g

Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.39 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 0.303 W/kg
SAR(1 g) = 0.219 mW/g; SAR(10 g) = 0.136 mW/g
Maximum value of SAR (measured) = 0.241 mW/g

0 dB = 0.241mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

Test Date: Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.994 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phamtom ; Type: SAM

Body 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.427 mW/g

Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.6 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 0.505 W/kg
SAR(1 g) = 0.407 mW/g; SAR(10 g) = 0.303 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.429 mW/g

0 dB = 0.429mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

Test Date: Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.994 mho/m; ε_r = 54.9; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phamtom ; Type: SAM

Body 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.265 mW/g

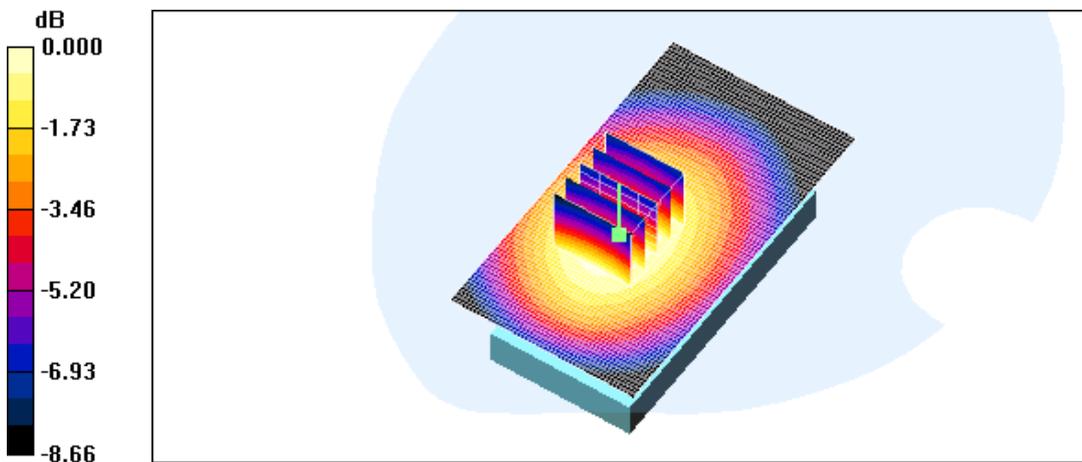**Body 4183/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = -0.066 dB
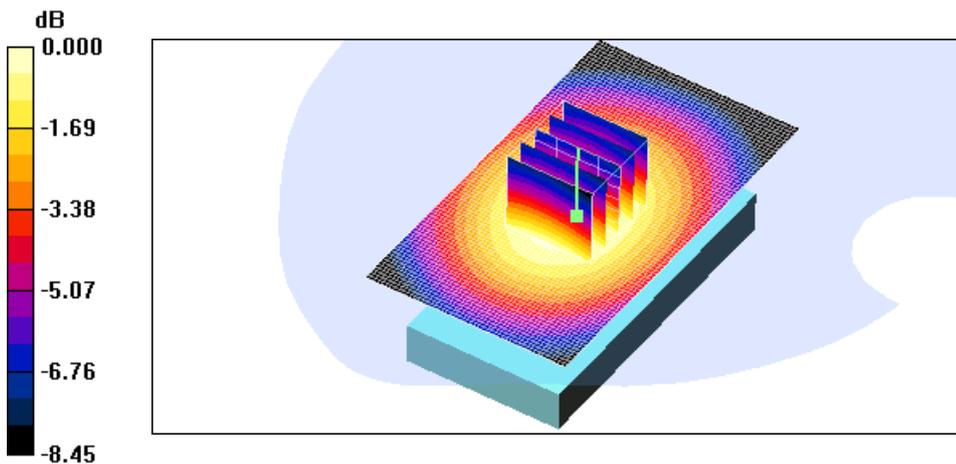Peak SAR (extrapolated) = 0.311 W/kg
SAR(1 g) = 0.253 mW/g; SAR(10 g) = 0.191 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.267 mW/g

0 dB = 0.267mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.1 ℃

Ambient Temperature: 21.3 ℃

Test Date: Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Body 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.308 mW/g

Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.13 V/m; Power Drift = 0.100 dB
Peak SAR (extrapolated) = 0.399 W/kg
SAR(1 g) = 0.289 mW/g; SAR(10 g) = 0.180 mW/g
Maximum value of SAR (measured) = 0.317 mW/g

0 dB = 0.317mW/g

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Test Laboratory: HCT CO., LTD
EUT Type: Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature: 21.1 ℃
Ambient Temperature: 21.3 ℃
Test Date: Jan.04, 2010
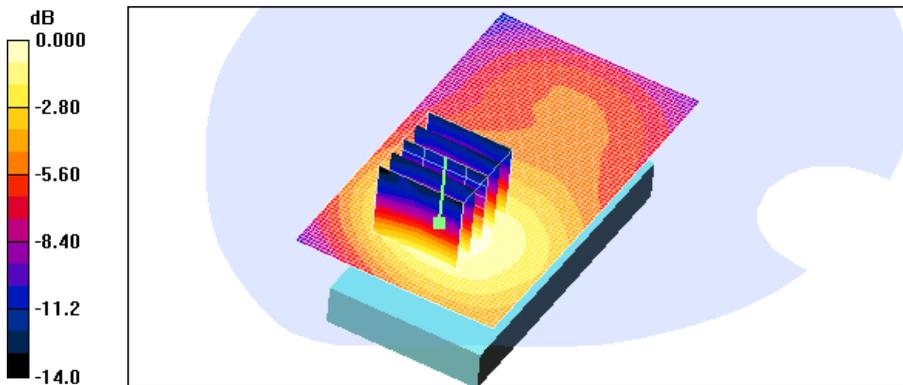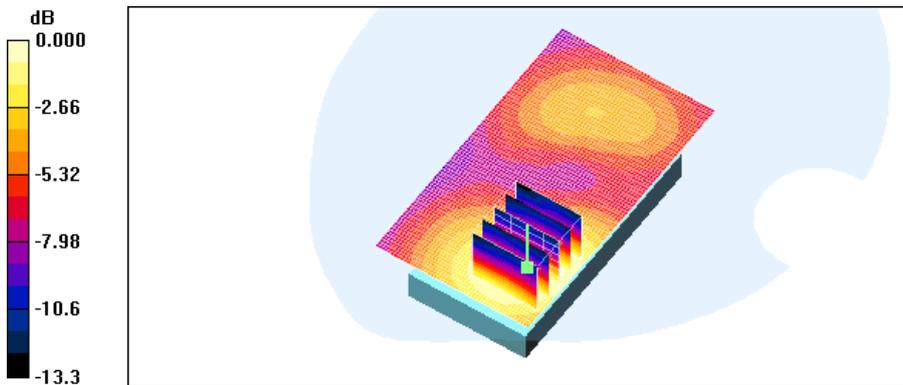
DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Body 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.224 mW/g

Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.44 V/m; Power Drift = 0.180 dB
Peak SAR (extrapolated) = 0.259 W/kg
SAR(1 g) = 0.204 mW/g; SAR(10 g) = 0.130 mW/g
Maximum value of SAR (measured) = 0.224 mW/g

0 dB = 0.224mW/g

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.4 ℃
Ambient Temperature:	21.6 ℃
Test Date:	Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.901 mho/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Right touch 190/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.506 mW/g

Right touch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = -0.078 dB
Peak SAR (extrapolated) = 0.549 W/kg
SAR(1 g) = 0.468 mW/g; SAR(10 g) = 0.365 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.486 mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

Test Date: Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 850; Frequency: 848.8 MHz;Duty Cycle: 1:4.15
Medium parameters used (interpolated): f = 848.8 MHz; σ = 1.01 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Body 251/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 1.22 mW/g

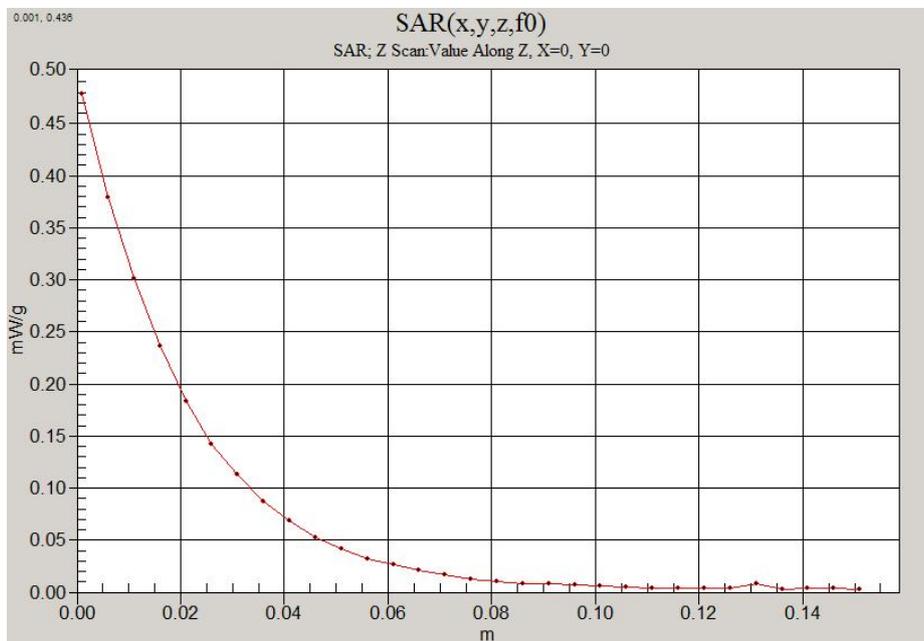**Body 251/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
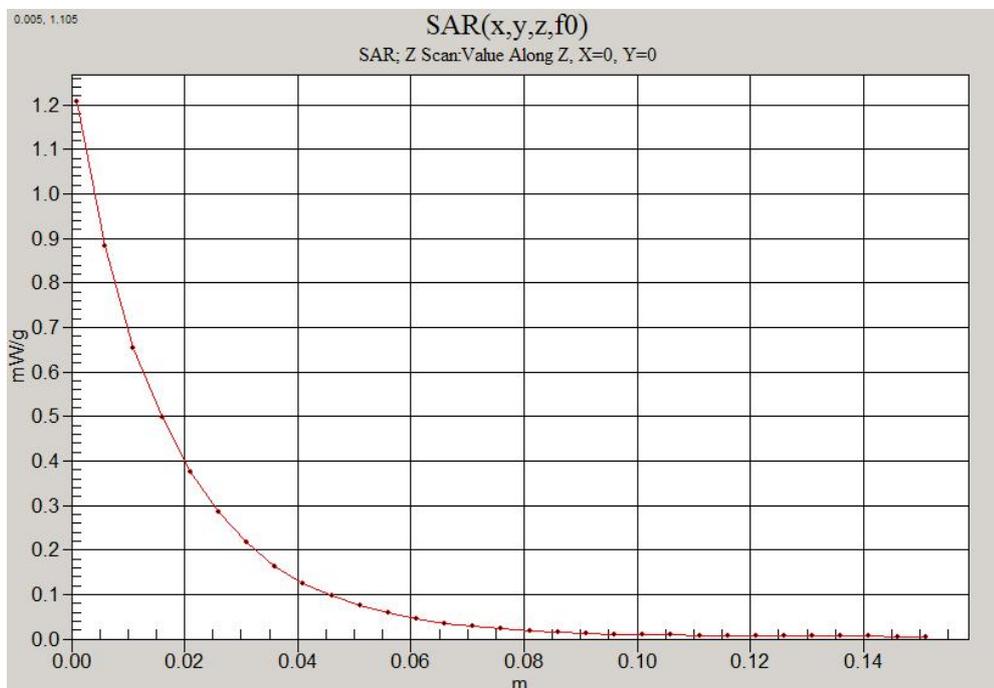Reference Value = 16.6 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.865 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 1.24 mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.1 ℃

Ambient Temperature: 21.3 ℃

Test Date: Jan.04, 2010
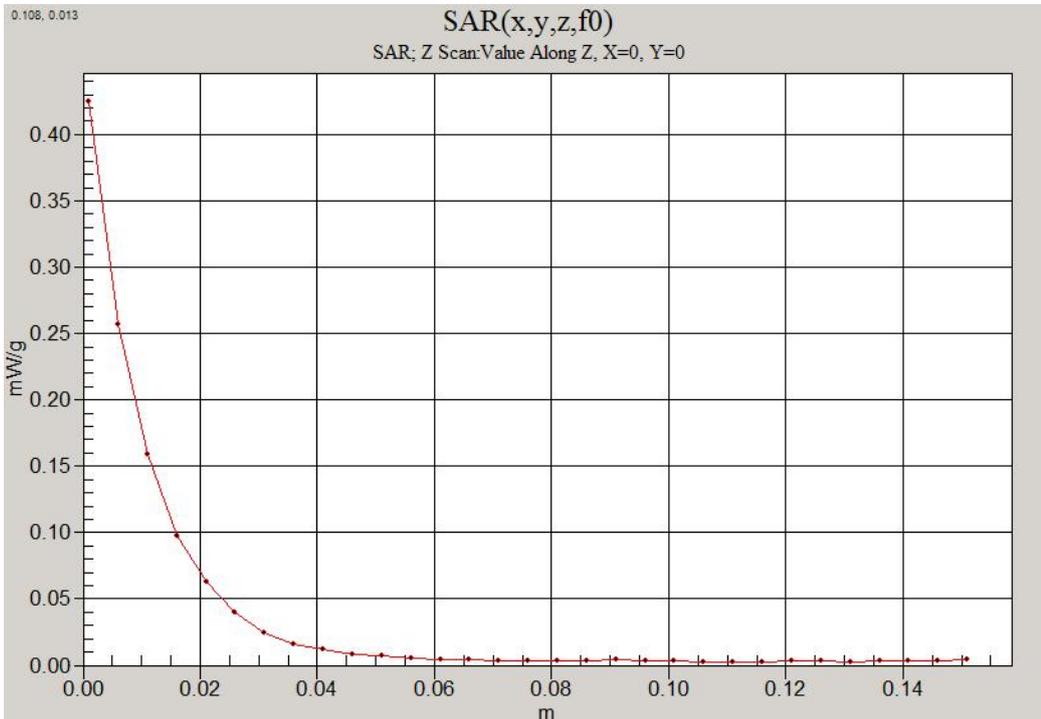
DUT: STX-2; Type: Bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 661/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.396 mW/g

Right touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.13 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.510 W/kg
SAR(1 g) = 0.365 mW/g; SAR(10 g) = 0.219 mW/g
Maximum value of SAR (measured) = 0.415 mW/g

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Test Laboratory:	HCT CO., LTD
Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

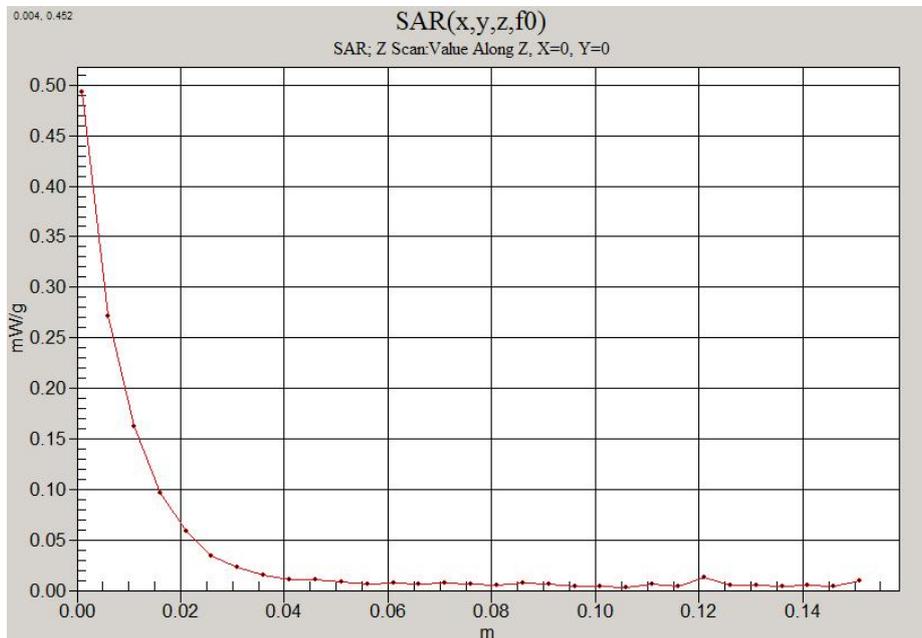Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Body 661/Area Scan (51x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.470 mW/g

Body 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.54 V/m; Power Drift = -0.131 dB
Peak SAR (extrapolated) = 0.608 W/kg
SAR(1 g) = 0.433 mW/g; SAR(10 g) = 0.268 mW/g
Maximum value of SAR (measured) = 0.474 mW/g

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Test Laboratory:	HCT CO., LTD	
EUT Type:	Slide GSM/UMTS Phone with Bluetooth	
Liquid Temperature:	21.4 ℃	
Ambient Temperature:	21.6 ℃	
Test Date:	Jan.03, 2010	

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.901 mho/m; ε_r = 42.5; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phantom ; Type: SAM

Right touch 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.315 mW/g

Right touch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
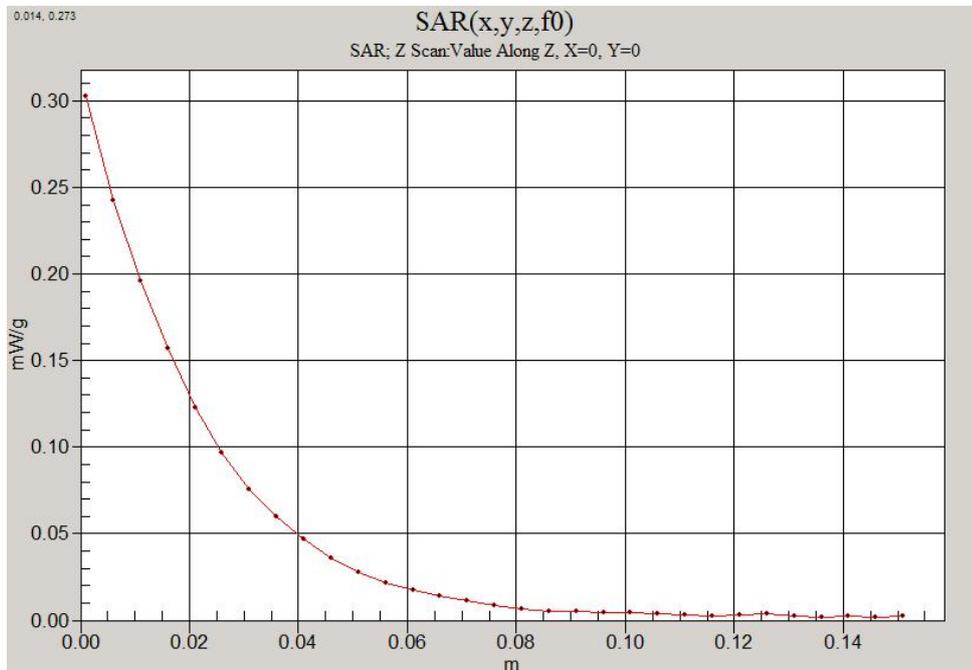Reference Value = 8.68 V/m; Power Drift = -0.137 dB
Peak SAR (extrapolated) = 0.344 W/kg
SAR(1 g) = 0.294 mW/g; SAR(10 g) = 0.228 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.304 mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.4 ℃

Ambient Temperature: 21.6 ℃

Test Date: Jan.03, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.994 mho/m; ε_r = 54.9; ρ = 1000 kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.91, 5.91, 5.91); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 835/900 Phamtom ; Type: SAM

Body 4183/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.427 mW/g

Body 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
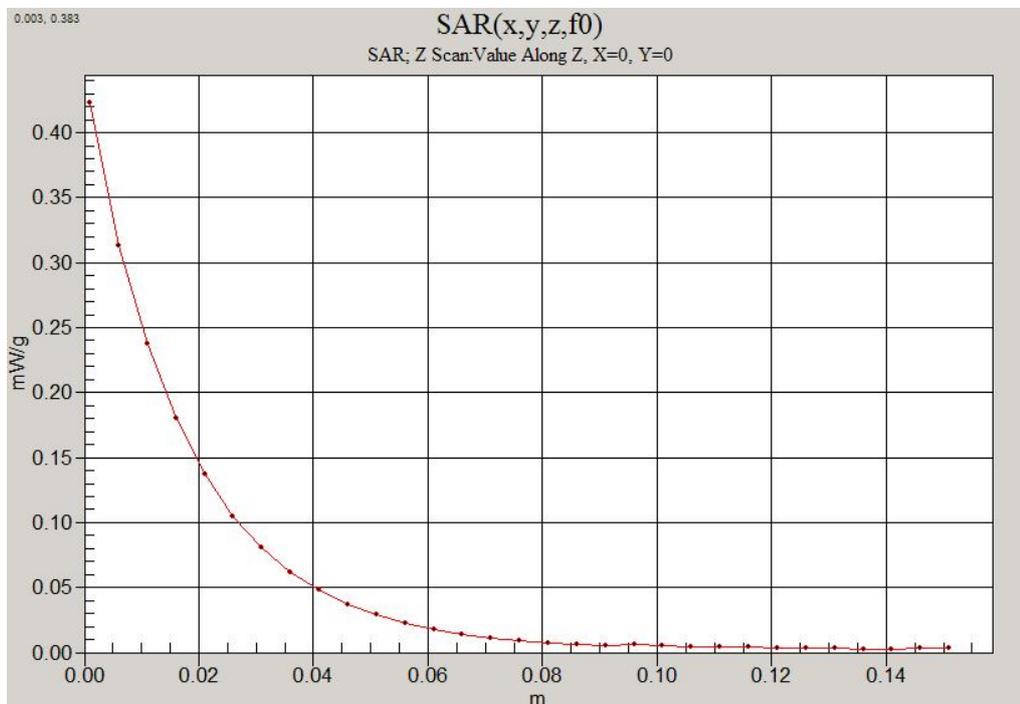Reference Value = 10.6 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 0.505 W/kg
SAR(1 g) = 0.407 mW/g; SAR(10 g) = 0.303 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.429 mW/g

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Test Laboratory:	HCT CO., LTD
EUT Type:	Slide GSM/UMTS Phone with Bluetooth
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.39 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Right touch 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.504 mW/g

Right touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.09 V/m; Power Drift = -0.149 dB
Peak SAR (extrapolated) = 0.625 W/kg
SAR(1 g) = 0.455 mW/g; SAR(10 g) = 0.276 mW/g
Maximum value of SAR (measured) = 0.510 mW/g

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Test Laboratory: HCT CO., LTD

EUT Type: Slide GSM/UMTS Phone with Bluetooth

Liquid Temperature: 21.1 ℃

Ambient Temperature: 21.3 ℃

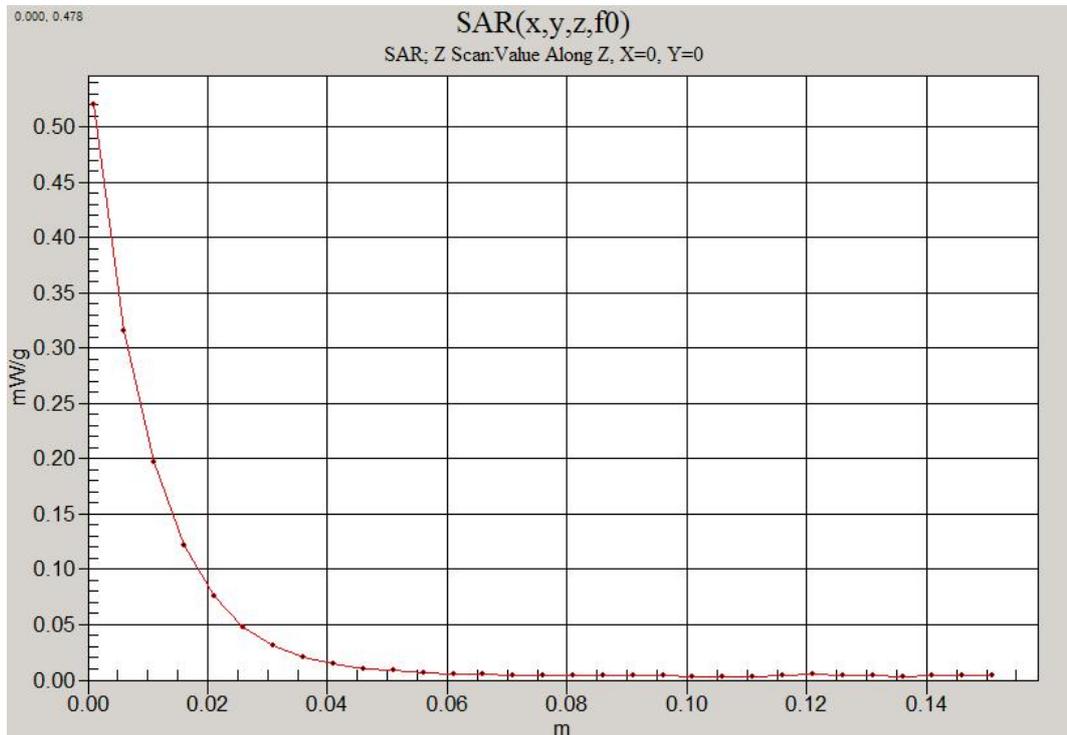Test Date: Jan.04, 2010

DUT: STX-2; Type: Bar; Serial: #1

Communication System: WCDMA1900(FCC); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(4.48, 4.48, 4.48); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

Body 9400/Area Scan (51x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.308 mW/g

Body 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.13 V/m; Power Drift = 0.100 dB
Peak SAR (extrapolated) = 0.399 W/kg
SAR(1 g) = 0.289 mW/g; SAR(10 g) = 0.180 mW/g
Maximum value of SAR (measured) = 0.317 mW/g

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Attachment 2. – Dipole Validation Plots

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■ Validation Data (835 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20dBm)

Liquid Temp: 21.4 ℃

Test Date: Jan.03, 2010

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; $ε_r$ = 42.5; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8
Build 176

DASY4 Configuration:
- Probe: ET3DV6 - SN1631; ConvF(5.83, 5.83, 5.83); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 835/900 MHz; Type: SAM

Validation 835MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.04 mW/g

Validation 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.4 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.960 mW/g; SAR(10 g) = 0.632 mW/g
Maximum value of SAR (measured) = 1.04 mW/g

0 dB = 1.04mW/g

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■ Validation Data (1900 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power   100 mW (20dBm)

Liquid Temp: 21.1 ℃

Test Date: Jan.04, 2010

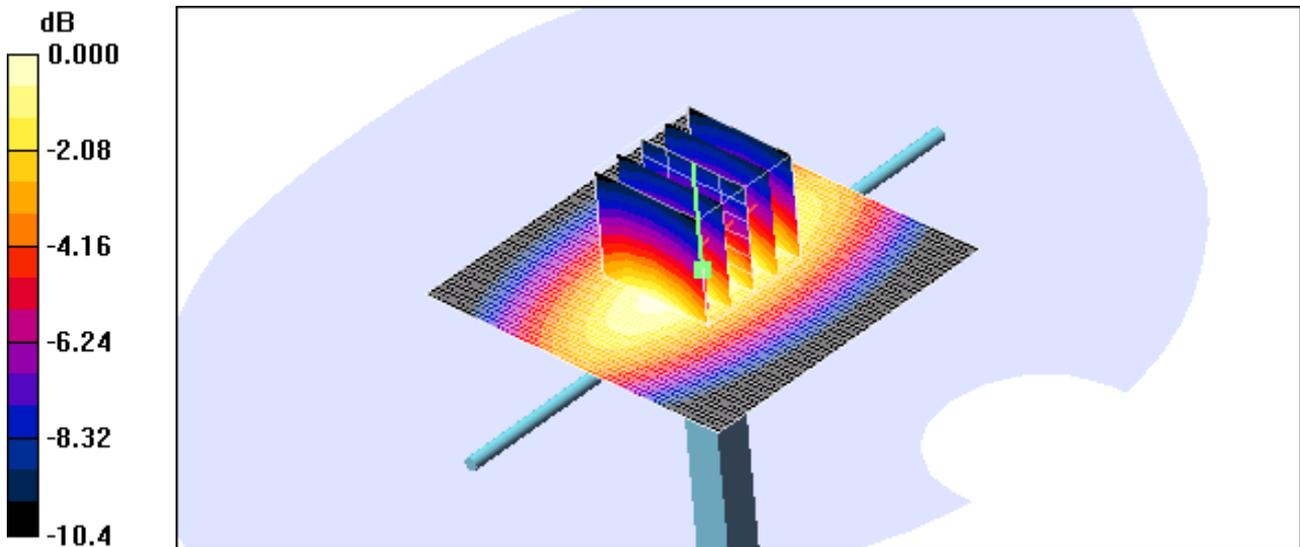**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 − SN:5d032**

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; $ε_r$ = 39.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:
− Probe: ET3DV6 − SN1631; ConvF(5.07, 5.07, 5.07); Calibrated: 2009−06−24
− Sensor−Surface: 4mm (Mechanical Surface Detection)
− Electronics: DAE3 Sn466; Calibrated: 2009−07−21
− Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.87 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 59.9 V/m; Power Drift = −0.011 dB
Peak SAR (extrapolated) = 7.05 W/kg
SAR(1 g) = 4.1 mW/g; SAR(10 g) = 2.11 mW/g
Maximum value of SAR (measured) = 4.60 mW/g

0 dB = 4.60mW/g

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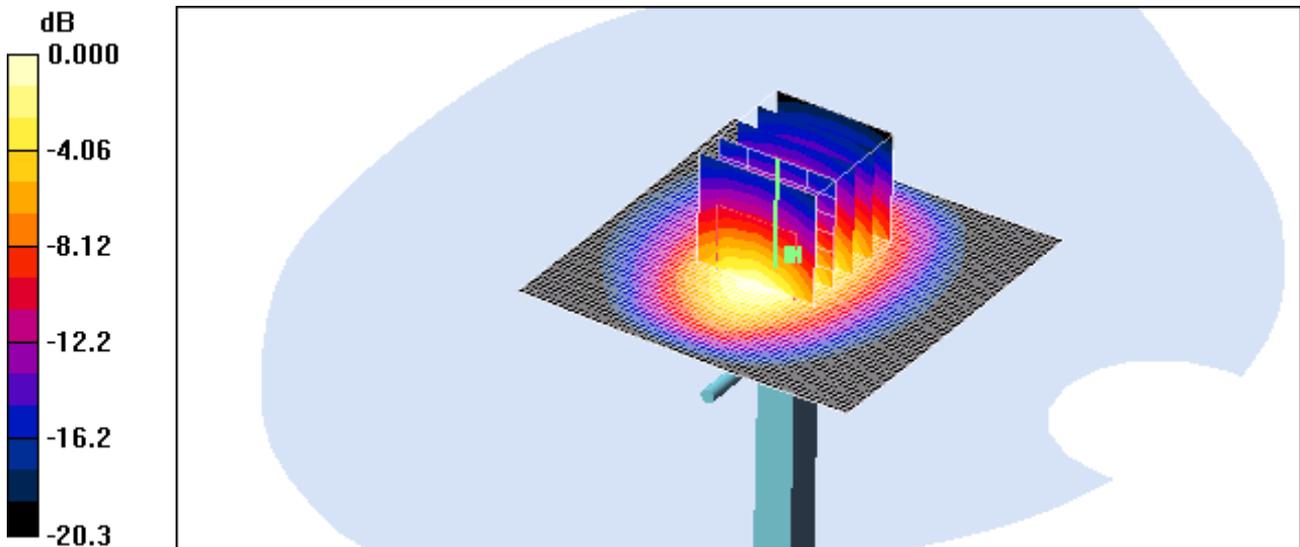
■ Dielectric Parameter (835 MHz Head)

Title   STX-2
SubTitle   GSM850(Head)
Test Date   Jan.03, 2010

Frequency	e'	e''
800000000	42.8932	19.4910
805000000	42.8254	19.4607
810000000	42.7830	19.4399
815000000	42.7257	19.4398
820000000	42.6955	19.4375
825000000	42.6345	19.4173
830000000	42.6024	19.3839
835000000	42.5348	19.3716
840000000	42.4738	19.3419
845000000	42.4021	19.3263
850000000	42.3548	19.3195
855000000	42.3147	19.3521
860000000	42.2624	19.3572
865000000	42.1560	19.3322
870000000	42.1223	19.3067
875000000	42.0711	19.2714
880000000	41.9686	19.2822
885000000	41.9137	19.2790
890000000	41.8758	19.2459
895000000	41.7512	19.2542
900000000	41.7678	19.2152

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■ Dielectric Parameter (835 MHz Body)

Title STX-2
SubTitle GSM850(Body)
Test Date Jan.03, 2010

Frequency	e'	e''
800000000	55.2893	21.4718
805000000	55.2392	21.4593
810000000	55.1965	21.4328
815000000	55.1495	21.4533
820000000	55.1602	21.4131
825000000	55.0969	21.3835
830000000	54.9815	21.3903
835000000	54.9403	21.3533
840000000	54.9484	21.3864
845000000	54.8378	21.3647
850000000	54.8272	21.3716
855000000	54.7217	21.3271
860000000	54.6852	21.2895
865000000	54.6040	21.3019
870000000	54.5673	21.2866
875000000	54.5026	21.2930
880000000	54.4557	21.2872
885000000	54.3724	21.2533
890000000	54.3156	21.2572
895000000	54.2420	21.2152
900000000	54.1985	21.1408

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■ Dielectric Parameter (1900 MHz Head)

Title	STX-2
SubTitle	GSM1900(Head)
Test Date	Jan.04, 2010

Frequency	e'	e''
1800000000.0000	39.9082	13.1019
1810000000.0000	39.8840	13.1335
1820000000.0000	39.8387	13.1387
1830000000.0000	39.7723	13.1420
1840000000.0000	39.6880	13.1389
1850000000.0000	39.6402	13.1585
1860000000.0000	39.5582	13.1550
1870000000.0000	39.4875	13.1866
1880000000.0000	39.4459	13.2479
1890000000.0000	39.4340	13.3349
1900000000.0000	39.4306	13.3954
1910000000.0000	39.3900	13.4143
1920000000.0000	39.3871	13.4622
1930000000.0000	39.3404	13.4909
1940000000.0000	39.3048	13.4803
1950000000.0000	39.2374	13.4465
1960000000.0000	39.1785	13.4782
1970000000.0000	39.1371	13.4723
1980000000.0000	39.0768	13.4939
1990000000.0000	39.0047	13.5177
2000000000.0000	38.9637	13.5909

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■ Dielectric Parameter (1900 MHz Body)

Title   STX-2
SubTitle   GSM1900(Body)
Test Date   Jan.04, 2010

Frequency	e'	e''
1700000000	52.1425	14.2565
1710000000	52.0968	14.2784
1720000000	52.0644	14.2827
1730000000	52.0492	14.3242
1740000000	51.9884	14.3336
1750000000	51.9693	14.3386
1760000000	51.9316	14.3805
1770000000	51.9187	14.4238
1780000000	51.9007	14.4496
1790000000	51.8470	14.4908
1800000000	51.8216	14.5374
1810000000	51.8012	14.5620
1820000000	51.7816	14.6148
1830000000	51.7164	14.6453
1840000000	51.6834	14.6775
1850000000	51.6370	14.7001
1860000000	51.6268	14.7419
1870000000	51.5700	14.7812
1880000000	51.5417	14.8427
1890000000	51.4846	14.8403
1900000000	51.4355	14.8493

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Attachment 3. – Probe Calibration Data

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Calibration Laboratory of
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Engineering AG
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S Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client	**H-CT (Dymstec)**	Certificate No: **ET3-1631_Jun09**

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1631
Calibration procedure(s)	QA CAL-01.v6, QA CAL-12.v5 and QA CAL-23.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	June 24, 2009
Condition of the calibrated item	In Tolerance

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 24, 2009

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: ET3-1631_Jun09 Page 1 of 9

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