SAR TEST REPORT

HCT CO., LTD

EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA & Cellular CDMA Phone with Bluetooth and WLAN/NFC
FCC ID:	ZNFLGL21
Model:	LGL21
Date of Issue:	Sep.11, 2012
Test report No.:	HCTA1209FS02
Test Laboratory:	**HCT CO., LTD.** 105-1, Jangam-ri, Majang-myeon, Icheon-si, Gyeonggi-do, Korea 467-811 TEL: +82 31 645 6485 FAX: +82 31 645 6401
Applicant :	**LG Electronics, MobileComm U.S.A., Inc.** 10101 Old Grove Road, San Diego, CA 92131
Testing has been carried out in accordance with:	RSS-102 Issue 4; Health Canada Safety Code 6 47CFR §2.1093 FCC OET Bulletin 65(Edition 97-01), Supplement C (Edition 01-01) ANSI/ IEEE C95.1 – 1992 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.
Signiture	Report prepared by : Young-Soo Jang Test Engineer of SAR Part Approved by : Jae-Sang So Manager of SAR Part

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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 C95.1-1992 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 (d*W*) absorbed by (dissipated in) an incremental mass (d*m*) contained in a volume element (d*V*) 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.

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{\rho\, dv}\right)$$

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.

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	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
FCC ID:	ZNFLGL21
Model:	LGL21
Trade Name	LG Electronics, MobileComm U.S.A., Inc.
Application Type	Certification
Mode(s) of Operation	CDMA835/GSM1900 /WCDMA850 / WCDMA1900/802.11a/b/g/n
Tx Frequency	824.70 - 848.31 MHz (CDMA))/1 850.20 – 1 909.80 MHz (GSM1900) 826.4-846.6 MHz (WCDMA850) /1 852.4 – 1 907.6 MHz (WCDMA1900) 2 412- 2 462 MHz (802.11b/g/n) 802.11a/n: 5180-5240MHz/ 5260-5320 MHz/ 5500-5700 MHz/ 5745-5825 MHz
Rx Frequency	869.70 - 893.31 MHz (CDMA)/1 930.20 – 1 989.80 MHz (GSM1900) 871.4 - 891.6 MHz (WCDMA850)/ 1 932.4 – 1 987.6 MHz (WCDMA1900) 2 412- 2 462 MHz (802.11b/g/n) 802.11a/n: 5180-5240MHz/ 5260-5320 MHz/ 5500-5700 MHz/ 5745-5825 MHz
FCC Classification	Licensed Portable Transmitter Held to Ear (PCE)
Production Unit or Identical Prototype	Prototype

Max SAR

Band	1g SAR (W/kg)		
	Head	Body-worn	Hotspot
CDMA835	0.456	0.639	0.711
GSM1900	0.187	0.509	0.509
WCDMA850	0.372	0.590	0.59
WCDMA1900	0.374	0.634	0.634
802.11b	0.017	0.012	0.12
802.11a	0.356	0.072	-
Simultaneous SAR per KDB 690783 D01	0.744	0.699	0.712

Date(s) of Tests	Sep. 7, 2012 ~ Sep. 10, 2012
Antenna Type	Integral Antenna
GPRS	Multislot Class: 10, Mode Class: B
Key Feature(s)	This device support Mobile Hotspot. But, Hotspot is not supported with 5GHz WiFi.

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.

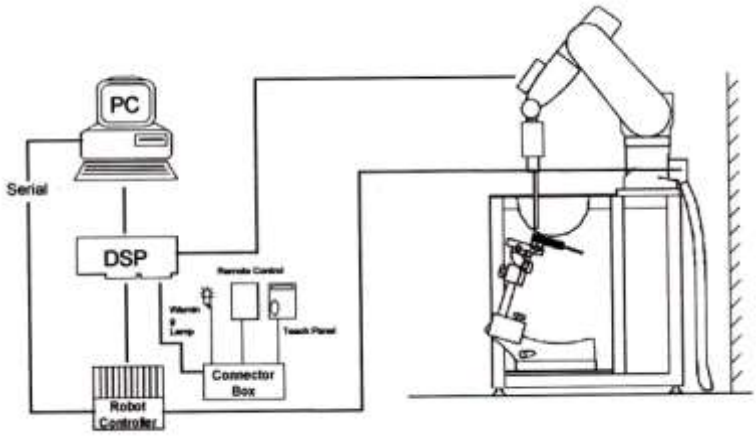


Figure 3.1 HCT SAR Lab. Test Measurement Set-up

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.

3.2 DASY4 E-FIELD PROBE SYSTEM

3.2.1 ET3DV6 Probe Specification

Construction	Symmetrical design with triangular core Interleaved sensors
	Built-in shielding against static charges
	PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air
	Conversion Factors (CF) for HSL 900 and HSL 1810
	Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis)
	± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm)
	Tip diameter: 2.5 mm (Body: 12 mm)
	Distance from probe tip to dipole centers: 1.0 mm
Application	General dosimetry up to 6 GHz
	Dosimetry in strong gradient fields
	Compliance tests of mobile phones

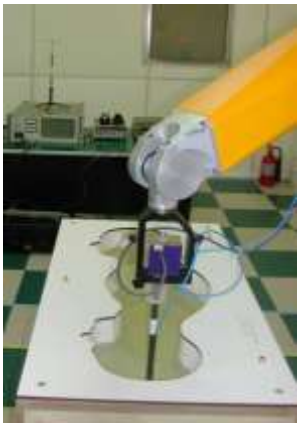


Figure 3.1 Photograph of the probe and the Phantom

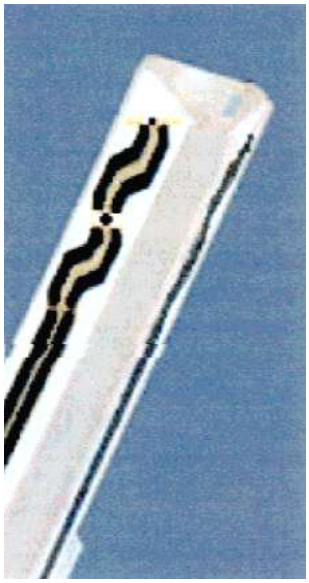


Figure 3.3 ET3DV6 E-field Probe

The SAR measurements were conducted with the dosimetric probe ET3DV6, designed in the classical triangular configuration [5] 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 mortifier 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 2 nd order fitting. The approach is stopped at reaching the maximum.

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 ± 10 %. The spherical isotropy was evaluated with the proper procedure and found to be better than ± 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)

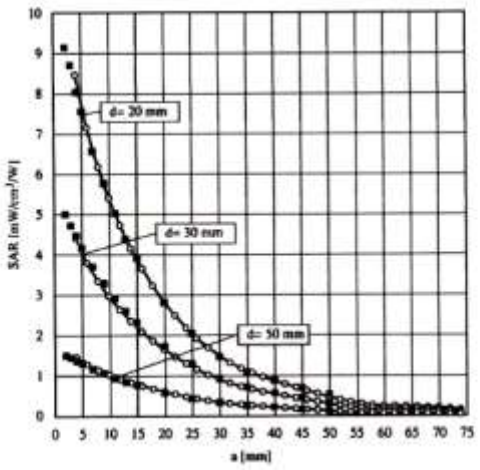


Figure 3.4 E-Field and Temperature measurements at 900 MHz

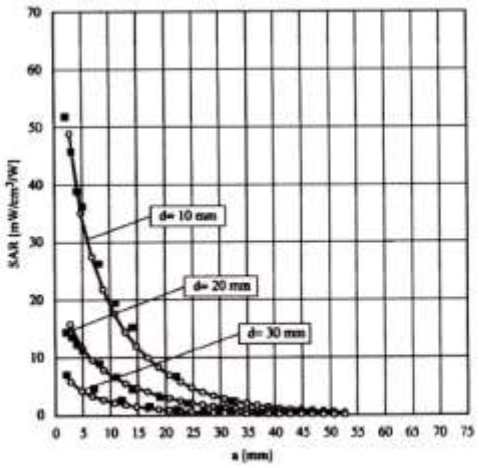


Figure 3.5 E-Field and temperature measurements at 1.8 GHz

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/cm^3

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/cm^2
E_{tot} = total electric field strength in V/m

3.4 SAM Phantom

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

Figure 3.6 SAM Phantom

Shell Thickness	2.0 mm ± 0.2 mm (6 ± 0.2 mm at ear point)
Filling Volume	about 25 L
Dimensions	1 000 mm x 500 mm (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

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.

0.Ingredients (% by weight)	Frequency (MHz)									
	835		915		1 900		2 450		5200-5800	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2	65.52	78.66
Salt (NaCl)	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04	0.0	0.0
Sugar	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0	0.0	0.0
HEC	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0	0.0	0.0
Bactericide	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0	17.24	10.67
DGBE	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7	0.0	0.0
Diethylene glycol hexyl ether									17.24	10.67

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

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	DAE4	479	Aug. 28, 2012	Annual	Aug. 28, 2013
SPEAG	DAE4	648	Apr. 27, 2012	Annual	Apr. 27, 2013
SPEAG	E-Field Probe ET3DV6	1609	Mar 19, 2012	Annual	Mar 19, 2013
SPEAG	E-Field Probe EX3DV4	3863	July 13, 2012	Annual	July 13, 2013
SPEAG	Validation Dipole D835V2	441	May 16, 2012	Annual	May 16, 2013
SPEAG	Validation Dipole D1900V2	5d032	July 20, 2012	Annual	July 20, 2013
SPEAG	Validation Dipole D2450V2	743	Aug. 23, 2012	Annual	Aug. 23, 2013
SPEAG	Validation Dipole D5GHzV2	1107	Nov. 15, 2011	Annual	Nov. 15, 2012
Agilent	Power Meter(F) E4419B	MY41291386	Nov. 04, 2011	Annual	Nov. 04, 2012
Agilent	Power Sensor(G) 8481	MY41090870	Nov. 04, 2011	Annual	Nov. 04, 2012
HP	Dielectric Probe Kit 85070C	00721521	N/A	N/A	N/A
HP	Dual Directional Coupler	16072	Nov. 04, 2011	Annual	Nov. 04, 2012
R&S	Base Station CMW500	1201.0002K50_1168	Jan. 17,2012	Annual	Jan. 17,2013
Agilent	Base Station E5515C	GB44400269	Feb. 10, 2012	Annual	Feb. 10, 2013
HP	Signal Generator E4438C	MY42082646	Nov. 11, 2011	Annual	Nov. 11, 2012
HP	Network Analyzer 8753ES	JP39240221	Apr. 3, 2012	Annual	Apr. 3, 2013

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.

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 15 mm x 15 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 30 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.

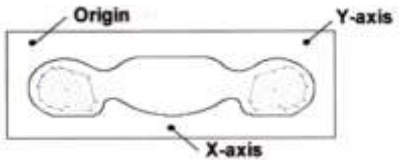


Figure 4.1 SAR Measurement Point in Area Scan

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 15º or until the device antenna touch the phantom. Please refer to IEEE 1528-2003 illustration below.

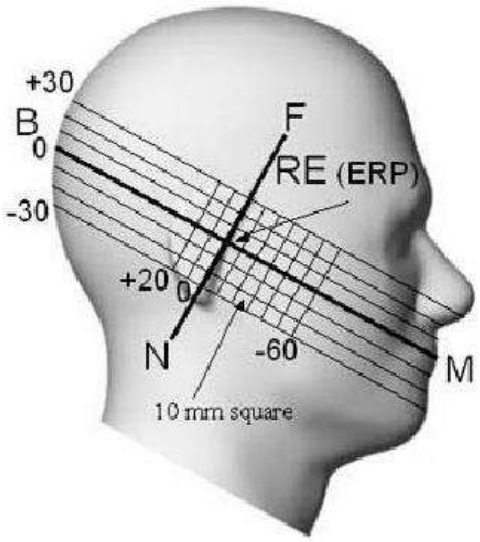


Figure 5.1 Side view of the phantom

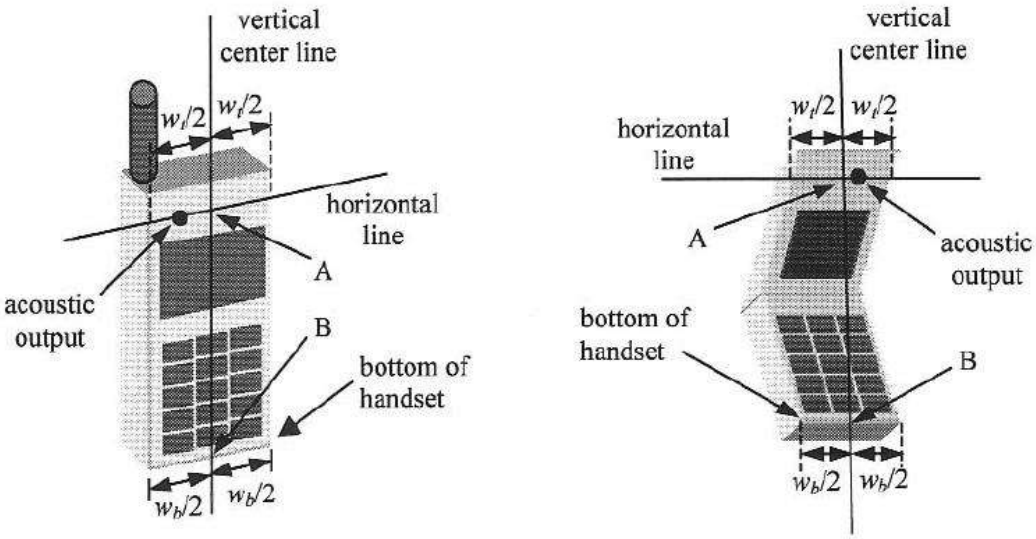


Figure 5.2 Handset vertical and horizontal reference lines

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 1.0 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

Error Description	Tol (± %)	Prob. dist.	Div.	c_i	Standard Uncertainty (± %)	v_{eff}
1. Measurement System						
Probe Calibration	6.00	N	1	1	6.00	∞
Axial Isotropy	4.70	R	1.73	0.7	1.90	∞
Hemispherical Isotropy	9.60	R	1.73	0.7	3.88	∞
Boundary Effects	1.00	R	1.73	1	0.58	∞
Linearity	4.70	R	1.73	1	2.71	∞
System Detection Limits	1.00	R	1.73	1	0.58	∞
Readout Electronics	0.30	N	1.00	1	0.30	∞
Response Time	0.8	R	1.73	1	0.46	∞
Integration Time	2.6	R	1.73	1	1.50	∞
RF Ambient Conditions	3.00	R	1.73	1	1.73	∞
Probe Positioner	0.40	R	1.73	1	0.23	∞
Probe Positioning	2.90	R	1.73	1	1.67	∞
Max SAR Eval	1.00	R	1.73	1	0.58	∞
2.Test Sample Related						
Device Positioning	2.90	N	1.00	1	2.90	145
Device Holder	3.60	N	1.00	1	3.60	5
Power Drift	5.00	R	1.73	1	2.89	∞
3.Phantom and Setup						
Phantom Uncertainty	4.00	R	1.73	1	2.31	∞
Liquid Conductivity(target)	5.00	R	1.73	0.64	1.85	∞
Liquid Conductivity(meas.)	2.07	N	1	0.64	1.32	9
Liquid Permitivity(target)	5.00	R	1.73	0.6	1.73	∞
Liquid Permitivity(meas.)	5.02	N	1	0.6	3.01	9
Combind Standard Uncertainty					11.13	
Coverage Factor for 95 %					*k*=2	
Expanded STD Uncertainty					22.25	

Table 6.1 Uncertainty (800 MHz- 2450 MHz)

Error Description	Tol (± %)	Prob. dist.	Div.	c_i	Standard Uncertainty (± %)	v_{eff}
1. Measurement System						
Probe Calibration	6.55	N	1	1	6.55	∞
Axial Isotropy	4.70	R	1.73	0.7	1.90	∞
Hemispherical Isotropy	9.60	R	1.73	0.7	3.88	∞
Boundary Effects	1.00	R	1.73	1	0.58	∞
Linearity	4.70	R	1.73	1	2.71	∞
System Detection Limits	1.00	R	1.73	1	0.58	∞
Readout Electronics	0.30	N	1.00	1	0.30	∞
Response Time	0.8	R	1.73	1	0.46	∞
Integration Time	2.6	R	1.73	1	1.50	∞
RF Ambient Conditions	3.00	R	1.73	1	1.73	∞
Probe Positioner	0.40	R	1.73	1	0.23	∞
Probe Positioning	2.90	R	1.73	1	1.67	∞
Max SAR Eval	1.00	R	1.73	1	0.58	∞
2.Test Sample Related						
Device Positioning	2.90	N	1.00	1	2.90	145
Device Holder	3.60	N	1.00	1	3.60	5
Power Drift	5.00	R	1.73	1	2.89	∞
3.Phantom and Setup						
Phantom Uncertainty	4.00	R	1.73	1	2.31	∞
Liquid Conductivity(target)	5.00	R	1.73	0.64	1.85	∞
Liquid Conductivity(meas.)	2.07	N	1	0.64	1.32	9
Liquid Permitivity(target)	5.00	R	1.73	0.6	1.73	∞
Liquid Permitivity(meas.)	5.02	N	1	0.6	3.01	9
Combind Standard Uncertainty					11.43	
Coverage Factor for 95 %					$k=2$	
Expanded STD Uncertainty					22.86	

Table 6.2 Uncertainty (5000-5900 MHz)

7. ANSI/ IEEE C95.1 - 1992 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).

8. SYSTEM VERIFICATION

8.1 Tissue Verification

Freq. [MHz]	Date	Liquid	Liquid Temp.[°C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
835	Sep.07, 2012	Head	21.3	ε r	41.5	41.9	0.96	± 5
				σ	0.90	0.963	7.00	± 5
835		Body		ε r	55.2	54.4	-1.45	± 5
				σ	0.97	1.01	4.12	± 5
1 900	Sep.08, 2012	Head	21.2	ε r	40.0	39.1	-2.25	± 5
				σ	1.40	1.39	-0.71	± 5
1 900		Body		ε r	53.3	52.8	-0.94	± 5
				σ	1.52	1.53	0.66	± 5
2 450	Sep.10, 2012	Head	21.1	ε r	39.2	39	-0.51	± 5
				σ	1.80	1.79	-0.56	± 5
2 450		Body		ε r	52.7	50.6	-3.98	± 5
				σ	1.95	1.98	1.54	± 5
5 200	Sep.09, 2012	Head	21.0	ε r	36.0	36.4	1.11	
				σ	4.66	4.53	-2.79	
5 200		Body		ε r	49.0	47.4	-3.27	
				σ	5.3	5.29	-0.19	
5500		Head		ε r	35.6	35.7	0.28	± 5
				σ	4.96	4.86	-2.02	± 5
5500		Body		ε r	48.6	46.5	-4.32	± 5
				σ	5.65	5.66	0.18	± 5
5800		Head		ε r	35.3	34.9	-1.13	± 5
				σ	5.27	5.27	0.00	± 5
5800		Body		ε r	48.2	46.1	-4.36	± 5
				σ	6.00	6.25	4.17	± 5

The Tissue dielectronic parameters were measured prior to the SAR evaluation using an Agilent 85070C Dielectronic Probe Kit and Agilent Network Analyzer.

8.2 System Validation

Prior to assessment, the system is verified to the ± 10 % of the specifications at 835 MHz /1 900 MHz/ 2 450 MHz/5.5GHz/5.8GHz by using the system validation kit. (Graphic Plots Attached)

Freq. [MHz]	Date	Probe (SN)	Liquid	Amb. Temp. [°C]	Liquid Temp. [°C]	1 W Target SAR_{1g} (SPEAG) (mW/g)	Measured SAR_{1g} (mW/g)	1 W Normalized SAR_{1g} (mW/g)	Deviation [%]	Limit [%]
835	Sep.07, 2012	1609	Head	21.5	21.3	9.43	0.98	9.8	+ 3.92	± 10
			Body			9.50	0.945	9.45	- 0.53	± 10
1 900	Sep.08, 2012	1609	Head	21.4	21.2	39.0	3.9	39	0.00	± 10
			Body			39.9	3.89	38.9	- 2.51	± 10
2 450	Sep.10, 2012	1609	Head	21.3	21.1	52.7	5.34	53.4	+1.33	± 10
			Body			51.2	4.98	49.8	- 2.73	± 10
5200	Sep.09, 2012	3863	Head	21.2	21.0	80.3	7.64	76.4	- 4.86	± 10
			Body			77.2	7.74	77.4	+ 0.26	± 10
5 500			Head			87.8	8.38	83.8	- 4.56	± 10
			Body			81.6	7.85	78.5	- 3.80	± 10
5 800			Head			78.9	7.71	77.1	- 2.28	± 10
			Body			76.9	7.75	77.5	+ 0.78	± 10

8.3 System Validation Procedure

SAR measurement was prior to assessment, the system is verified to the ± 10 % of the specifications at each frequency band by using the system validation kit. (Graphic Plots Attached)
- Cabling the system, using the validation kit equipments.
- Generate about 100 mW Input Level from the Signal generator to the Dipole Antenna.
- Dipole Antenna was placed below the Flat phantom.
- The measured one-gram SAR at the surface of the phantom above the dipole feed-point should be within 10 % of the target reference value.
- The results are normalized to 1 W input power.

Note;
SAR Verification was performed according to the FCC KDB 450824.

9. RF CONDUCTED POWER MEASUREMENT

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

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

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.

9.1 CDMA

9.1.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices", May 2006. MMaximum output power is verified on the High, Middle and Low channels according to procedures defined in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 tests were measured with power control bits in “All Up” condition.

1. If the mobile station supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9 600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1 (Table 9.1) parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC 3, 4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9 600 bps Fundamental Channel and 9 600 bps SCH0 data rate Channel and 9 600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2(Table 9.2) was applied.
5. FCHs were configured at full rate for mMaximum SAR with “All Up” power control bits.

Parameters for Max. Power for RC1

Parameter	Units	Value
I_{or}	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table. 9.1

Parameters for Max. Power for RC3

Parameter	Units	Value
I_{or}	dBm/1.23 MHz	-86
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table. 9.2

9.1.2 Head SAR Measurement

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the mMaximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the mMaximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

9.1.3 Body SAR Measurement

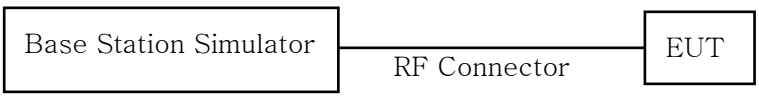
SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCHn) is not required when the mMaximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the mMaximum output channel (FCH + SCHn) with FCH at full rate and SCH0 enabled at 9 600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts.

Body SAR in RC1 is not required when the mMaximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the mMaximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

Band	Channel	SO2	SO2	SO55	SO55	TDSO SO32
		RC1/1 (dBm)	RC3/3 (dBm)	RC1/1 (dBm)	RC3/3 (dBm)	RC3/3 (dBm)
CDMA	1013	24.58	24.58	24.56	24.58	24.50
	384	24.33	24.33	24.31	24.31	24.33
	777	24.36	24.37	24.40	24.43	24.39

9.2 GSM

Conducted output power measurements were performed using a base station simulator under digital average power.



SAR Test for WWAN were performed with a base station simulator Agilent E5515C. Communication between the device and the emulator was established by air link. Set base station emulator to allow DUT to radiate maximum output power during all tests. Please refer to the below worst case SAR operation setup.

- GSM voice: Head SAR

- GPRS Multi-slots : Body SAR with GPRS Multi-slot Class10 with CS 1 (GMSK)

Note;

CS1/MCS7 coding scheme was used in GPRS/EDGE output power measurements and SAR Testing, as a condition where GMSK/8PSK modulation was ensured. Investigation has shown that CS1 - CS4/ MCS5 – MCS9 settings do not have any impact on the output levels in the GPRS/EDGE modes.

GSM Conducted output powers (Burst-Average)

Band	Channel	Voice	GPRS(GMSK) Data – CS1	
		GSM (dBm)	GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)
GSM 1900	512	29.84	29.84	28.84
	661	29.88	29.87	28.90
	810	29.73	29.72	28.82

GSM Conducted output powers (Frame-Average)

Band	Channel	Voice	GPRS(GMSK) Data – CS1	
		GSM (dBm)	GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)
GSM 1900	512	20.81	20.81	22.82
	661	20.85	20.84	22.88
	810	20.7	20.69	22.8

Note:

Time slot average factor is as follows:

1 Tx slot = 9.03 dB, Frame-Average output power = Burst-Average output power – 9.03 dB

2 Tx slot = 6.02 dB, Frame-Average output power = Burst-Average output power – 6.02 dB

3 Tx slot = 4.26 dB, Frame-Average output power = Burst-Average output power – 4.26 dB

4 Tx slot = 3.01 dB, Frame-Average output power = Burst-Average output power – 3.01 dB

9.2 WCDMA

Body SAR is not required for handsets with HSDPA capabilities when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75 % of the SAR limit. Otherwise, SAR is Measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that results in the highest SAR in 12.2 kbps RMC for that RF channel.

9.2.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3 GPP TS 34.121, using the appropriate RMC or AMR with TPC(transmit power control) set to all “1s”.

9.2.2 Head SAR Measurements

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than ¼ dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer using the exposure configuration that results in the highest SAR for that RF channel in 12.2 RMC.

9.2.3 Body SAR Measurement

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all “1s”.

9.2.4 Handsets with Release 5 HSDPA

Body SAR is not required for handsets with HSDPA capabilities when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75 % of the SAR limit. Otherwise, SAR is Measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that results in the highest SAR in 12.2 kbps RMC for that RF channel.

Sub-Test 1 Setup for Release 5 HSDPA

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM (dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15.
Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

9.2.5 Handsets with Release 6 HSPA (HSDPA/HSUPA)

Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75 % of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.1 kbps RMC without HSPA. When VOIP is applicable for head exposure, SAR is not required when the maximum output of each RF channel with HSPA is less than ¼ dB higher than that measured using 12.2 kbps RMC; otherwise, the same HSPA configuration used for body measurement should be used to test for head exposure.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}(1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}: 47/15 β_{ed2}: 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ A_{hs} = β_{hs}/β_c = 30/15 ⇔ β_{hs}= 30/15 *β_c.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

WCDMA Average Conducted output powers

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			MPR Target
			4132	4183	4233	
99	WCDMA	12.2 kbps RMC	23.18	23.29	23.23	-
99	WCDMA	12.2 kbps AMR	23.16	23.25	23.18	
5	HSDPA	Subtest 1	23.18	23.25	23.18	0
5		Subtest 2	23.12	23.16	23.17	0
5		Subtest 3	22.65	22.7	22.6	0.5
5		Subtest 4	22.63	22.72	22.63	0.5
6	HSUPA	Subtest 1	22.77	22.56	22.42	0
6		Subtest 2	21.55	21.71	21.66	2
6		Subtest 3	21.93	22.09	21.92	1
6		Subtest 4	21.68	21.85	21.68	2
6		Subtest 5	22.77	22.56	22.42	0

3GPP Release Version	Mode	3GPP 34.121 Subtest	PCS Band [dBm]			MPR Target
			9262	9262	9262	
99	WCDMA	12.2 kbps RMC	23.09	23.24	23.1	-
99	WCDMA	12.2 kbps AMR	23.08	23.24	23.05	
5	HSDPA	Subtest 1	23.08	23.22	23.05	0
5		Subtest 2	23.08	23.21	23.05	0
5		Subtest 3	22.58	22.71	22.65	0.5
5		Subtest 4	22.57	22.71	22.66	0.5
6	HSUPA	Subtest 1	22.33	22.45	22.43	0
6		Subtest 2	21.55	21.59	21.37	2
6		Subtest 3	21.87	22	21.94	1
6		Subtest 4	21.57	21.58	21.69	2
6		Subtest 5	22.33	22.45	22.42	0

Note;

This model implements an Enhanced MPR(E-MRP) software algorithm.

Enhanced MPR takes into account the measured CM of the transmitted signal after power scaling and thus provides a more representative CM value to be used in the determination of required power reduction.

An accurate CM value is desirable as the goal of power reduction is to maintain compliance with emissions limits. By using a more accurate CM value, the E-MPR process minimizes the magnitudes of power reduction required to maintain emissions compliance whereas the legacy MPR software may incorporate a magnitude of power reduction that is higher than is required for emissions compliance. The HSPA transmitter power will not exceed the R99 maximum transmit power and be compliant with 3GPP requirements.

9.3 WiFi

9.3.1 SAR Testing for 802.11a/b/g/n modes

General Device Setup

Normal Network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

Frequency Channel Configurations

80.11 a/b/g and 4.9 GHz operating modes are tested independently according to the service requirements in each frequency band. 80.211 b/g modes are tested on channels 1, 6 and 11.802.11a is tested for UNII operations on channels 36 and 48 in the 5.15-5.25 GHz band; channels 52 and 64 in the 5.25-5.35 GHz band; Channels 104, 116, 124 and 136 in the 5.470-5.725 GHz band; and channels 149 and 161 in the 5.8 GHz band. When 5.8 GHz § 15.247 is also available, channels 149, 157 and 165 should be tested instead of the UNII channels. 4.9 GHz is tested on channels 1, 10 and 5 or 6, whichever has the higher output power, for 5 MHz channels; channels 11,15 and 19 for 10 MHz channels; and channels 21 and 25 for 20 MHz channels.

These are referred to as the “default test channels”. 802.11g mode was evaluated only if the output power was 0.25 dB higher than the 802.11b mode.

Mode		GHz	Channel	Turbo Channel	"Default Test Channels"			
					§15.247		UNII	
					802.11b	802.11g		
802.11 b/g		2.412	1		√	∇		
		2.437	6	6	√	∇		
		2.462	11		√	∇		
802.11a	UNII	5.18	36				√	
		5.20	40	42 (5.21 GHz)				*
		5.22	44					*
		5.24	48	50 (5.25 GHz)			√	
		5.26	52				√	
		5.28	56	58 (5.29 GHz)				*
		5.30	60					*
		5.32	64				√	
		5.500	100	Unknown				*
		5.520	104				√	
		5.540	108					*
		5.560	112					*
		5.580	116				√	
		5.600	120					*
		5.620	124				√	
		5.640	128					*
		5.660	132					*
		5.680	136				√	
		5.700	140					*
	UNII or §15.247	5.745	149		√		√	
		5.765	153	152 (5.76 GHz)		*		*
		5.785	157		√			*
		5.805	161	160 (5.80 GHz)		*	√	
	§15.247	5.825	165		√			

802.11 Test Channels per FCC Requirements

Band	Channel	Conducted Power (dBm)			
		Data Rate (Mbps)			
		1	2	5.5	11
IEEE 802.11b	1	10.89	10.54	10.17	10.33
	6	11.85	11.32	10.86	11.43
	11	12.26	12.19	12.06	11.95

Average IEEE 802.11b Conducted output power

Band	Channel	Conducted Power (dBm)							
		Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
IEEE 802.11g	1	11.70	11.86	11.82	11.50	11.22	11.02	10.65	10.37
	6	12.50	12.33	12.15	12.26	11.77	11.69	11.23	11.35
	11	11.25	11.13	11.12	10.72	10.79	10.27	9.77	9.78

Average IEEE 802.11g Conducted output power

Band	Channel	Conducted Power (dBm)							
		Data Rate (Mbps)							
		6.5	13	19.5	26	39	52	58.5	65
IEEE 802.11n (HT-20)	1	11.78	11.70	11.54	11.23	11.08	10.93	10.92	10.54
	6	112.38	12.21	11.95	12.05	11.62	11.31	11.18	11.23
	11	11.64	10.89	10.67	10.43	10.35	10.35	10.01	9.31

Average IEEE 802.11n Conducted output power

WLAN 5GHz Average Conducted Powers

802.11a

Mode	Freq [MHz]	Channel	conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	36	12.21	12.05	12.02	11.85	11.61	10.78	10.50	10.36
802.11a	5200	40	12.47	12.02	11.93	11.72	11.06	10.68	10.47	10.22
802.11a	5220	44	11.59	11.40	11.35	11.21	11.09	10.59	10.41	10.49
802.11a	5240	48	12.01	11.94	11.73	11.44	11.16	10.82	10.62	10.15
802.11a	5260	52	12.27	12.11	11.88	11.44	11.30	10.93	10.52	10.37
802.11a	5280	56	11.84	11.51	11.16	11.09	10.94	10.97	10.44	10.31
802.11a	5300	60	11.57	11.46	11.38	11.20	10.95	10.72	10.38	10.15
802.11a	5320	64	12.47	12.22	11.83	11.66	11.42	10.95	10.58	10.30
802.11a	5500	100	12.08	11.86	11.74	11.66	11.35	10.99	10.69	10.54
802.11a	5520	104	12.06	11.98	11.83	11.73	11.52	11.33	11.03	10.91
802.11a	5540	108	12.38	12.29	12.23	12.09	11.90	11.54	11.08	10.89
802.11a	5560	112	12.32	12.30	12.27	12.18	1.74	11.32	11.08	10.95
802.11a	5580	116	12.31	12.13	12.02	11.80	11.65	11.37	11.11	11.01
802.11a	5660	132	11.70	11.54	11.49	11.29	11.11	10.82	10.59	10.48
802.11a	5680	136	11.62	11.45	11.34	11.21	11.01	10.75	10.50	10.38
802.11a	5700	140	11.57	11.55	11.42	11.21	11.02	10.72	10.47	10.36
802.11a	5745	149	11.89	11.73	11.58	11.46	11.27	10.98	10.72	10.64
802.11a	5765	153	11.58	11.48	11.38	11.26	11.04	10.86	10.51	11.42
802.11a	5785	157	11.48	11.36	11.23	11.06	10.90	10.61	10.26	10.16
802.11a	5805	161	11.24	11.13	11.03	10.87	10.71	10.47	10.17	10.08
802.11a	5825	165	11.15	11.03	10.96	10.80	10.65	10.42	10.12	10.02

802.11n

Mode	Freq [MHz]	Channel	conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	20	26	39	52	58	65
802.11n	5180	36	10.84	10.68	10.54	10.45	10.13	9.92	9.84	9.73
802.11n	5200	40	10.45	10.36	10.05	9.92	9.69	9.45	9.37	9.25
802.11n	5220	44	10.75	10.30	10.13	9.95	9.73	9.50	9.42	9.34
802.11n	5240	48	10.52	10.26	10.19	10.02	9.81	9.60	9.48	9.40
802.11n	5260	52	10.60	10.38	10.27	10.08	9.78	9.58	9.49	9.36
802.11n	5280	56	10.70	10.53	10.48	10.23	10.01	9.74	9.62	9.47
802.11n	5300	60	10.55	10.40	10.21	10.05	9.82	9.55	9.44	9.35
802.11n	5320	64	10.65	10.47	10.35	10.13	9.86	9.50	9.47	9.35
802.11n	5500	100	10.95	10.72	10.58	10.43	10.15	9.85	9.83	9.76
802.11n	5520	104	11.20	11.04	10.81	10.51	10.33	9.90	9.77	9.66
802.11n	5540	108	11.32	11.05	10.91	10.69	10.12	9.95	9.84	9.52
802.11n	5560	112	10.13	11.01	10.71	10.54	10.38	9.81	9.68	9.54
802.11n	5580	116	10.90	10.73	10.51	10.34	10.12	9.82	9.71	9.57
802.11n	5660	132	10.55	10.45	10.01	9.80	9.51	9.43	9.08	9.00
802.11n	5680	136	10.55	10.27	10.09	10.05	9.54	9.53	9.10	9.01
802.11n	5700	140	10.58	10.35	10.17	9.95	9.67	9.39	9.28	9.15
802.11n	5745	149	10.58	10.45	10.16	10.00	9.73	9.36	9.26	9.23
802.11n	5765	153	10.27	10.03	9.85	9.65	9.41	9.13	9.03	8.92
802.11n	5785	157	10.06	9.87	9.70	9.43	9.20	9.01	8.85	8.75
802.11n	5805	161	9.89	9.68	9.46	9.26	9.01	8.81	8.63	8.56
802.11n	5825	165	9.71	9.50	9.35	9.18	8.91	8.62	8.55	8.48

Mode	Freq [MHz]	Channel	conducted Power [dBm] 40MHz Bandwidth							
			Data Rate [Mbps]							
			13.5/15	27/30	40.5/45	54/60	81/90	108/120	121.5/135	135/150
802.11n	5190	38	11.85	11.69	11.53	11.34	11.11	10.92	10.79	10.74
802.11n	5230	46	11.38	11.30	11.26	11.02	10.80	10.67	10.64	10.52
802.11n	5270	54	11.51	11.41	11.25	11.06	10.85	10.68	10.55	10.50
802.11n	5310	62	11.43	11.31	11.17	10.96	10.78	10.54	10.52	10.39
802.11n	5510	102	11.84	11.75	11.29	11.11	10.82	10.53	150	10.46
802.11n	5550	110	12.13	11.88	11.72	11.47	11.23	10.85	10.77	10.62
802.11n	5670	134	11.15	11.22	11.20	10.96	10.71	10.36	10.42	10.21
802.11n	5755	151	11.15	11.03	10.86	10.65	10.43	10.17	10.12	10.05
802.11n	5795	159	10.82	10.70	10.51	10.33	10.10	9.85	9.73	9.71

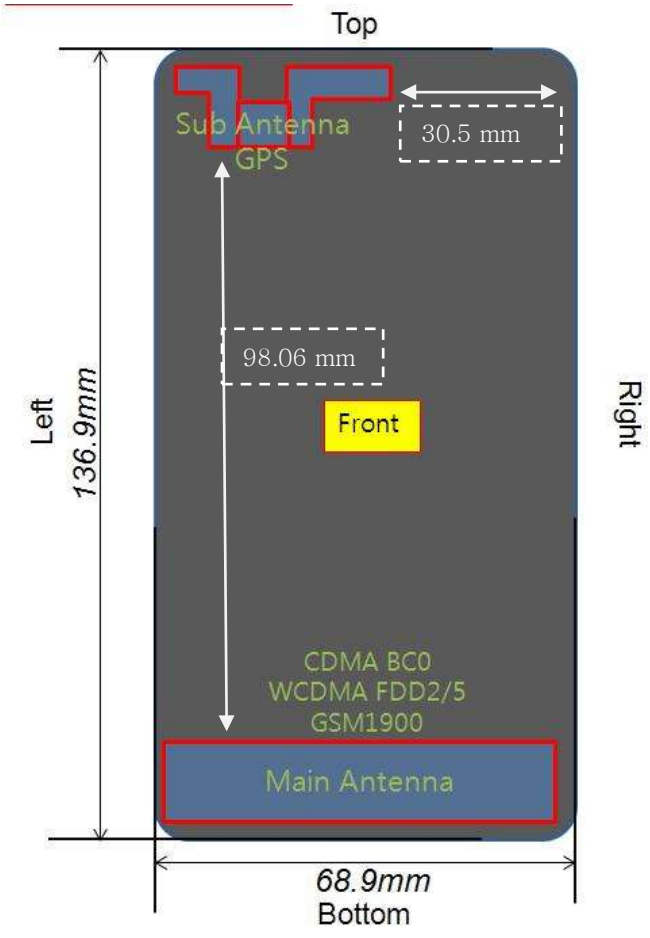
Note;
SAR testing was performed according to the FCC KDB 248227.

10. SAR Test configuration & Antenna Information

10.1 SAR Test configurations

Mode	Back	Front	Left	Right	Bottom	Top
850 GPRS	Yes	Yes	Yes	Yes	Yes	No
1900 GPRS	Yes	Yes	Yes	Yes	Yes	No
WCDMA850	Yes	Yes	Yes	Yes	Yes	No
WCDMA1900	Yes	Yes	Yes	Yes	Yes	No
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN	Yes	Yes	No	No	No	No

10.2 Antenna and Device Information



① LTE B18, GSM900/1800/1900, WCDMA850/1900/2100, CDMA BC0/BC6 LTE B11, CDMA BC0 DRX, LTE B18 DRX

MODE	BAND	TX(MHz)	RX(MHz)
LTE	B11	1427.9~1447.9	1475.9~1495.9
	B18	815~830	860~875
CDMA	BC0	824~849	869~894
	BC6	1,920~1,980	2,110~2,170
WCDMA	FDD1	1,920~1,980	2,110~2,170
	FDD2	1,850~1,910	1,930~1,990
	FDD5	824~849	869~894
GSM	GSM900	880~915	925~960
	DCS1800	1,710~1,785	1,805~1,880
	PCS1900	1,850~1,910	1,930~1,990

② LTE B11 DRX , CDMA BC6 DRX , GPS, BT/WIFI

MODE	BAND	TX(MHz)	RX(MHz)
LTE	B11	x	1475.9~1495.9
CDMA	BC6	x	2,110~2,170
GPS(GNSS)	x	x	1565~1605
BT & WiFi (802.11a/b /g/n)	x	BT : 2402(1ch) ~ 2480(79ch) WIFI 2.4: 2412(1ch) ~ 2462(11ch) WIFI 5: 5.2, 5.3, 5.5, 5.8Ghz	BT: 2402(1ch) ~ 2480 (79ch) WIFI 2.4: 2412(1ch) ~ 2462(11ch) WIFI 5: 5.2,5.3, 5.5,5.8Ghz

③ 1-Seg

MODE	BAND	TX(MHz)	RX(MHz)
1-SEG	x	x	473.143 ~ 707.143

[Front side View]

Note;

Per FCC KDB Publication 941225 D06, we performed the SAR testing at 1 cm from the top & bottom surfaces and also from side edges with a transmitting antenna ≤ 2.5 cm from an edge.

11. SAR Considerations for Multiple Transmitters and Antennas

11.1 SAR Evaluation Considerations

These procedures were followed according to FCC "SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas", May 2008. The procedures are applicable to phones with built-in unlicensed transmitters, such as 802.11 a/b/g and Bluetooth devices.

	2.45	5.15 - 5.35	5.47 - 5.85	GHz
P_{Ref}	12	6	5	mW
Device output power should be rounded to the nearest mW to compare with values specified in this				

Table. 11.1 Output Power Thresholds for Unlicensed Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	Routine evaluation required	SAR not required: Unlicensed only o when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas Licensed & Unlicensed o when the sum of the 1-g SAR is < 1.6 W/kg for all simultaneous transmitting antennas o when SAR to peak location separation ratio of simultaneous transmitting antenna pair is < 0.3 SAR required: Licensed & Unlicensed antenna pairs with SAR to peak location separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in stand-alone configuration for each wireless mode and exposure condition Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Unlicensed Transmitters	When there is no simultaneous transmission – o output ≤ 60/f: SAR not required o output > 60/f: stand-alone SAR required When there is simultaneous transmission – Stand-alone SAR not required when o output ≤ 2·P_{Ref} and antenna is ≥ 5.0 cm from other antennas o output ≤ P_{Ref} and antenna is ≥ 2.5 cm from other antennas o output ≤ P_{Ref} and antenna is < 2.5 cm from other antennas, each with either output power ≤ P_{Ref} or 1-g SAR < 1.2 W/kg Otherwise stand-alone SAR is required When stand-alone SAR is required o test SAR on highest output channel for each wireless mode and exposure condition o if SAR for highest output channel is > 50% of SAR limit, evaluate all channels according to normal procedures	
Jaw, Mouth and Nose	Flat phantom SAR required o when measurement is required in tight regions of SAM and it is not feasible or the results can be questionable due to probe tilt, calibration, positioning and orientation issues o position rectangular and clam-shell phones according to flat phantom procedures and conduct SAR measurements for these specific locations	When simultaneous transmission SAR testing is required, contact the FCC Laboratory for interim guidance.

SAR Evaluation Requirements for Multiple Transmitters Handsets

FCC ID: ZNFLGL21

BT Max. RF output power: 9.25 dBm

11.2 SAR Summation Scenario

Simultaneous Transmission Summation for Held to Ear

Simultaneous TX	configuration	CDMA835 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	∑SAR (W/kg)	Simultaneous TX	configuration	GSM1900 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	∑SAR (W/kg)
Head SAR	Left Cheek	0.456	0.015	0.471	Head SAR	Left Cheek	0.187	0.015	0.202
	Left Tilt	0.259	0.017	0.276		Left Tilt	0.031	0.017	0.048
	Right Cheek	0.409	0.016	0.425		Right Cheek	0.12	0.016	0.136
	Right Tilt	0.239	0.013	0.252		Right Tilt	0.044	0.013	0.057
Simultaneous TX	configuration	CDMA835 SAR(W/kg)	5G WIFI SAR (W/kg)	∑SAR (W/kg)	Simultaneous TX	configuration	GSM1900 SAR(W/kg)	5G WIFI SAR (W/kg)	∑SAR (W/kg)
Head SAR	Left Cheek	0.456	0.288	0.744	Head SAR	Left Cheek	0.187	0.288	0.475
	Left Tilt	0.259	0.356	0.615		Left Tilt	0.031	0.356	0.387
	Right Cheek	0.409	0.279	0.688		Right Cheek	0.12	0.279	0.399
	Right Tilt	0.239	0.279	0.518		Right Tilt	0.044	0.279	0.323
Simultaneous TX	configuration	WCDMA 850 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	∑SAR (W/kg)	Simultaneous TX	configuration	WCDMA 1900 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	∑SAR (W/kg)
Head SAR	Left Cheek	0.372	0.015	0.387	Head SAR	Left Cheek	0.374	0.015	0.389
	Left Tilt	0.21	0.017	0.227		Left Tilt	0.06	0.017	0.077
	Right Cheek	0.332	0.016	0.348		Right Cheek	0.225	0.016	0.241
	Right Tilt	0.21	0.013	0.223		Right Tilt	0.088	0.013	0.101
Simultaneous TX	configuration	WCDMA 850 SAR(W/kg)	5G WIFI SAR (W/kg)	∑SAR (W/kg)	Simultaneous TX	configuration	WCDMA 1900 SAR(W/kg)	5G WIFI SAR (W/kg)	∑SAR (W/kg)
Head SAR	Left Cheek	0.372	0.288	0.660	Head SAR	Left Cheek	0.374	0.288	0.662
	Left Tilt	0.21	0.356	0.566		Left Tilt	0.06	0.356	0.416
	Right Cheek	0.332	0.279	0.611		Right Cheek	0.225	0.279	0.504
	Right Tilt	0.21	0.279	0.489		Right Tilt	0.088	0.279	0.367

Simultaneous Transmission Summation for Body-Worn (1cm)

Simultaneous TX	configuration	CDMA 835 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	∑SAR (W/kg)	Simultaneous TX	configuration	CDMA 835 SAR(W/kg)	5 GHz WIFI SAR (W/kg)	∑SAR (W/kg)
Body SAR	Back	0.639	0.012	0.651	Body SAR	Back	0.639	0.06	0.699
	Front	0.537	0.00621	0.543		Front	0.537	0.072	0.609
Simultaneous TX	configuration	1900 GPRS SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	∑SAR (W/kg)	Simultaneous TX	configuration	1900 GPRS SAR(W/kg)	5 GHz WIFI SAR (W/kg)	∑SAR (W/kg)
Body SAR	Back	0.509	0.012	0.521	Body SAR	Back	0.509	0.06	0.569
	Front	0.332	0.00621	0.338		Front	0.332	0.072	0.404
Simultaneous TX	configuration	WCDMA 850 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	∑SAR (W/kg)	Simultaneous TX	configuration	WCDMA 850 SAR(W/kg)	5 GHz WIFI SAR (W/kg)	∑SAR (W/kg)
Body SAR	Back	0.52	0.012	0.532	Body SAR	Back	0.52	0.06	0.580
	Front	0.431	0.00621	0.437		Front	0.431	0.072	0.503
Simultaneous TX	configuration	WCDMA1900 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	∑SAR (W/kg)	Simultaneous TX	configuration	WCDMA 1900 SAR(W/kg)	5 GHz WIFI SAR (W/kg)	∑SAR (W/kg)
Body SAR	Back	0.634	0.012	0.646	Body SAR	Back	0.634	0.06	0.694
	Front	0.505	0.00621	0.511		Front	0.505	0.072	0.577

Simultaneous Transmission Summation for Hotspot (1cm)

Simultaneous TX	configuration	CDMA 835 SAR(W/kg)	2.4GHz WIFI SAR (W/kg)	∑SAR (W/kg)	Simultaneous TX	configuration	1900 GPRS SAR(W/kg)	2.4GHz WIFI SAR (W/kg)	∑SAR (W/kg)
Body SAR	Back	0.639	0.012	0.651	Body SAR	Back	0.509	0.012	0.521
	Front	0.537	0.00621	0.543		Front	0.332	0.00621	0.338
	Left	0.711	0.00132	0.712		Left	0.171	0.00132	0.172
	Right	0.464	-	0.464		Right	0.087	-	0.087
	Bottom	0.149	-	0.149		Bottom	0.291	-	0.291
	Top	-	0.00584	0.006		Top	-	0.00584	0.006
Simultaneous TX	configuration	WCDMA850 SAR(W/kg)	2.4GHz WIFI SAR (W/kg)	∑SAR (W/kg)	Simultaneous TX	configuration	WCDMA1900 SAR(W/kg)	2.4GHz WIFI SAR (W/kg)	∑SAR (W/kg)
Body SAR	Back	0.52	0.012	0.532	Body SAR	Back	0.634	0.012	0.646
	Front	0.431	0.00621	0.437		Front	0.505	0.00621	0.511
	Left	0.59	0.00132	0.591		Left	0.289	0.00132	0.290
	Right	0.425	-	0.425		Right	0.111	-	0.111
	Bottom	0.123	-	0.123		Bottom	0.382	-	0.382
	Top	-	0.00584	0.006		Top	-	0.00584	0.006

Note;

Body-Worn SAR : The Rear side hotspot SAR test configurations can be considered for body-worn accessory SAR. Although body-worn accessory conditions are typically for voice configurations, the GPRS slot frame averaged output power was more conservative and was included for the body-worn accessory SAR assessment.

11.3 Simultaneous Transmission Conclusion

The above tables represent the worst-case simultaneous transmission scenarios possibility with this device.

The conducted output power level of the BT transmitter are less than $2*P_{ref}$, the BT /WLAN antenna is more than 5 cm from the other antenna, therefore, stand-alone BT SAR evaluation are not required.

12. SAR TEST DATA SUMMARY

12.1 Measurement Results (CDMA835 Head SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Battery	Phantom Position	SAR(mW/g)
MHz	Channel						
836.52	384 (Mid)	CDMA835	24.31	-0.059	Standard	Left Ear	0.456
836.52	384 (Mid)	CDMA835	24.31	-0.179	Standard	Left Tilt 15°	0.259
836.52	384 (Mid)	CDMA835	24.31	-0.159	Standard	Right Ear	0.409
836.52	384 (Mid)	CDMA835	24.31	0.082	Standard	Right Tilt 15°	0.239
ANSI/ IEEE C95.1 - 1992– 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).

12.2 Measurement Results (GSM1900 Head SAR)

Frequency		Modulation	ConductedPower (dBm)	Power Drift (dB)	Battery	Phantom Position	SAR(mW/g)
MHz	Channel						
1 880.0	661 (Mid)	GSM1900	29.88	-0.097	Standard	Left Ear	0.187
			29.88	0.060	Standard	Left Tilt 15°	0.031
			29.88	0.010	Standard	Right Ear	0.12
			29.88	-0.008	Standard	Right Tilt 15°	0.044
ANSI/ IEEE C95.1 - 1992– 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).

12.3 Measurement Results (WCDMA850 Head SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Battery	Phantom Position	SAR(mW/g)
MHz	Channel						
836.6	4183 (Mid)	WCDMA850	23.29	-0.048	Standard	Left Ear	0.372
			23.29	-0.152	Standard	Left Tilt 15°	0.21
			23.29	0.047	Standard	Right Ear	0.332
			23.29	0.039	Standard	Right Tilt 15°	0.21
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).
8 WCDMA Mode was tested under RMC 12.2 kbps and HSPA Inactive.

12.4 Measurement Results (WCDMA1900 Head SAR)

Frequency		Modulation	ConductedPower (dBm)	Power Drift (dB)	Battery	Phantom Position	SAR(mW/g)
MHz	Channel						
1 880.0	9400 (Mid)	WCDMA1900	23.24	-0.063	Standard	Left Ear	0.374
			23.24	-0.045	Standard	Left Tilt 15°	0.06
			23.24	-0.100	Standard	Right Ear	0.225
			23.24	-0.013	Standard	Right Tilt 15°	0.088
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).
8 WCDMA Mode was tested under RMC 12.2 kbps and HSPA Inactive.

12.5 Measurement Results (802.11a/n 5GHz Head SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Battery	Phantom Position	Data Rate	SAR(mW/g)
MHz	Channel							
5200	40	802.11a	11.82	-0.041	Standard	Left Ear	6Mbps	0.251
5200	40	802.11a	11.82	-0.152	Standard	Left Tilt 15°	6Mbps	0.219
5200	40	802.11a	11.82	-0.126	Standard	Right Ear	6Mbps	0.237
5200	40	802.11a	11.82	-0.0167	Standard	Right Tilt 15	6Mbps	0.215
5320	64	802.11a	11.80	0.164	Standard	Left Ear	6Mbps	0.288
5320	64	802.11a	11.80	-0.149	Standard	Left Tilt 15°	6Mbps	0.238
5320	64	802.11a	11.80	0.075	Standard	Right Ear	6Mbps	0.279
5320	64	802.11a	11.80	-0.042	Standard	Right Tilt 15	6Mbps	0.279
5540	108	802.11a	12.38	0.016	Standard	Left Ear	6Mbps	0.288
5540	108	802.11a	12.38	-0.044	Standard	Left Tilt 15°	6Mbps	0.356
5540	108	802.11a	12.38	0.117	Standard	Right Ear	6Mbps	0.275
5540	108	802.11a	12.38	0.082	Standard	Right Tilt 15	6Mbps	0.273
5745	149	802.11a	11.89	0.104	Standard	Left Ear	6Mbps	0.206
5745	149	802.11a	11.89	-0.046	Standard	Left Tilt 15°	6Mbps	0.198
5745	149	802.11a	11.89	-0.122	Standard	Right Ear	6Mbps	0.175
5745	149	802.11a	11.89	0.146	Standard	Right Tilt 15	6Mbps	0.175
ANSI/ IEEE C95.1 - 1992– 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 Highest average RF output power channel for the lowest data rate were selected for SAR testing. IEEE 802.11(including 802.11n) SAR testing is required when the conducted powers are equal to or greater than 0.25 dB than the conducted powers in IEEE 802.11a.
8 When Hotspot is enabled, 5 GHz Bands are disabled
9 For 5GHz WLAN, Highest average power channel for the lowest data rate was selected for SAR evaluation based on KDB 248227. Other channels are required because 1g-average SAR > 0.8 W/Kg and peak SAR > 1.6W/Kg per KDB 248227.

12.6 Measurement Results (802.11b/g/n Head)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Battery	Phantom Position	Data Rate	SAR(mW/g)
MHz	Channel							
2 462	11 (High)	802.11b	12.26	0.054	Standard	Left Ear	1 Mbps	0.015
			12.26	0.005	Standard	Left Tilt 15°	1 Mbps	0.017
			12.26	0.01	Standard	Right Ear	1 Mbps	0.016
			12.26	-0.057	Standard	Right Tilt 15	1 Mbps	0.013
ANSI/ IEEE C95.1 - 1992– 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 IEEE 802.11g(including 802.11n) SAR testing is required when the conducted powers are equal to or greater than 0.25 dB Than the conducted powers in IEEE 802.11b.
8 For 2.4GHz WLAN, Highest average power channel for the lowest data rate was selected for SAR evaluation based on KDB 248227. Other channels are not necessary because 1g-average SAR < 0.8 W/Kg and peak SAR < 1.6W/Kg per KDB 248227.

12.7 Measurement Results (CDMA835 Body SAR)

Frequency		Modulation	ConductedPower (dBm)	Power Drift (dB)	Configuration	Separation Distance	SAR(mW/g)
MHz	Channel						
836.52	384 (Mid)	CDMA835	24.33	0.082	Rear	1.0 cm	0.639
836.52	384 (Mid)	CDMA835	24.33	-0.042	Front	1.0 cm	0.537
836.52	384 (Mid)	CDMA835	24.33	0.007	Left	1.0 cm	0.711
836.52	384 (Mid)	CDMA835	24.33	-0.132	Right	1.0 cm	0.464
836.52	384 (Mid)	CDMA835	24.33	-0.024	Bottom	1.0 cm	0.149
ANSI/ IEEE C95.1 - 1992– 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 Test Configuration ☐ With Holster ☒ Without Holster
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).

12.8 Measurement Results (GSM1900 Hotspot SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	Separation Distance	SAR(mW/g)
MHz	Channel						
1 880.0	661 (Mid)	GPRS 2Tx	28.90	-0.146	Rear	1.0 cm	0.509
1 880.0	661 (Mid)	GPRS 2Tx	28.90	-0.013	Front	1.0 cm	0.332
1 880.0	661 (Mid)	GPRS 2Tx	28.90	-0.065	Left	1.0 cm	0.171
1 880.0	661 (Mid)	GPRS 2Tx	28.90	-0.039	Right	1.0 cm	0.087
1 880.0	661 (Mid)	GPRS 2Tx	28.90	-0.069	Bottom	1.0 cm	0.291
ANSI/ IEEE C95.1 - 1992– 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-body 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 Test Configuration ☐ With Holster ☒ Without Holster
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).
9 For body SAR testing, the EUT was set in GPRS multi-slot class33 with 3uplink slots for GSM1900 due to maximum source-based time-averaged output power.
According to the KDB 941225 D03 SAR test reduction GSM/GPRS/EDGE, the maximum output power configuration were chosen for Body SAR testing.

12.9 Measurement Results (WCDMA850 Hotspot SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	Separation Distance	SAR(mW/g)
MHz	Channel						
836.6	4183 (Mid)	WCDMA850	23.29	0.069	Rear	1.0 cm	0.52
836.6	4183 (Mid)	WCDMA850	23.29	0.120	Front	1.0 cm	0.431
836.6	4183 (Mid)	WCDMA850	23.29	-0.004	Left	1.0 cm	0.59
836.6	4183 (Mid)	WCDMA850	23.29	0.002	Right	1.0 cm	0.425
836.6	4183 (Mid)	WCDMA850	23.29	-0.012	Bottom	1.0 cm	0.123
ANSI/ IEEE C95.1 - 2005– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population					**Body 1.6 W/kg (mW/g) **Averaged over 1 gram		

1 The test data reported are the worst-case SAR value with the antenna-body 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 Test Configuration ☐ With Holster ☒ Without Holster
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).
9 WCDMA Mode was tested under RMC 12.2 kbps and HSPA Inactive.

12.10 Measurement Results (WCDMA1900 Hotspot SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	Separation Distance	SAR(mW/g)
MHz	Channel						
1 880.0	9400 (Mid)	WCDMA1900	23.24	-0.089	Rear	1.0 cm	0.634
1 880.0	9400 (Mid)	WCDMA1900	23.24	-0.070	Front	1.0 cm	0.505
1 880.0	9400 (Mid)	WCDMA1900	23.24	0.106	Left	1.0 cm	0.289
1 880.0	9400 (Mid)	WCDMA1900	23.24	0.023	Right	1.0 cm	0.111
1 880.0	9400 (Mid)	WCDMA1900	23.24	-0.088	Bottom	1.0 cm	0.382
ANSI/ IEEE C95.1 - 2005– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						**Body 1.6 W/kg (mW/g)** Averaged over 1 gram	

1 The test data reported are the worst-case SAR value with the antenna-Body 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 Test Configuration ☐ With Holster ☒ Without Holster
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).
9 WCDMA Mode was tested under RMC 12.2 kbps and HSPA Inactive.

12.11 Measurement Results (802.11a/n 5GHz Body-Worn)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	Separation Distance	Data Rate	SAR(mW/g)
MHz	Channel							
5200	40	802.11a	11.82	0.07	Rear	1.0 cm	6Mbps	0.027
5200	40	802.11a	11.82	0.008	Front	1.0 cm	6Mbps	0.036
5320	64	802.11a	11.80	0.080	Rear	1.0 cm	6Mbps	0.034
5320	64	802.11a	11.80	-0.04	Front	1.0 cm	6Mbps	0.051
5540	108	802.11a	12.38	-0.02	Rear	1.0 cm	6Mbps	0.052
5540	108	802.11a	12.38	0.07	Front	1.0 cm	6Mbps	0.072
5745	149	802.11a	11.89	0.05	Rear	1.0 cm	6Mbps	0.06
5745	149	802.11a	11.89	0.01	Front	1.0 cm	6Mbps	0.039
ANSI/ IEEE C95.1 - 1992– 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 Highest average RF output power channel for the lowest data rate were selected for SAR testing. IEEE 802.11(including 802.11n) SAR testing is required when the conducted powers are equal to or greater than 0.25 dB than the conducted powers in IEEE 802.11a.
8 When Hotspot is enabled, 5 GHz Bands are disabled
9 For 5GHz WLAN, Highest average power channel for the lowest data rate was selected for SAR evaluation based on KDB 248227. Other channels are not necessary because 1g-average SAR < 0.8 W/Kg and peak SAR < 1.6W/Kg per KDB 248227.

12.12 Measurement Results (802.11b/g/n Hotspot SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	Separation Distance	Data Rate	SAR(mW/g)
MHz	Channel							
2 462	11 (High)	802.11b	12.26	-0.062	Rear	1.0 cm	1 Mbps	0.012
2 462	11 (High)	802.11b	12.26	0.024	Front	1.0 cm	1 Mbps	0.00621
2 462	11 (High)	802.11b	12.26	0.160	Left	1.0 cm	1 Mbps	0.00132
2 462	11 (High)	802.11b	12.26	0.014	Bottom	1.0 cm	1 Mbps	0.00584
ANSI/ IEEE C95.1 1992 – 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-body 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 code ☐ Base Station Simulator
7 IEEE 802.11g(including 802.11n) SAR testing is required when the conducted powers are equal to or greater than 0.25 dB Than the conducted powers in IEEE 802.11b.
8 For 2.4GHz WLAN, Highest average power channel for the lowest data rate was selected for SAR evaluation based on KDB 248227. Other channels are not necessary because 1g-average SAR < 0.8 W/Kg and peak SAR < 1.6W/Kg per KDB 248227.

13. CONCLUSION

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/ IEEE C95.1 1992.

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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Attachment 1. – SAR Test Plots

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.963 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

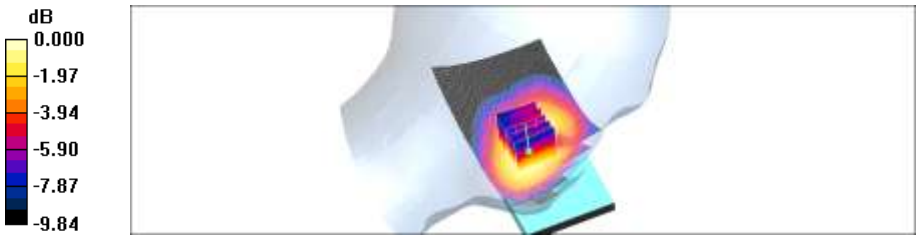
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left Touch 384/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.524 mW/g

Left Touch 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.57 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.604 W/kg
SAR(1 g) = 0.456 mW/g; SAR(10 g) = 0.339 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.488 mW/g



0 dB = 0.488mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.963 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

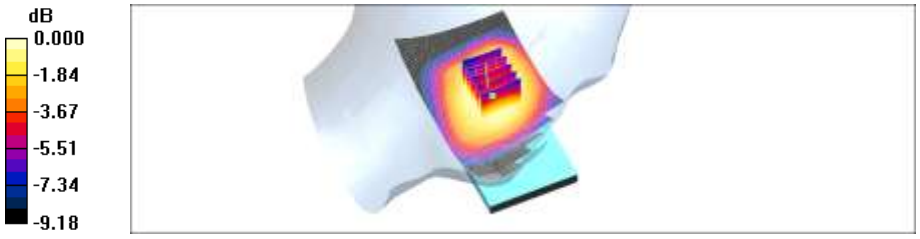
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left Tilt 384/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.278 mW/g

Left Tilt 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.7 V/m; Power Drift = -0.179 dB
Peak SAR (extrapolated) = 0.306 W/kg
SAR(1 g) = 0.259 mW/g; SAR(10 g) = 0.202 mW/g

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



0 dB = 0.269mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.963 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

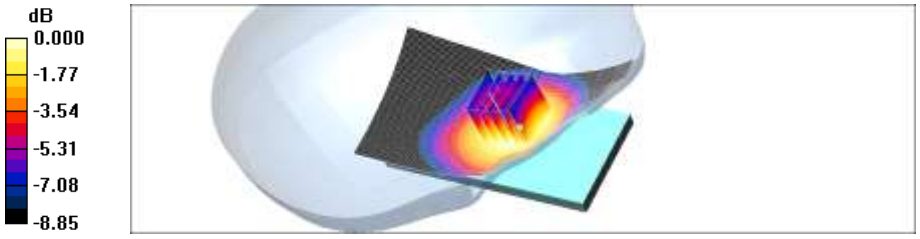
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Touch 384/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.434 mW/g

Right Touch 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.74 V/m; Power Drift = -0.159 dB
Peak SAR (extrapolated) = 0.485 W/kg
SAR(1 g) = 0.409 mW/g; SAR(10 g) = 0.316 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.425 mW/g



0 dB = 0.425mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.963 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

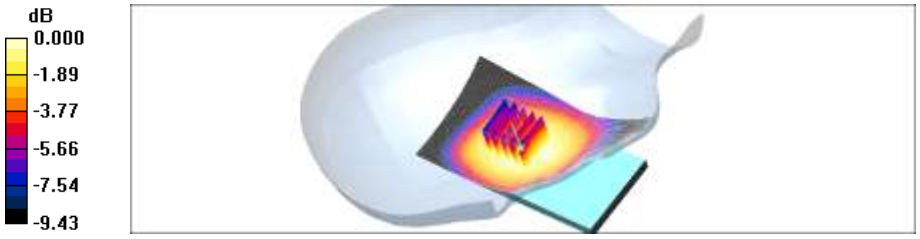
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Tilt 384/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.261 mW/g

Right Tilt 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = -0.082 dB
Peak SAR (extrapolated) = 0.284 W/kg
SAR(1 g) = 0.239 mW/g; SAR(10 g) = 0.186 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.248 mW/g



0 dB = 0.248mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

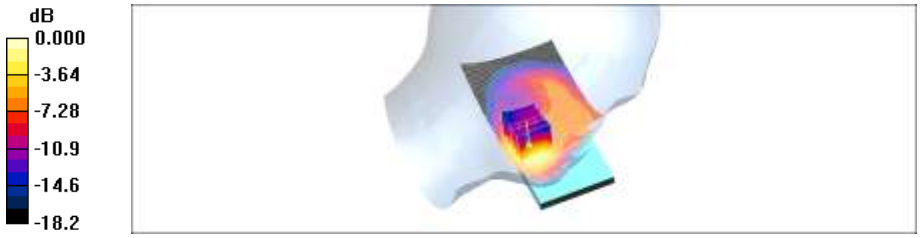
DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.201 mW/g

Left touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.86 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 0.292 W/kg
SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.109 mW/g
Maximum value of SAR (measured) = 0.209 mW/g



0 dB = 0.209mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

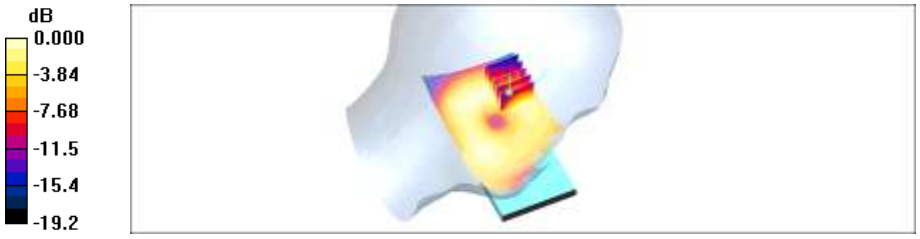
DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left tilt 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.038 mW/g

Left tilt 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.54 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 0.046 W/kg
SAR(1 g) = 0.031 mW/g; SAR(10 g) = 0.019 mW/g
Maximum value of SAR (measured) = 0.034 mW/g



0 dB = 0.034mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

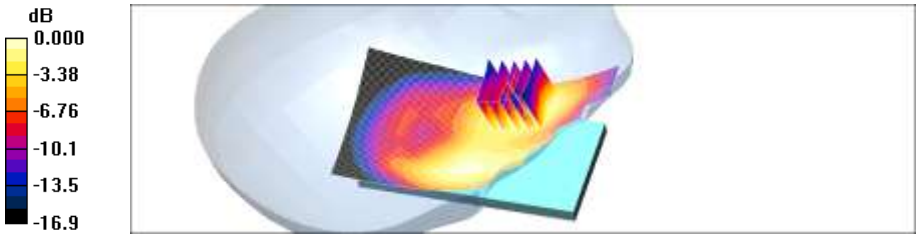
DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right touch 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.130 mW/g

Right touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.84 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 0.171 W/kg
SAR(1 g) = 0.120 mW/g; SAR(10 g) = 0.074 mW/g
Maximum value of SAR (measured) = 0.132 mW/g



0 dB = 0.132mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

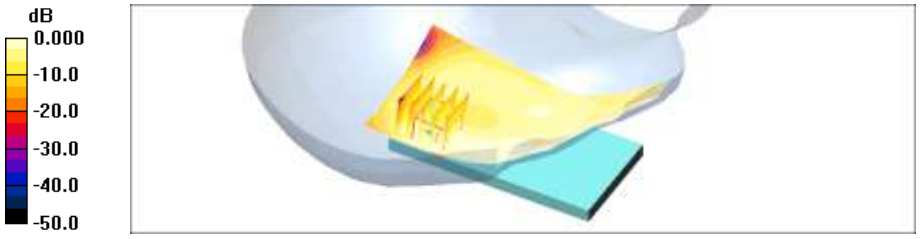
DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right tilt 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.052 mW/g

Right tilt 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.42 V/m; Power Drift = -0.008 dB
Peak SAR (extrapolated) = 0.068 W/kg
SAR(1 g) = 0.044 mW/g; SAR(10 g) = 0.025 mW/g
Maximum value of SAR (measured) = 0.048 mW/g



0 dB = 0.048mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

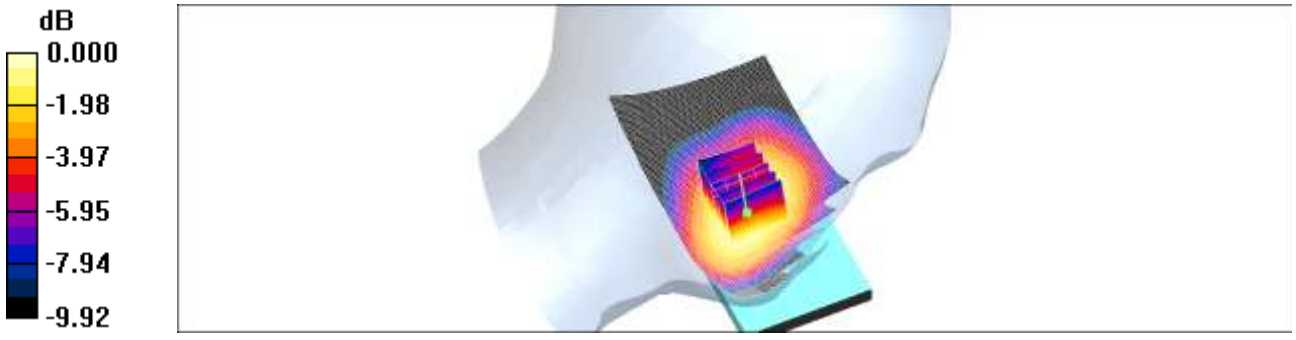
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.963 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left Touch 4183/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.391 mW/g

Left Touch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.19 V/m; Power Drift = -0.048 dB
Peak SAR (extrapolated) = 0.468 W/kg
SAR(1 g) = 0.372 mW/g; SAR(10 g) = 0.277 mW/g
Maximum value of SAR (measured) = 0.395 mW/g



0 dB = 0.395mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.963 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

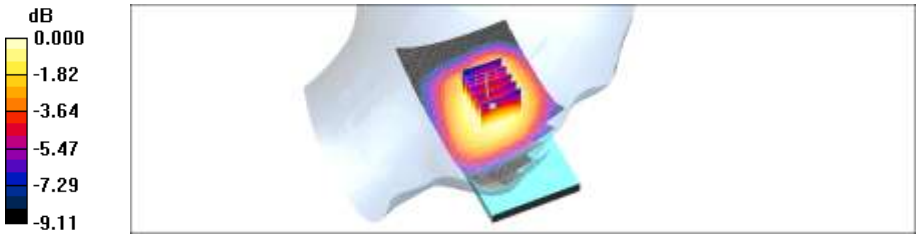
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left Tilt 4183/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.225 mW/g

Left Tilt 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.70 V/m; Power Drift = -0.152 dB
Peak SAR (extrapolated) = 0.249 W/kg
SAR(1 g) = 0.210 mW/g; SAR(10 g) = 0.164 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.218 mW/g



0 dB = 0.218mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.963 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

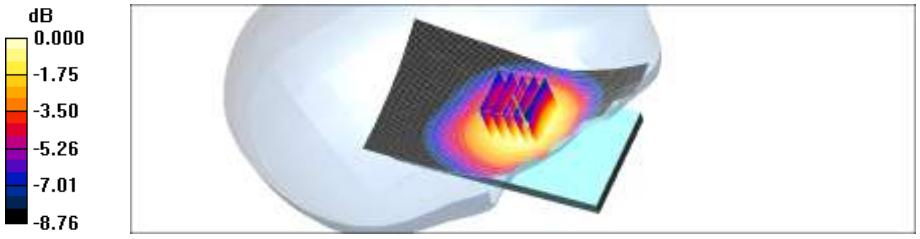
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Touch 4183/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.353 mW/g

Right Touch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.84 V/m; Power Drift = 0.047 dB
Peak SAR (extrapolated) = 0.397 W/kg
SAR(1 g) = 0.332 mW/g; SAR(10 g) = 0.253 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.350 mW/g



0 dB = 0.350mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.963 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

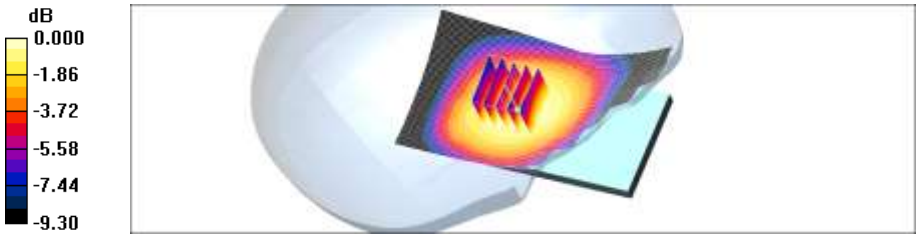
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Tilt 4183/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.219 mW/g

Right Tilt 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.92 V/m; Power Drift = 0.039 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.210 mW/g; SAR(10 g) = 0.162 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.219 mW/g



0 dB = 0.219mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

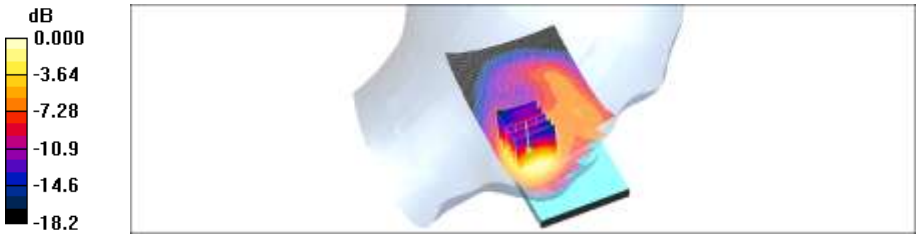
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left Touch 9400/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.416 mW/g

Left Touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.43 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 0.590 W/kg
SAR(1 g) = 0.374 mW/g; SAR(10 g) = 0.217 mW/g
Maximum value of SAR (measured) = 0.421 mW/g



0 dB = 0.421mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

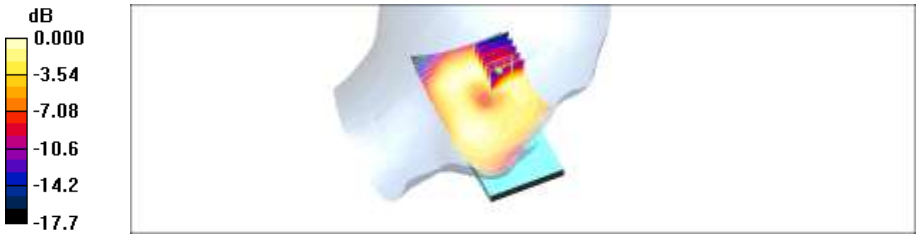
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left Tilt 9400/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.072 mW/g

Left Tilt 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.49 V/m; Power Drift = -0.045 dB
Peak SAR (extrapolated) = 0.089 W/kg
SAR(1 g) = 0.060 mW/g; SAR(10 g) = 0.037 mW/g
Maximum value of SAR (measured) = 0.065 mW/g



0 dB = 0.065mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

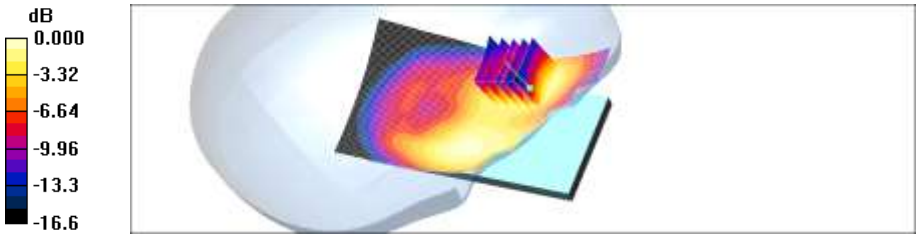
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Touch 9400/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.248 mW/g

Right Touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.50 V/m; Power Drift = -0.100 dB
Peak SAR (extrapolated) = 0.318 W/kg
SAR(1 g) = 0.225 mW/g; SAR(10 g) = 0.140 mW/g
Maximum value of SAR (measured) = 0.246 mW/g



0 dB = 0.246mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

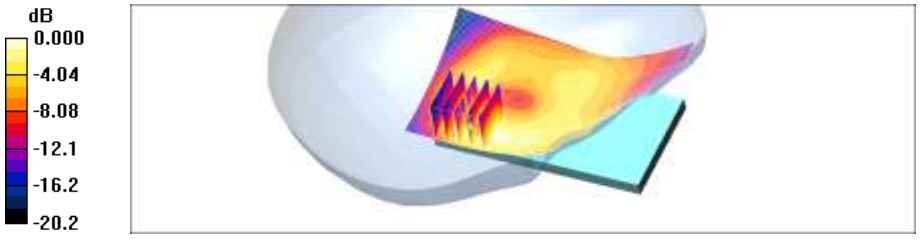
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right Tilt 9400/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.102 mW/g

Right Tilt 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.20 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 0.138 W/kg
SAR(1 g) = 0.088 mW/g; SAR(10 g) = 0.050 mW/g
Maximum value of SAR (measured) = 0.096 mW/g



0 dB = 0.096mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

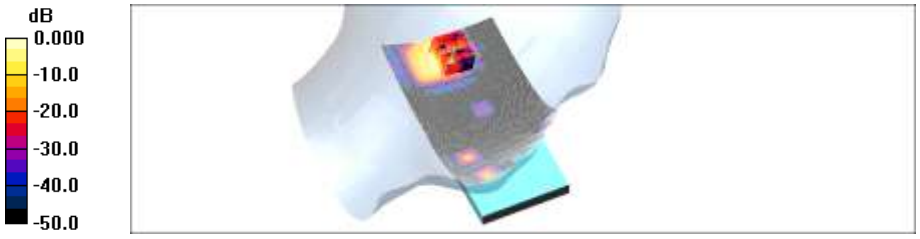
DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.53 mho/m; ε_r = 36.4; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.96, 4.96, 4.96); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Left touch 40ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.569 mW/g

802.11a Left touch 40ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.8 V/m; Power Drift = -0.041 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.251 mW/g; SAR(10 g) = 0.060 mW/g
aximum value of SAR (measured) = 0.554 mW/g



0 dB = 0.554mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

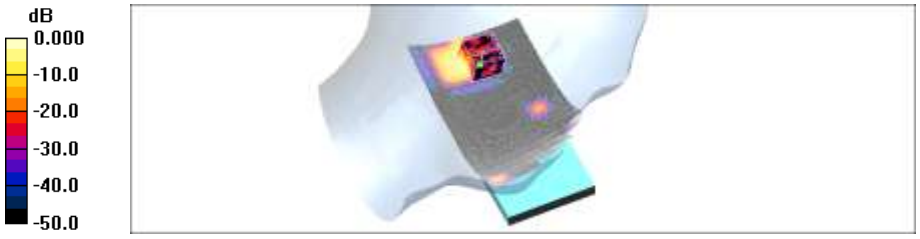
DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.53 mho/m; ε_r = 36.4; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.96, 4.96, 4.96); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Left tilt 40ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.703 mW/g

802.11a Left tilt 40ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.1 V/m; Power Drift = -0.152 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.219 mW/g; SAR(10 g) = 0.053 mW/g
aximum value of SAR (measured) = 0.465 mW/g



0 dB = 0.465mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

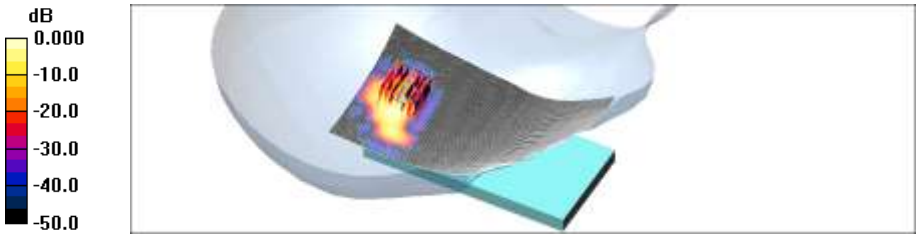
DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.53 mho/m; ε_r = 36.4; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.96, 4.96, 4.96); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Right Touch 40ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.775 mW/g

802.11a Right Touch 40ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.7 V/m; Power Drift = -0.126 dB
Peak SAR (extrapolated) = 0.965 W/kg
SAR(1 g) = 0.237 mW/g; SAR(10 g) = 0.055 mW/g
aximum value of SAR (measured) = 0.526 mW/g



0 dB = 0.526mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

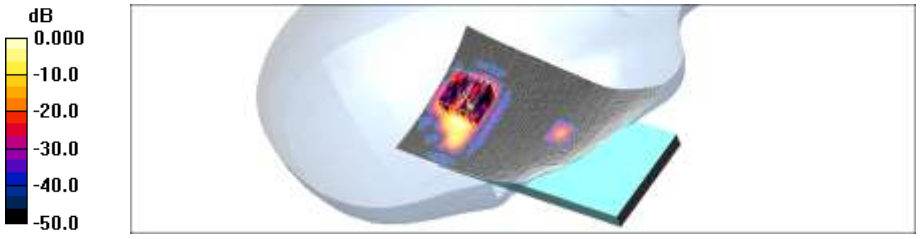
DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.53 mho/m; ε_r = 36.4; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.96, 4.96, 4.96); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Right Tilt 40ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.691 mW/g

802.11a Right Tilt 40ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.1 V/m; Power Drift = -0.167 dB
Peak SAR (extrapolated) = 1.27 W/kg
SAR(1 g) = 0.215 mW/g; SAR(10 g) = 0.051 mW/g
aximum value of SAR (measured) = 0.480 mW/g



0 dB = 0.480mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5320 MHz; σ = 4.67 mho/m; ε_r = 36.1; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

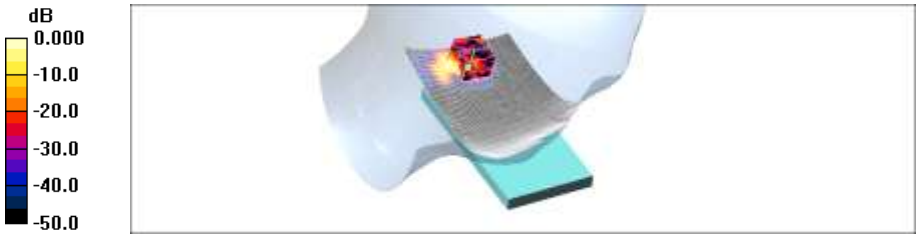
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.79, 4.79, 4.79); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Left touch 64ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.446 mW/g

802.11a Left touch 64ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 8.69 V/m; Power Drift = 0.164 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.288 mW/g; SAR(10 g) = 0.061 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.409 mW/g



0 dB = 0.409mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5320 MHz; σ = 4.67 mho/m; ε_r = 36.1; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

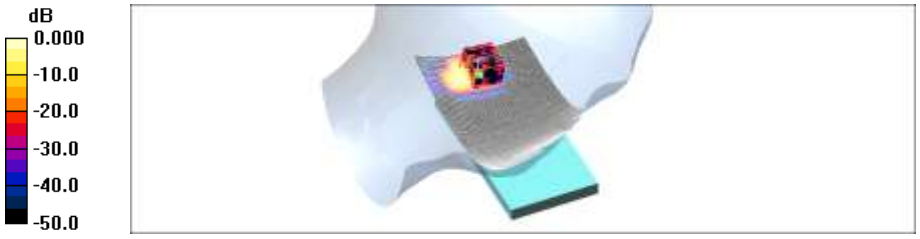
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.79, 4.79, 4.79); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Left tilt 64ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.345 mW/g

802.11a Left tilt 64ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 7.98 V/m; Power Drift = -0.149 dB
Peak SAR (extrapolated) = 0.898 W/kg
SAR(1 g) = 0.238 mW/g; SAR(10 g) = 0.058 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.305 mW/g



0 dB = 0.305mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5320 MHz; σ = 4.67 mho/m; ε_r = 36.1; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

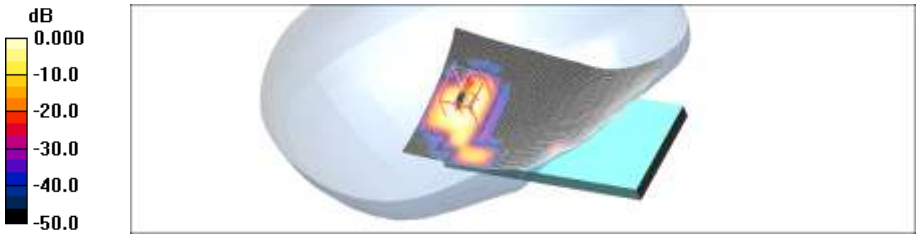
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.79, 4.79, 4.79); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Right touch 64ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.793 mW/g

802.11a Right touch 64ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 9.42 V/m; Power Drift = 0.075 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.279 mW/g; SAR(10 g) = 0.064 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.372 mW/g



0 dB = 0.372mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5320 MHz; σ = 4.67 mho/m; ε_r = 36.1; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

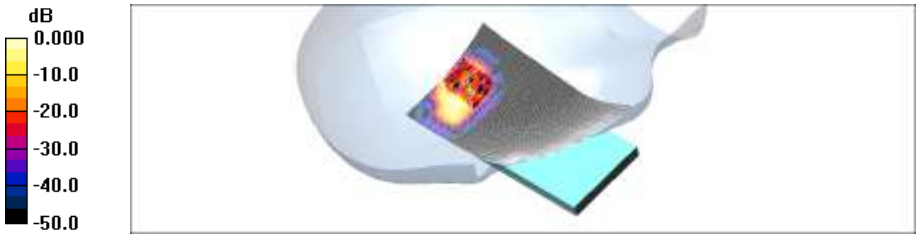
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.79, 4.79, 4.79); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Right tilt 64ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.690 mW/g

802.11a Right tilt 64ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 9.59 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 0.969 W/kg
SAR(1 g) = 0.279 mW/g; SAR(10 g) = 0.061 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.375 mW/g



0 dB = 0.375mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5540 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5540 MHz; σ = 4.93 mho/m; ε_r = 35.6; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

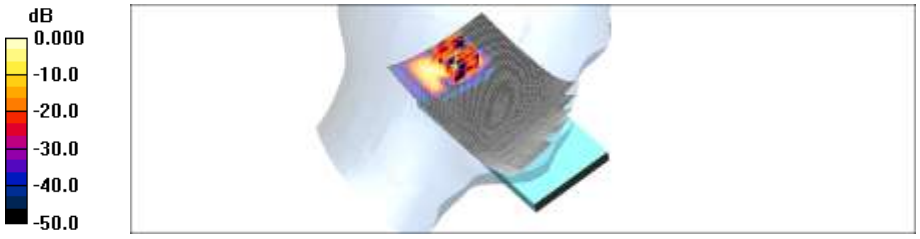
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.66, 4.66, 4.66); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Left touch 108ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.577 mW/g

802.11a Left touch 108ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 9.11 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.288 mW/g; SAR(10 g) = 0.060 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.426 mW/g



0 dB = 0.426mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5540 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5540 MHz; σ = 4.93 mho/m; ε_r = 35.6; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

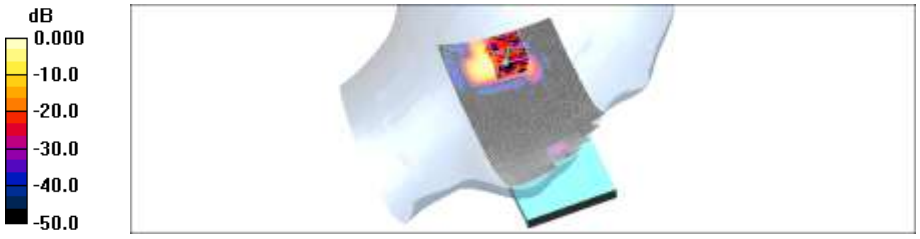
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.66, 4.66, 4.66); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Left tilt 108ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.592 mW/g

802.11a Left tilt 108ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 10.6 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.356 mW/g; SAR(10 g) = 0.081 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.507 mW/g



0 dB = 0.507mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5540 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5540 MHz; σ = 4.93 mho/m; ε_r = 35.6; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

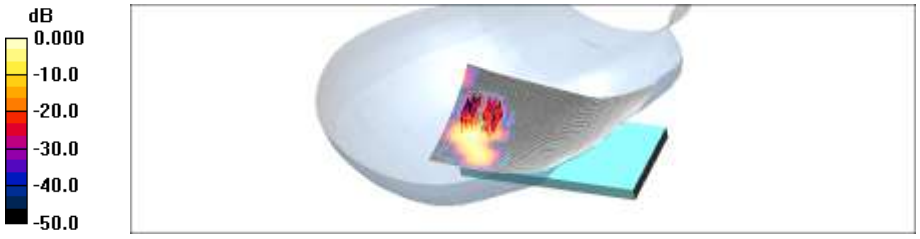
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.66, 4.66, 4.66); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right touch 802.11a 108ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.749 mW/g

Right touch 802.11a 108ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 8.29 V/m; Power Drift = 0.117 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 0.275 mW/g; SAR(10 g) = 0.063 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.681 mW/g



0 dB = 0.681mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5540 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5540 MHz; σ = 4.93 mho/m; ε_r = 35.6; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

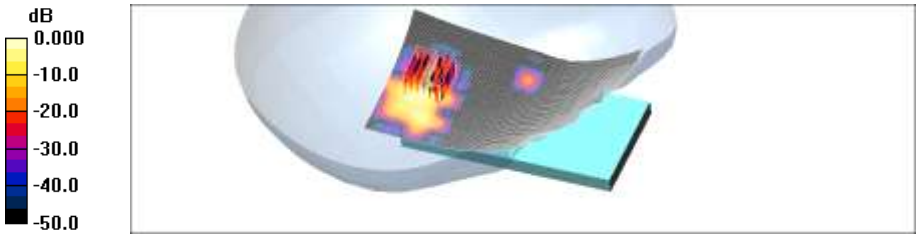
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.66, 4.66, 4.66); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right tilt 802.11a 108ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.726 mW/g

Right tilt 802.11a 108ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 8.05 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 0.273 mW/g; SAR(10 g) = 0.066 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.647 mW/g



0 dB = 0.647mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 5.18 mho/m; ε_r = 35; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

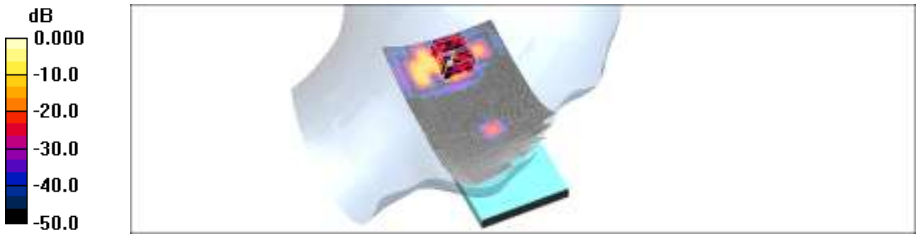
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.61, 4.61, 4.61); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 802.11a 149ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.150 mW/g

Left touch 802.11a 149ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 11.1 V/m; Power Drift = 0.104 dB
Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.206 mW/g; SAR(10 g) = 0.044 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.569 mW/g



0 dB = 0.569mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 5.18 mho/m; ε_r = 35; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

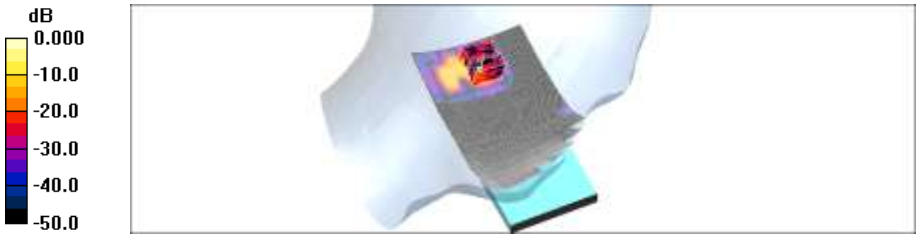
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.61, 4.61, 4.61); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left tilt 802.11a 149ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.160 mW/g

Left tilt 802.11a 149ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 10.9 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 1.00 W/kg
SAR(1 g) = 0.198 mW/g; SAR(10 g) = 0.042 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.555 mW/g



0 dB = 0.555mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 5.18 mho/m; ε_r = 35; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

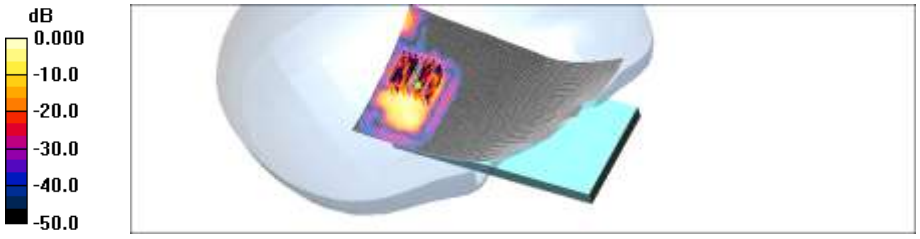
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.61, 4.61, 4.61); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right touch 802.11a 149ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.176 mW/g

Right touch 802.11a 149ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 7.43 V/m; Power Drift = -0.122 dB
Peak SAR (extrapolated) = 0.683 W/kg
SAR(1 g) = 0.175 mW/g; SAR(10 g) = 0.043 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.257 mW/g



0 dB = 0.257mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 5.18 mho/m; ε_r = 35; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

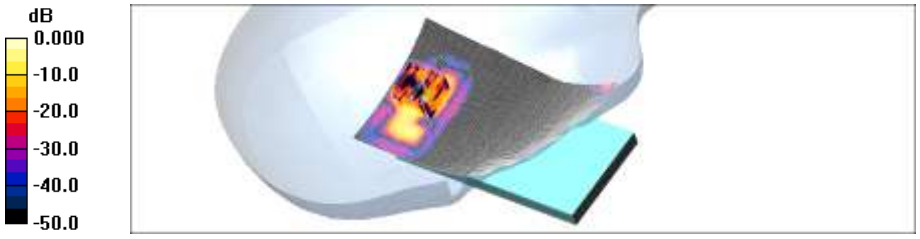
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.61, 4.61, 4.61); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Right tilt 802.11a 149ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.181 mW/g

Right tilt 802.11a 149ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 7.09 V/m; Power Drift = 0.146 dB
Peak SAR (extrapolated) = 0.664 W/kg
SAR(1 g) = 0.175 mW/g; SAR(10 g) = 0.045 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.253 mW/g



0 dB = 0.253mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Sep.10, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.81 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

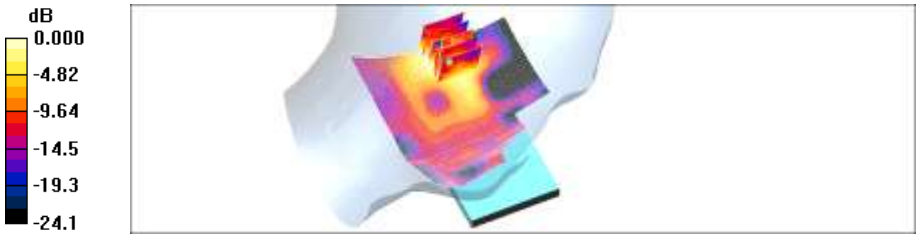
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 835/900 Phamtom ; Type: SAM

801.11b Left touch 11ch 1Mbps/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.018 mW/g

801.11b Left touch 11ch 1Mbps/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.48 V/m; Power Drift = 0.054 dB
Peak SAR (extrapolated) = 0.027 W/kg
SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00751 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.016 mW/g



0 dB = 0.016mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Sep.10, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.81 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

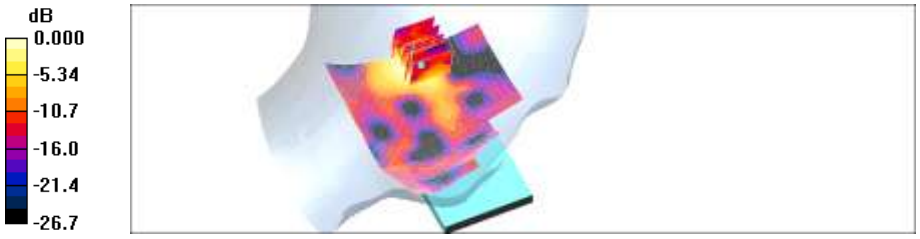
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 835/900 Phamtom ; Type: SAM

801.11b Left tilt 11ch 1Mbps/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.023 mW/g

801.11b Left tilt 11ch 1Mbps/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.39 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 0.036 W/kg
SAR(1 g) = 0.017 mW/g; SAR(10 g) = 0.00784 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.018 mW/g



0 dB = 0.018mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Sep.10, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.81 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

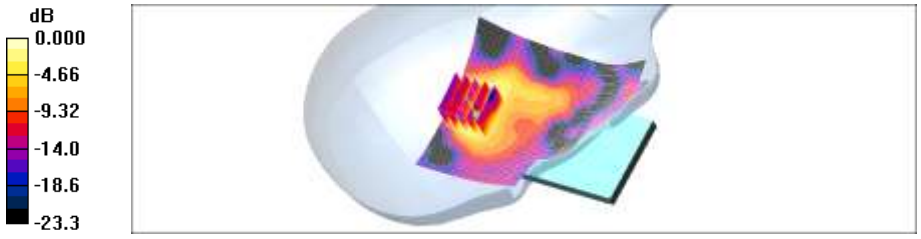
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 835/900 Phamtom ; Type: SAM

801.11b Right touch 11ch 1Mbps/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.018 mW/g

801.11b Right touch 11ch 1Mbps/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.19 V/m; Power Drift = 0.010 dB
Peak SAR (extrapolated) = 0.067 W/kg
SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.00764 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.018 mW/g



0 dB = 0.018mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Sep.10, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.81 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

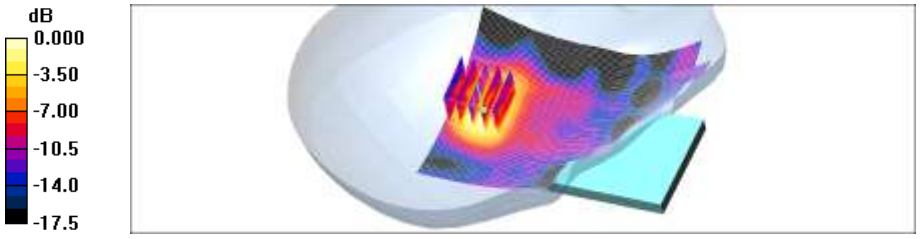
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 835/900 Phamtom ; Type: SAM

801.11b Right touch 11ch 1Mbps/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.016 mW/g

801.11b Right touch 11ch 1Mbps/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.05 V/m; Power Drift = -0.057 dB
Peak SAR (extrapolated) = 0.025 W/kg
SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.0067 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.015 mW/g



0 dB = 0.015mW/g

EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

CDMA835 Body rear 384/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

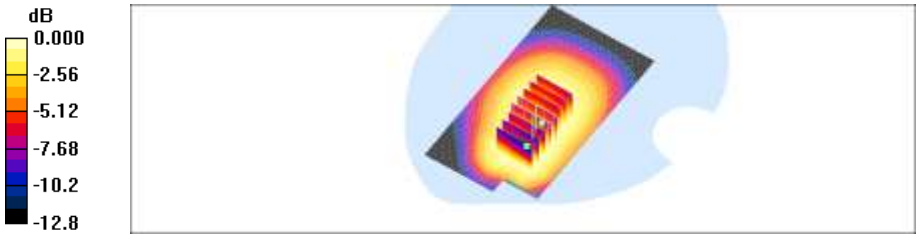
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.673 mW/g

CDMA835 Body rear 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.0 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 0.797 W/kg
SAR(1 g) = 0.639 mW/g; SAR(10 g) = 0.480 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.674 mW/g

CDMA835 Body rear 384/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.0 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 0.846 W/kg
SAR(1 g) = 0.637 mW/g; SAR(10 g) = 0.468 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.672 mW/g



0 dB = 0.672mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

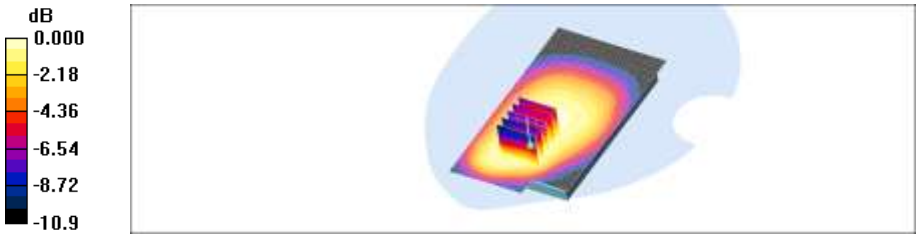
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

CDMA835 Body front 384/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.584 mW/g

CDMA835 Body front 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.8 V/m; Power Drift = -0.042 dB
Peak SAR (extrapolated) = 0.709 W/kg
SAR(1 g) = 0.537 mW/g; SAR(10 g) = 0.398 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.567 mW/g



0 dB = 0.567mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

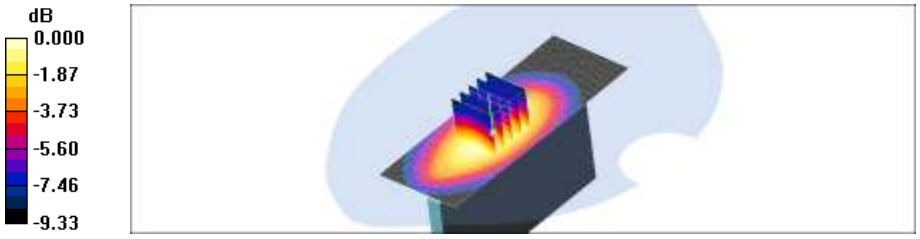
DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

CDMA835 Left side 384/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.775 mW/g

CDMA835 Left side 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.3 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 0.953 W/kg
SAR(1 g) = 0.711 mW/g; SAR(10 g) = 0.495 mW/g
Maximum value of SAR (measured) = 0.766 mW/g



0 dB = 0.766mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

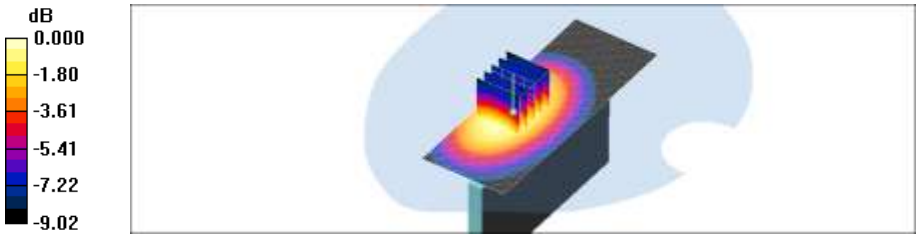
DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

CDMA835 Right side 384/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.503 mW/g

CDMA835 Right side 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.1 V/m; Power Drift = -0.132 dB
Peak SAR (extrapolated) = 0.618 W/kg
SAR(1 g) = 0.464 mW/g; SAR(10 g) = 0.325 mW/g
Maximum value of SAR (measured) = 0.496 mW/g



0 dB = 0.496mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

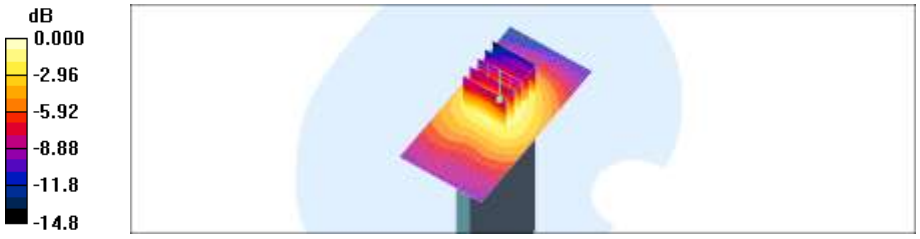
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

CDMA835 body bottom 384/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.153 mW/g

CDMA835 body bottom 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 0.247 W/kg
SAR(1 g) = 0.149 mW/g; SAR(10 g) = 0.096 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.162 mW/g



0 dB = 0.162mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

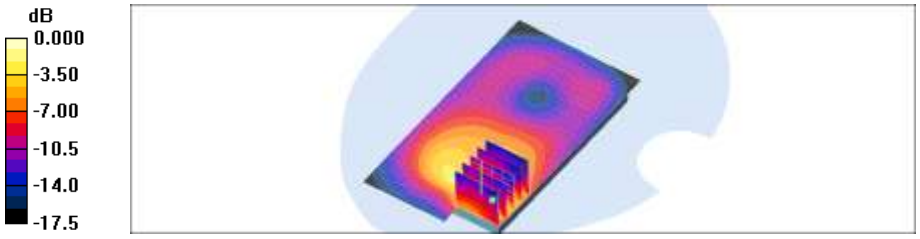
DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

GSM1900 GPRS Hotspot Rear 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.454 mW/g

GSM1900 GPRS Hotspot Rear 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.97 V/m; Power Drift = -0.146 dB
Peak SAR (extrapolated) = 0.758 W/kg
SAR(1 g) = 0.509 mW/g; SAR(10 g) = 0.282 mW/g
aximum value of SAR (measured) = 0.571 mW/g



0 dB = 0.571mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

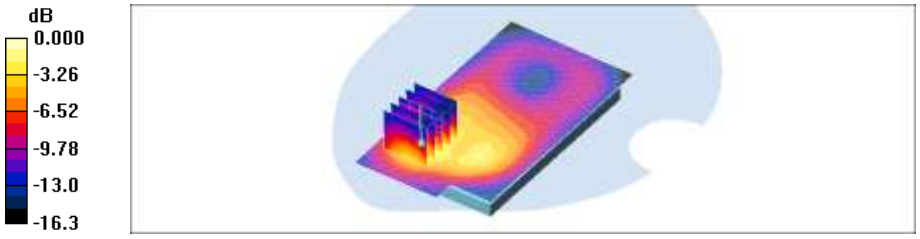
DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

GSM1900 GPRS Hotspot Front 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.346 mW/g

GSM1900 GPRS Hotspot Front 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.17 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 0.529 W/kg
SAR(1 g) = 0.332 mW/g; SAR(10 g) = 0.187 mW/g
Maximum value of SAR (measured) = 0.375 mW/g



0 dB = 0.375mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

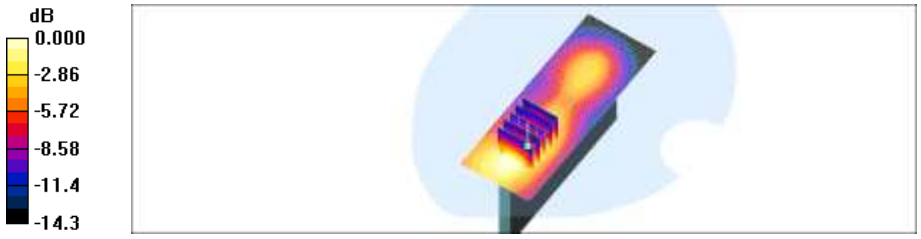
DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

GSM1900 GPRS Hotspot Left side 661/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.192 mW/g

GSM1900 GPRS Hotspot Left side 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.39 V/m; Power Drift = -0.065 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.171 mW/g; SAR(10 g) = 0.105 mW/g
aximum value of SAR (measured) = 0.188 mW/g



0 dB = 0.188mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

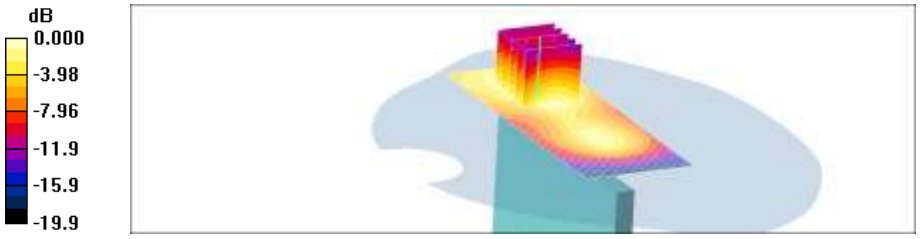
DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

GSM1900 GPRS Hotspot Right side 661/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.096 mW/g

GSM1900 GPRS Hotspot Right side 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.87 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 0.126 W/kg
SAR(1 g) = 0.087 mW/g; SAR(10 g) = 0.055 mW/g
Maximum value of SAR (measured) = 0.095 mW/g



0 dB = 0.095mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

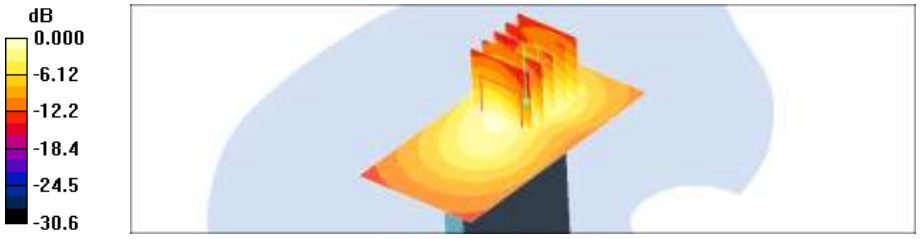
DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

GSM1900 GPRS Hotspot Bottom Side 661/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.312 mW/g

GSM1900 GPRS Hotspot Bottom Side 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.1 V/m; Power Drift = -0.069 dB
Peak SAR (extrapolated) = 0.443 W/kg
SAR(1 g) = 0.291 mW/g; SAR(10 g) = 0.160 mW/g
aximum value of SAR (measured) = 0.323 mW/g



0 dB = 0.323mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

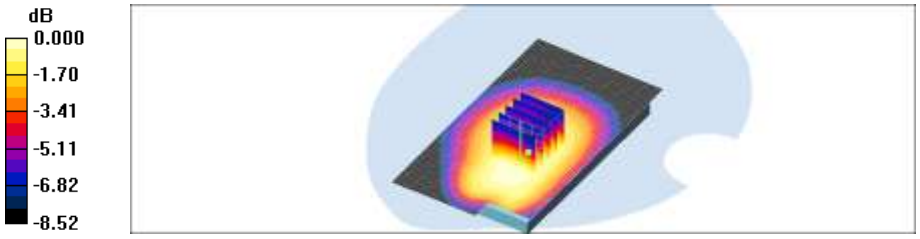
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Body rear 4183/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.542 mW/g

WCDMA850 Body rear 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.8 V/m; Power Drift = 0.069 dB
Peak SAR (extrapolated) = 0.649 W/kg
SAR(1 g) = 0.520 mW/g; SAR(10 g) = 0.392 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.548 mW/g



0 dB = 0.548mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

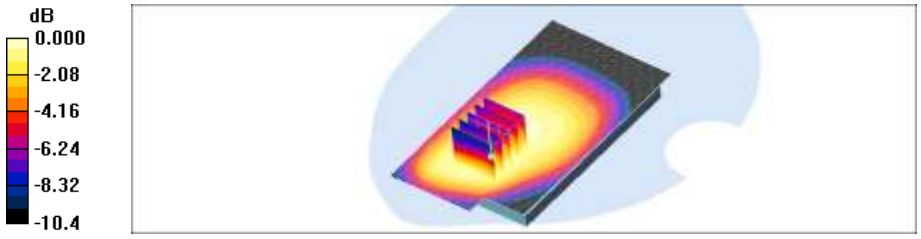
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Body front 4183/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.453 mW/g

WCDMA850 Body front 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.6 V/m; Power Drift = 0.120 dB
Peak SAR (extrapolated) = 0.556 W/kg
SAR(1 g) = 0.431 mW/g; SAR(10 g) = 0.323 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.453 mW/g



0 dB = 0.453mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

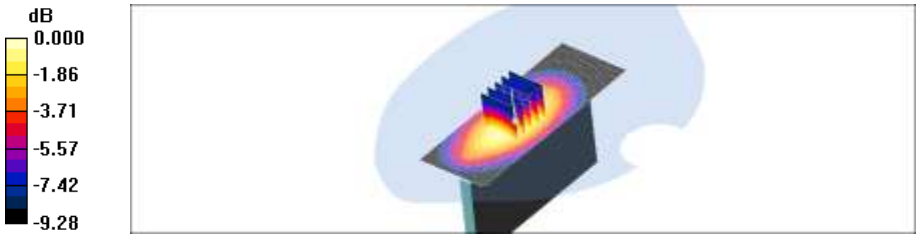
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Left side 4183/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.634 mW/g

WCDMA850 Left side 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.3 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 0.792 W/kg
SAR(1 g) = 0.590 mW/g; SAR(10 g) = 0.409 mW/g
Maximum value of SAR (measured) = 0.635 mW/g



0 dB = 0.635mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

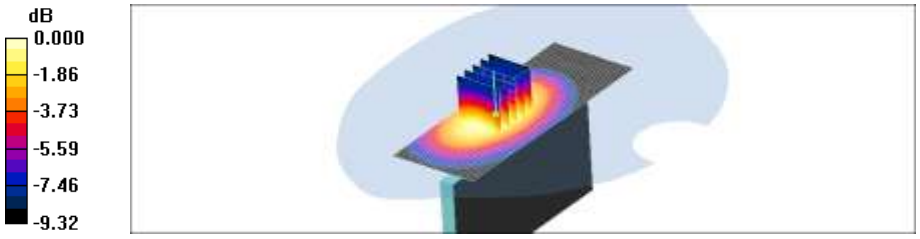
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 right side 4183/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.452 mW/g

WCDMA850 right side 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.2 V/m; Power Drift = 0.002 dB
Peak SAR (extrapolated) = 0.570 W/kg
SAR(1 g) = 0.425 mW/g; SAR(10 g) = 0.296 mW/g
Maximum value of SAR (measured) = 0.455 mW/g



0 dB = 0.455mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

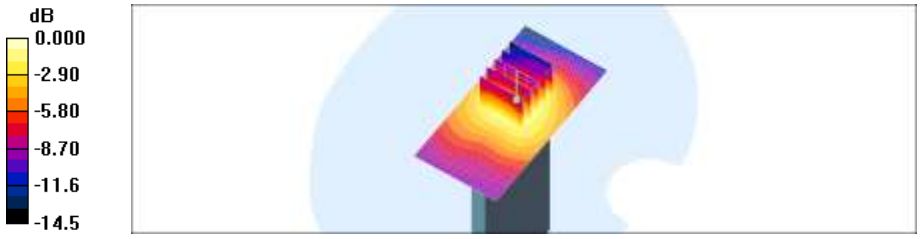
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Body bottom 4183/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.130 mW/g

WCDMA850 Body bottom 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.1 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.203 W/kg
SAR(1 g) = 0.123 mW/g; SAR(10 g) = 0.080 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.133 mW/g



0 dB = 0.133mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

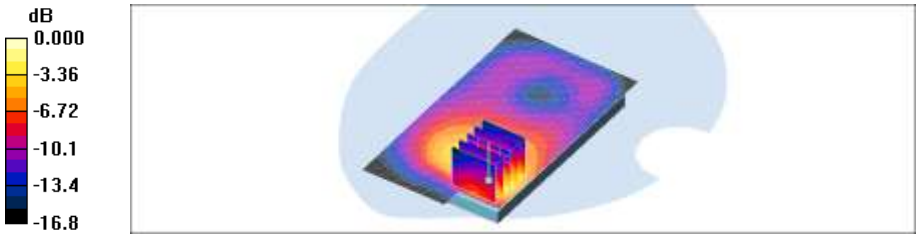
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Hotspot Body Rear 9400/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.697 mW/g

Hotspot Body Rear 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.65 V/m; Power Drift = -0.089 dB
Peak SAR (extrapolated) = 0.941 W/kg
SAR(1 g) = 0.634 mW/g; SAR(10 g) = 0.354 mW/g
Maximum value of SAR (measured) = 0.717 mW/g



0 dB = 0.717mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

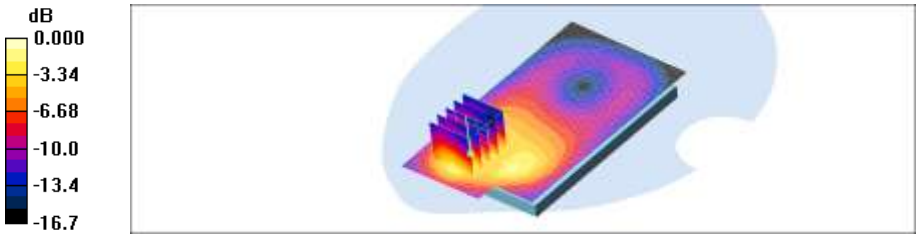
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Hotspot Body Front 9400/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.544 mW/g

Hotspot Body Front 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.69 V/m; Power Drift = -0.070 dB
Peak SAR (extrapolated) = 0.828 W/kg
SAR(1 g) = 0.505 mW/g; SAR(10 g) = 0.276 mW/g
Maximum value of SAR (measured) = 0.551 mW/g



0 dB = 0.551mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

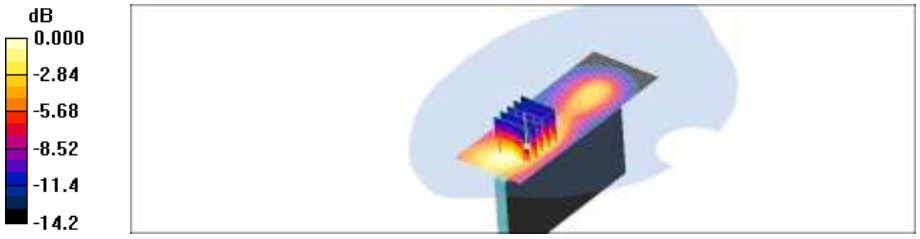
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Hotspot Body Left side 9400/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.317 mW/g

Hotspot Body Left side 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.106 dB
Peak SAR (extrapolated) = 0.435 W/kg
SAR(1 g) = 0.289 mW/g; SAR(10 g) = 0.173 mW/g
aximum value of SAR (measured) = 0.324 mW/g



0 dB = 0.324mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

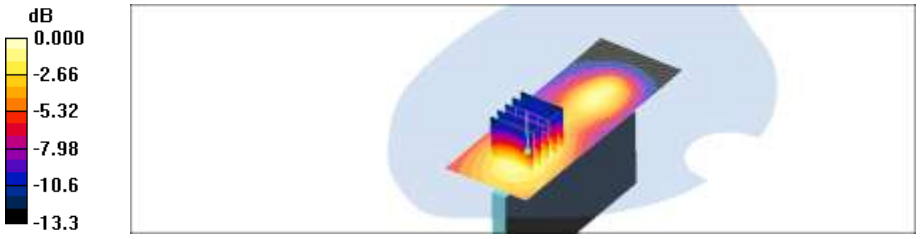
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Hotspot Body Right side 9400/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.120 mW/g

Hotspot Body Right side 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.12 V/m; Power Drift = 0.023 dB
Peak SAR (extrapolated) = 0.161 W/kg
SAR(1 g) = 0.111 mW/g; SAR(10 g) = 0.069 mW/g
Maximum value of SAR (measured) = 0.122 mW/g



0 dB = 0.122mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

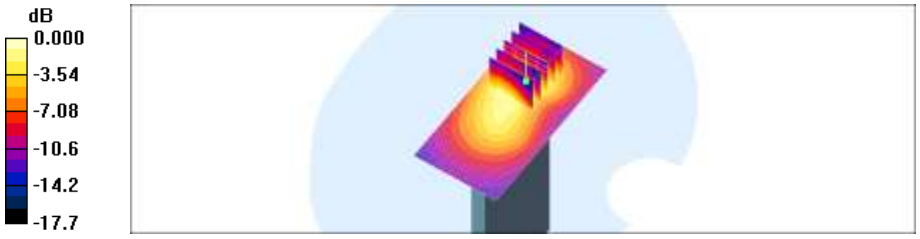
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Hotspot Body Bottom 9400/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.408 mW/g

Hotspot Body Bottom 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.1 V/m; Power Drift = -0.088 dB
Peak SAR (extrapolated) = 0.569 W/kg
SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.225 mW/g
Maximum value of SAR (measured) = 0.423 mW/g



0 dB = 0.423mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

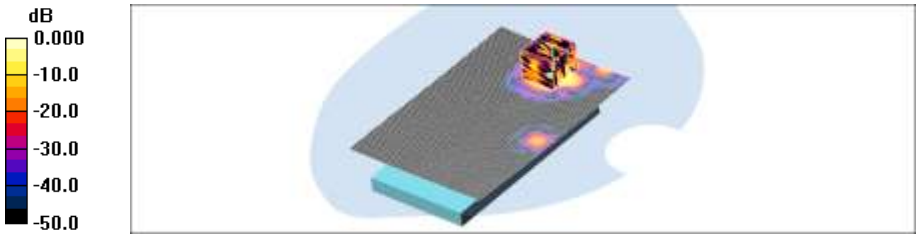
DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.29 mho/m; ε_r = 47.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.35, 4.35, 4.35); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

WIFI 5GHz Body Rear 40ch 6Mbps/Area Scan (101x151x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.063 mW/g

WIFI 5GHz Body Rear 40ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.280 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.166 W/kg
SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.00587 mW/g
aximum value of SAR (measured) = 0.075 mW/g



0 dB = 0.075mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

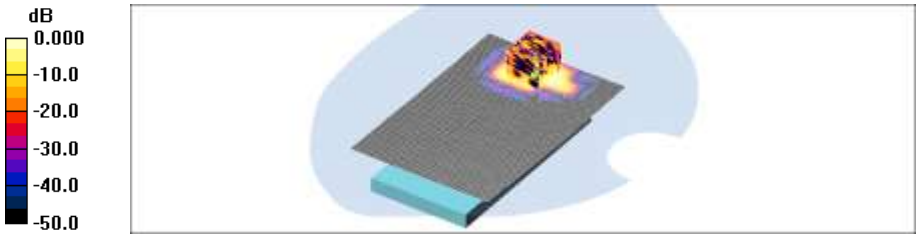
DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.29 mho/m; ε_r = 47.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.35, 4.35, 4.35); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

WIFI 5GHz Body Front 40ch 6Mbps/Area Scan (101x151x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.108 mW/g

WIFI 5GHz Body Front 40ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.000 V/m; Power Drift = 0.008 dB
Peak SAR (extrapolated) = 0.402 W/kg
SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.011 mW/g
aximum value of SAR (measured) = 0.087 mW/g



0 dB = 0.087mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5320 MHz; σ = 5.44 mho/m; ε_r = 47.1; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

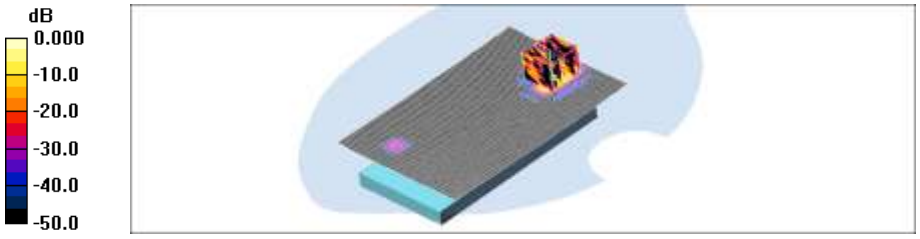
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.1, 4.1, 4.1); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

WIFI 5GHz Body Rear 64ch 6Mbps/Area Scan (101x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.113 mW/g

WIFI 5GHz Body Rear 64ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.000 V/m; Power Drift = 0.080 dB
Peak SAR (extrapolated) = 0.255 W/kg
SAR(1 g) = 0.034 mW/g; SAR(10 g) = 0.0066 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.087 mW/g



0 dB = 0.087mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5320 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5320 MHz; σ = 5.44 mho/m; ε_r = 47.1; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

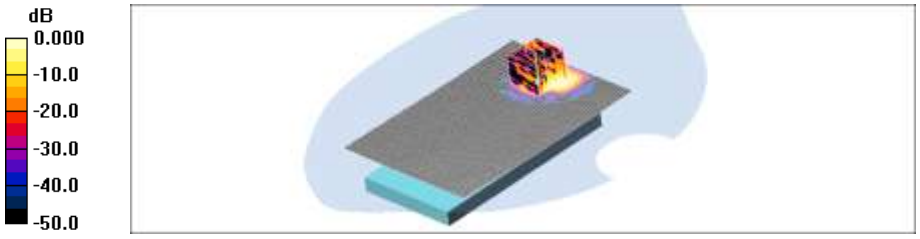
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.1, 4.1, 4.1); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

WIFI 5GHz Body Front 64ch 6Mbps/Area Scan (101x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.319 mW/g

WIFI 5GHz Body Front 64ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.622 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.415 W/kg
SAR(1 g) = 0.051 mW/g; SAR(10 g) = 0.017 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.132 mW/g



0 dB = 0.132mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5540 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5540 MHz; σ = 5.88 mho/m; ε_r = 46.6; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

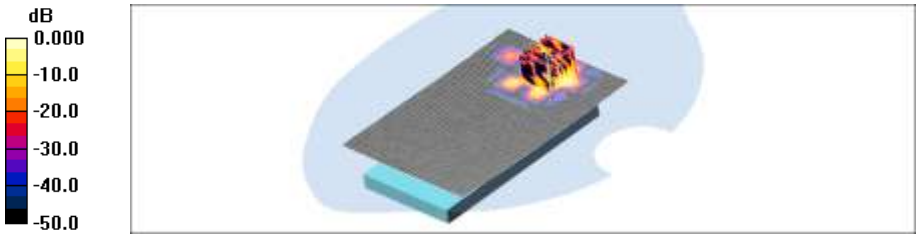
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(3.91, 3.91, 3.91); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

WIFI 5GHz Body Rear 108ch 6Mbps/Area Scan (101x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.278 mW/g

WIFI 5GHz Body Rear 108ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.449 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.235 W/kg
SAR(1 g) = 0.052 mW/g; SAR(10 g) = 0.014 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.143 mW/g



0 dB = 0.143mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5540 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5540 MHz; σ = 5.88 mho/m; ε_r = 46.6; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

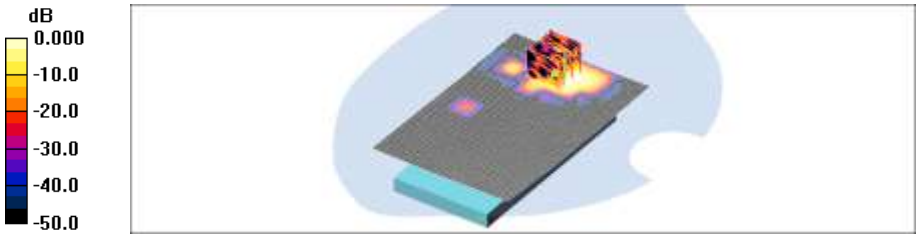
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(3.91, 3.91, 3.91); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

WIFI 5GHz Body Front 108ch 6Mbps/Area Scan (101x151x1): Measurement grid: dx=10mm, dy=10mm

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

WIFI 5GHz Body Front 108ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.000 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.372 W/kg
SAR(1 g) = 0.072 mW/g; SAR(10 g) = 0.020 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.182 mW/g



0 dB = 0.182mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 6.27 mho/m; ε_r = 46; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

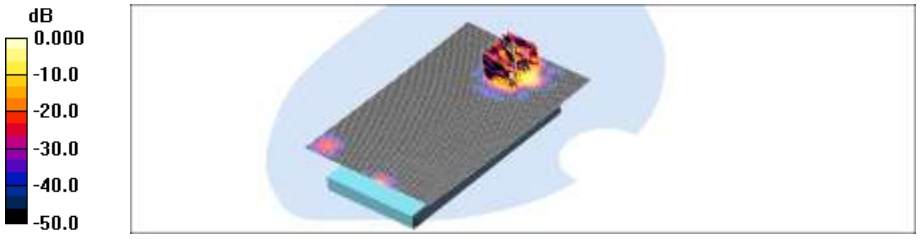
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(3.81, 3.81, 3.81); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

WIFI 5GHz Body Rear 149ch 6Mbps/Area Scan (101x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.268 mW/g

WIFI 5GHz Body Rear 149ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.000 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.320 W/kg
SAR(1 g) = 0.060 mW/g; SAR(10 g) = 0.015 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.167 mW/g



0 dB = 0.167mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5745 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5745 MHz; σ = 6.27 mho/m; ε_r = 46; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

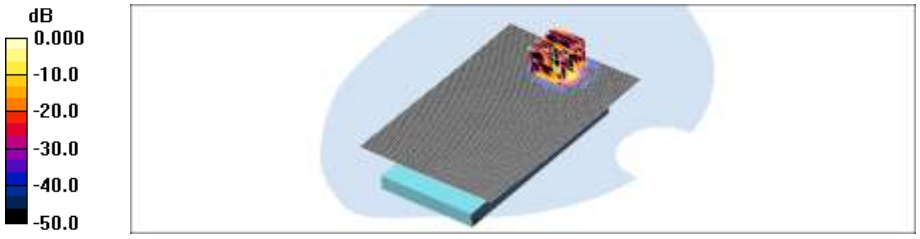
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(3.81, 3.81, 3.81); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

WIFI 5GHz Body Front 149ch 6Mbps/Area Scan (101x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.085 mW/g

WIFI 5GHz Body Front 149ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.000 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.357 W/kg
SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.00829 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.089 mW/g



0 dB = 0.089mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Sep.10, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.99 mho/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

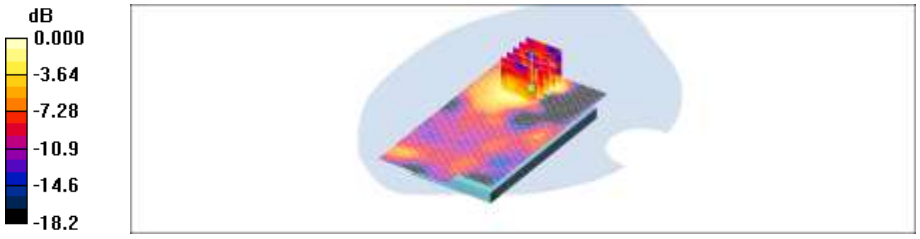
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.01, 4.01, 4.01); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

Hotspot Body Rear 11/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.015 mW/g

Hotspot Body Rear 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.79 V/m; Power Drift = -0.062 dB
Peak SAR (extrapolated) = 0.042 W/kg
SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00666 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.012 mW/g



0 dB = 0.012mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Sep.10, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.99 mho/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

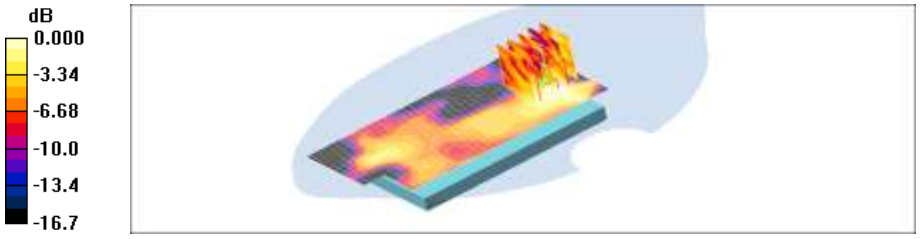
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.01, 4.01, 4.01); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

Hotspot Body Front 11/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.009 mW/g

Hotspot Body Front 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.980 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 0.025 W/kg
SAR(1 g) = 0.00621 mW/g; SAR(10 g) = 0.00209 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.006 mW/g



0 dB = 0.006mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Sep.10, 2012

DUT: LGL21; Type: bar; Serial: #1

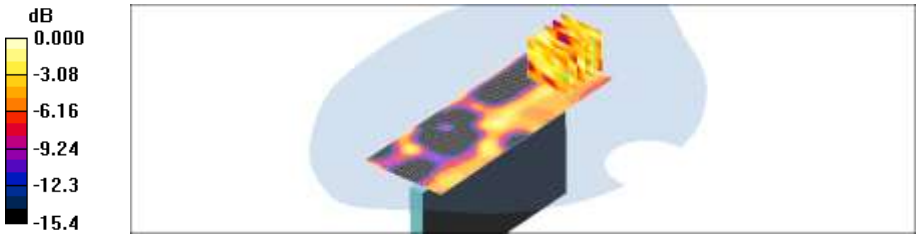
Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2460 MHz; σ = 1.99 mho/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.01, 4.01, 4.01); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

WiFi2450 Left side 11/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.002 mW/g

WiFi2450 Left side 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.497 V/m; Power Drift = 0.160 dB
Peak SAR (extrapolated) = 0.006 W/kg
SAR(1 g) = 0.00132 mW/g; SAR(10 g) = 0.000711 mW/g

Maximum value of SAR (measured) = 0.003 mW/g



0 dB = 0.003mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Sep.10, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.99 mho/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

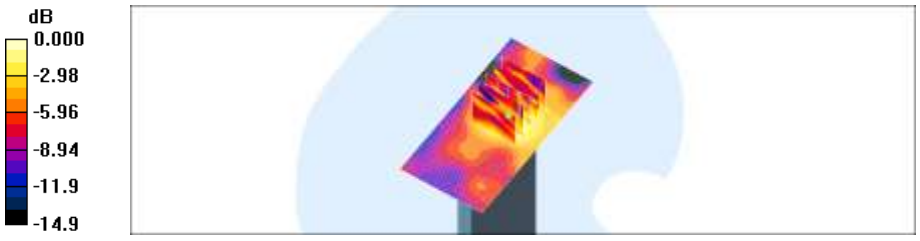
DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.01, 4.01, 4.01); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

WiFi2450 top side 11/Area Scan (41x81x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.007 mW/g

WiFi2450 top side 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.44 V/m; Power Drift = 0.014 dB
Peak SAR (extrapolated) = 0.009 W/kg
SAR(1 g) = 0.00584 mW/g; SAR(10 g) = 0.0032 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.006 mW/g



0 dB = 0.006mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 0.963 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left Touch 384/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.524 mW/g

Left Touch 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.57 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.604 W/kg
SAR(1 g) = 0.456 mW/g; SAR(10 g) = 0.339 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.488 mW/g

EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.52 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

CDMA835 Body rear 384/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.673 mW/g

CDMA835 Body rear 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.0 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 0.797 W/kg
SAR(1 g) = 0.639 mW/g; SAR(10 g) = 0.480 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.674 mW/g

CDMA835 Body rear 384/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.0 V/m; Power Drift = 0.082 dB
Peak SAR (extrapolated) = 0.846 W/kg
SAR(1 g) = 0.637 mW/g; SAR(10 g) = 0.468 mW/g
aximum value of SAR (measured) = 0.672 mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left touch 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.201 mW/g

Left touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.86 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 0.292 W/kg
SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.109 mW/g
Maximum value of SAR (measured) = 0.209 mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

GSM1900 GPRS Hotspot Rear 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.454 mW/g

GSM1900 GPRS Hotspot Rear 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.97 V/m; Power Drift = -0.146 dB
Peak SAR (extrapolated) = 0.758 W/kg
SAR(1 g) = 0.509 mW/g; SAR(10 g) = 0.282 mW/g
aximum value of SAR (measured) = 0.571 mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.963 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left Touch 4183/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.391 mW/g

Left Touch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.19 V/m; Power Drift = -0.048 dB
Peak SAR (extrapolated) = 0.468 W/kg
SAR(1 g) = 0.372 mW/g; SAR(10 g) = 0.277 mW/g
Maximum value of SAR (measured) = 0.395 mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.3 ℃
Ambient Temperature:	21.5 ℃
Test Date:	Sep.07, 2012

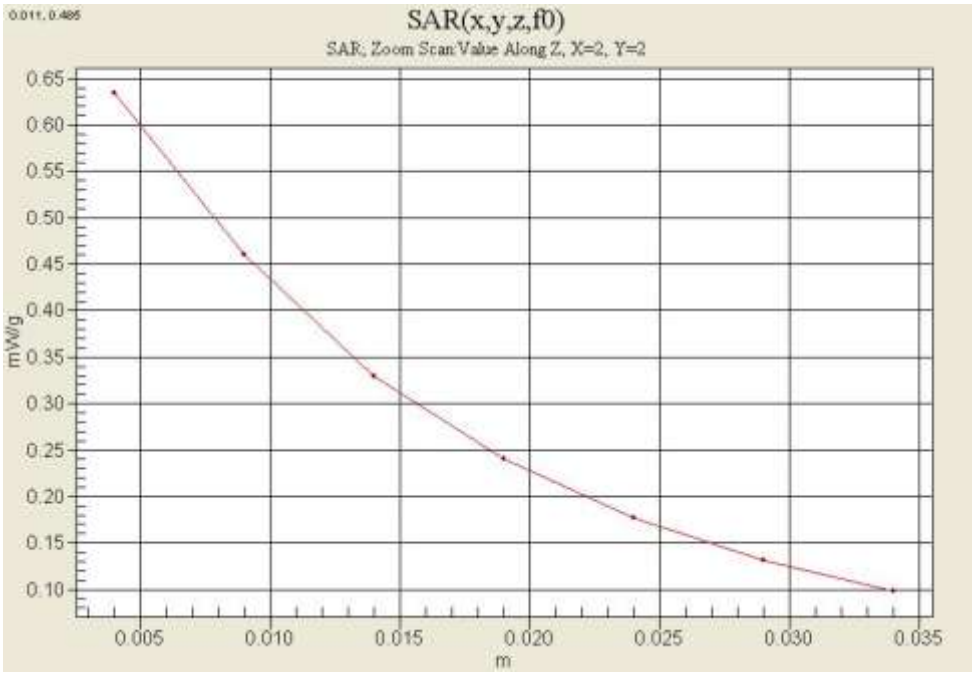
DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Left side 4183/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.634 mW/g

WCDMA850 Left side 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.3 V/m; Power Drift = -0.004 dB
Peak SAR (extrapolated) = 0.792 W/kg
SAR(1 g) = 0.590 mW/g; SAR(10 g) = 0.409 mW/g
Maximum value of SAR (measured) = 0.635 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.37 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Left Touch 9400/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.416 mW/g

Left Touch 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.43 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 0.590 W/kg
SAR(1 g) = 0.374 mW/g; SAR(10 g) = 0.217 mW/g
Maximum value of SAR (measured) = 0.421 mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.2 ℃
Ambient Temperature:	21.4 ℃
Test Date:	Sep.08, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WCDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 53; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.55, 4.55, 4.55); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Hotspot Body Rear 9400/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.697 mW/g

Hotspot Body Rear 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.65 V/m; Power Drift = -0.089 dB
Peak SAR (extrapolated) = 0.941 W/kg
SAR(1 g) = 0.634 mW/g; SAR(10 g) = 0.354 mW/g
Maximum value of SAR (measured) = 0.717 mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5540 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5540 MHz; σ = 4.93 mho/m; ε_r = 35.6; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

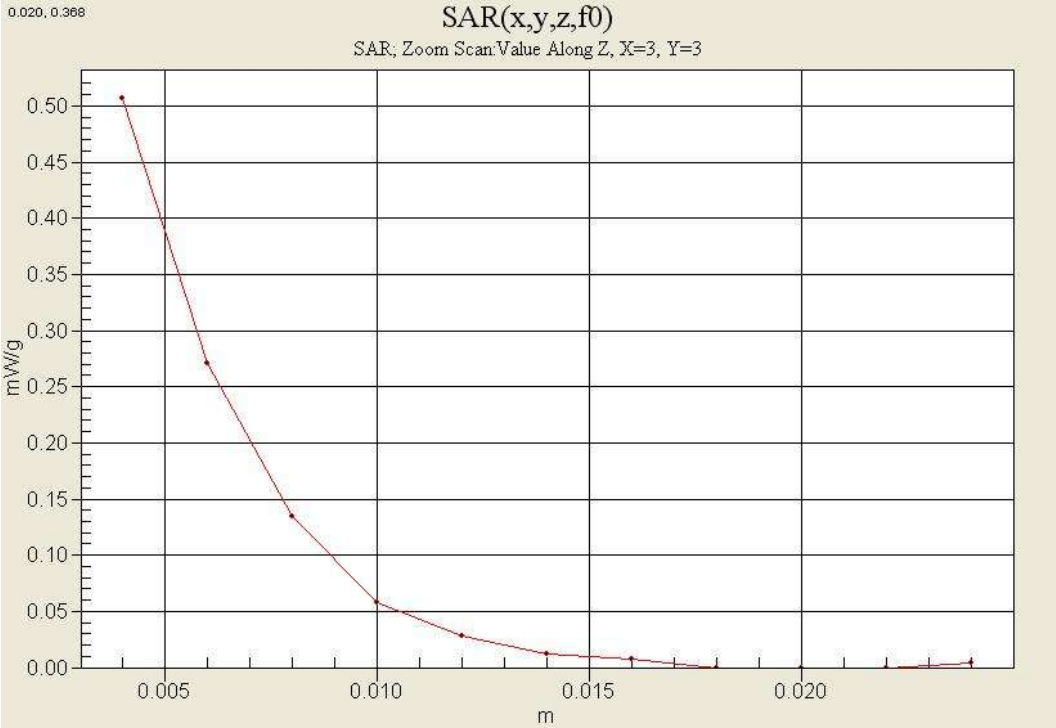
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.66, 4.66, 4.66); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

802.11a Left tilt 108ch 6Mbps/Area Scan (91x151x1): Measurement grid: dx=10mm, dy=10mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.592 mW/g

802.11a Left tilt 108ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 10.6 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.356 mW/g; SAR(10 g) = 0.081 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.507 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.0 ℃
Ambient Temperature:	21.2 ℃
Test Date:	Sep.09, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5540 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 5540 MHz; σ = 5.88 mho/m; ε_r = 46.6; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

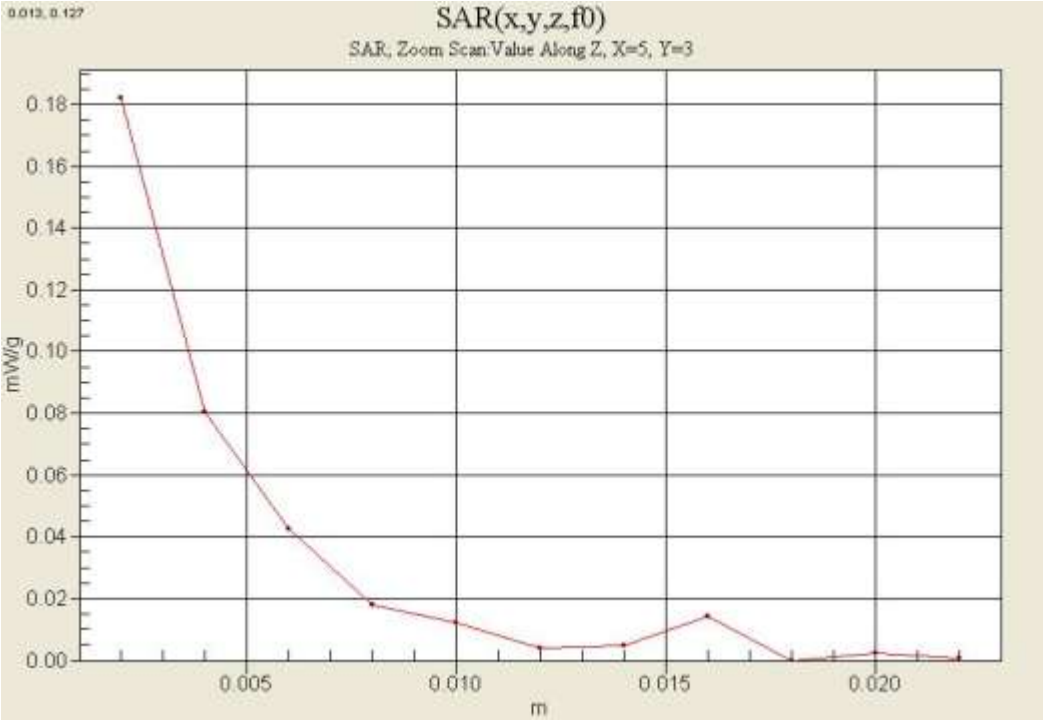
DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(3.91, 3.91, 3.91); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

WIFI 5GHz Body Front 108ch 6Mbps/Area Scan (101x151x1): Measurement grid: dx=10mm, dy=10mm

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

WIFI 5GHz Body Front 108ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.000 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.372 W/kg
SAR(1 g) = 0.072 mW/g; SAR(10 g) = 0.020 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.182 mW/g



Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Sep.10, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.81 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 835/900 Phamtom ; Type: SAM

801.11b Left tilt 11ch 1Mbps/Area Scan (81x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.023 mW/g

801.11b Left tilt 11ch 1Mbps/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.39 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 0.036 W/kg
SAR(1 g) = 0.017 mW/g; SAR(10 g) = 0.00784 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
aximum value of SAR (measured) = 0.018 mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	PCS GSM/GPRS & Cellular/PCS WCDMA&Cellular CDMA Phone with Bluetooth and WLAN/NFC
Liquid Temperature:	21.1 ℃
Ambient Temperature:	21.3 ℃
Test Date:	Sep.10, 2012

DUT: LGL21; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.99 mho/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.01, 4.01, 4.01); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 800/900 Phantom; Type: SAM

Hotspot Body Rear 11/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.015 mW/g

Hotspot Body Rear 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.79 V/m; Power Drift = -0.062 dB
Peak SAR (extrapolated) = 0.042 W/kg
SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00666 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.012 mW/g

Attachment 2. – Dipole Validation Plots

■ Validation Data (835 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.3 ℃

Test Date: Sep.07, 2012

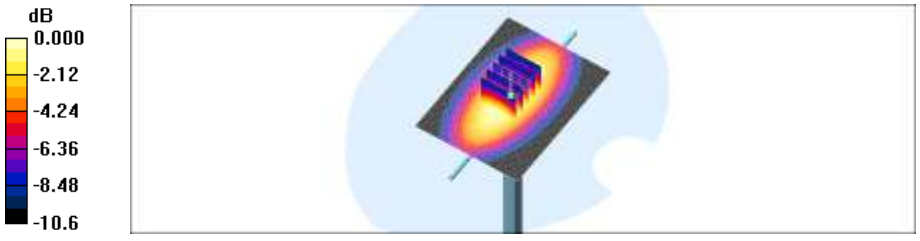
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.963 mho/m; ε_r = 41.9; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.36, 6.36, 6.36); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: 1800/1900 Phantom; Type: SAM

Validation 835 MHz/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.07 mW/g

Validation 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.4 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.980 mW/g; SAR(10 g) = 0.643 mW/g
Maximum value of SAR (measured) = 1.06 mW/g



0 dB = 1.06mW/g

■ Validation Data (835 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.3 ℃

Test Date: Sep.07, 2012

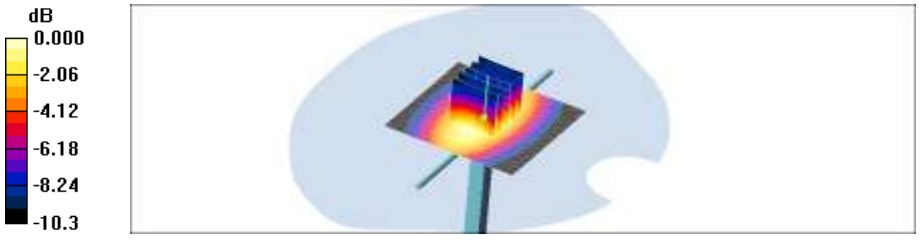
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:441

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(6.24, 6.24, 6.24); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Validation 835MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.02 mW/g

Validation 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.3 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 1.35 W/kg
SAR(1 g) = 0.945 mW/g; SAR(10 g) = 0.625 mW/g
Maximum value of SAR (measured) = 1.02 mW/g



0 dB = 1.02mW/g

■ Validation Data (1 900 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.2 ℃

Test Date: Sep.08, 2012

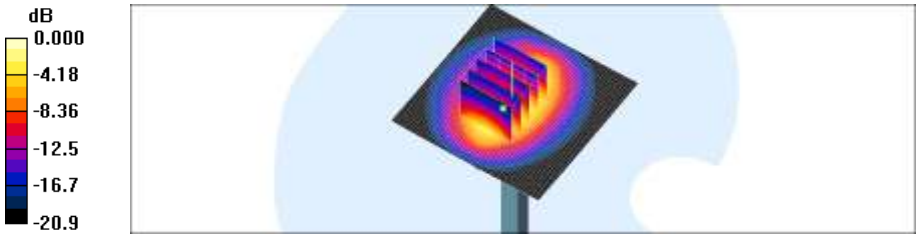
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 – SN:5d032

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.39 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.56 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 59.0 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 6.83 W/kg
SAR(1 g) = 3.9 mW/g; SAR(10 g) = 2 mW/g
aximum value of SAR (measured) = 4.42 mW/g



0 dB = 4.42mW/g

■ Validation Data (1 900 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.2 ℃

Test Date: Sep.08, 2012

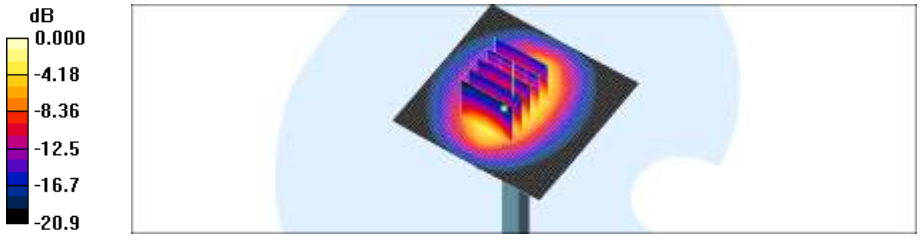
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 – SN:5d032

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.39 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(5.26, 5.26, 5.26); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.56 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 59.0 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 6.83 W/kg
SAR(1 g) = 3.9 mW/g; SAR(10 g) = 2 mW/g
aximum value of SAR (measured) = 4.42 mW/g



0 dB = 4.42mW/g

■ Validation Data (2 450 MHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	21.1 ℃
Test Date:	Sep.10, 2012

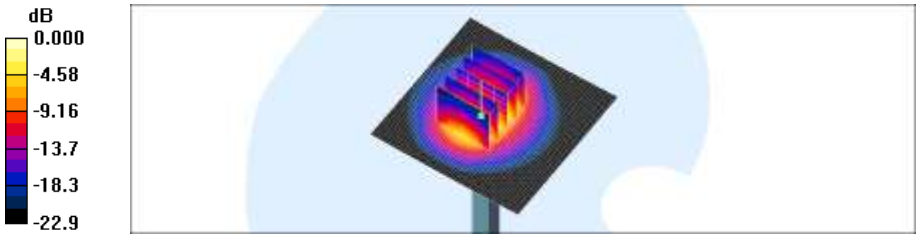
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:743

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.79 mho/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.52, 4.52, 4.52); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Validation 2450MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 6.52 mW/g

Validation 2450MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 61.0 V/m; Power Drift = -0.106 dB
Peak SAR (extrapolated) = 12.1 W/kg
SAR(1 g) = 5.34 mW/g; SAR(10 g) = 2.46 mW/g
Maximum value of SAR (measured) = 5.84 mW/g



0 dB = 5.84mW/g

■ Validation Data (2 450 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.1 ℃

Test Date: Sep.10, 2012

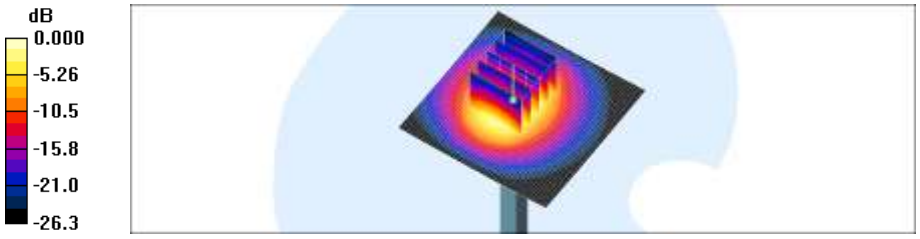
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:743

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.98 mho/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: ET3DV6 - SN1609; ConvF(4.01, 4.01, 4.01); Calibrated: 2012-03-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2012-04-27
- Phantom: SAM 835/900 MHz; Type: SAM

Validation 2450MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 5.92 mW/g

Validation 2450MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.1 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 12.9 W/kg
SAR(1 g) = 4.98 mW/g; SAR(10 g) = 2.2 mW/g
Maximum value of SAR (measured) = 5.33 mW/g



0 dB = 5.33mW/g

■ Validation Data (5.5 GHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	21.0 ℃
Test Date:	Sep.09, 2012

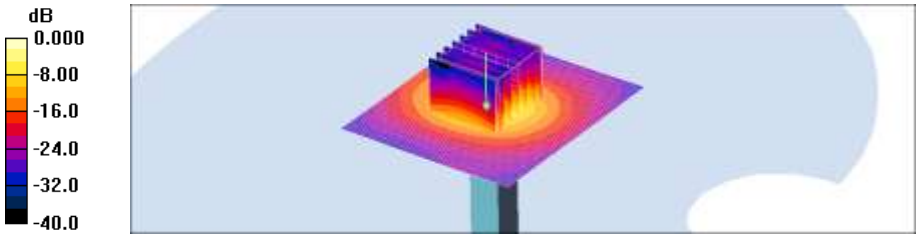
DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.53 mho/m; ε_r = 36.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.96, 4.96, 4.96); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 5200MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.98 mW/g

Validation 5200MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 41.3 V/m; Power Drift = 0.070 dB
Peak SAR (extrapolated) = 32.7 W/kg
SAR(1 g) = 7.64 mW/g; SAR(10 g) = 2.12 mW/g
aximum value of SAR (measured) = 15.3 mW/g



0 dB = 15.3mW/g

■ Validation Data (5.2 GHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.0 ℃

Test Date: Sep.09, 2012

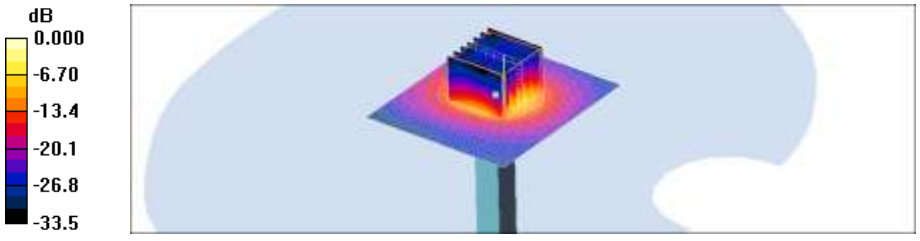
DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 – SN:1107

Communication System: CW; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 5.29 mho/m; ε_r = 47.4; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 – SN3863; ConvF(4.35, 4.35, 4.35); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 5200MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.89 mW/g

Validation 5200MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 37.9 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 33.1 W/kg
SAR(1 g) = 7.74 mW/g; SAR(10 g) = 2.13 mW/g
aximum value of SAR (measured) = 15.4 mW/g



0 dB = 15.4mW/g

■ Validation Data (5.5 GHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	21.0 ℃
Test Date:	Sep.09, 2012

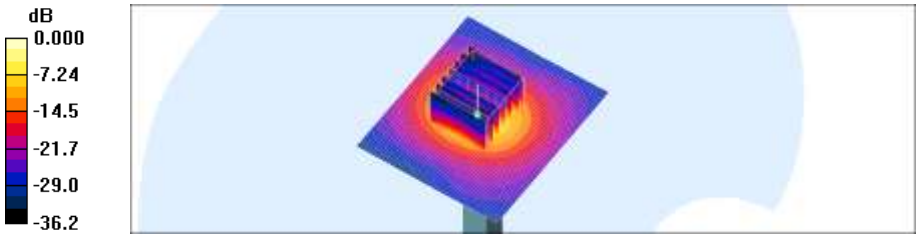
DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 4.86 mho/m; ε_r = 35.7; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.66, 4.66, 4.66); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 5500MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 9.71 mW/g

Validation 5500MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 41.0 V/m; Power Drift = 0.076 dB
Peak SAR (extrapolated) = 38.5 W/kg
SAR(1 g) = 8.38 mW/g; SAR(10 g) = 2.3 mW/g
aximum value of SAR (measured) = 17.0 mW/g



0 dB = 17.0mW/g

■ Validation Data (5.5 GHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.0 ℃

Test Date: Sep.09, 2012

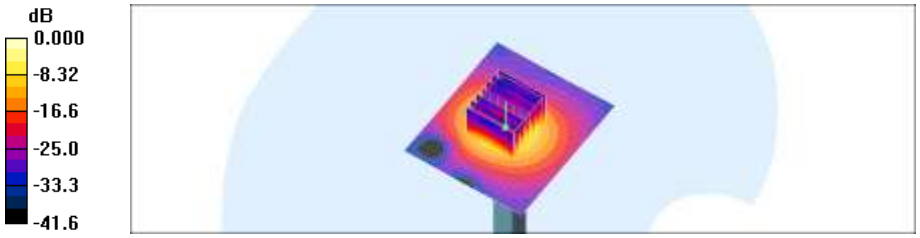
DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

Communication System: CW; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5500 MHz; σ = 5.66 mho/m; ε_r = 46.5; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(3.91, 3.91, 3.91); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 5500MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.88 mW/g

Validation 5500MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 38.7 V/m; Power Drift = 0.125 dB
Peak SAR (extrapolated) = 35.2 W/kg
SAR(1 g) = 7.85 mW/g; SAR(10 g) = 2.21 mW/g
aximum value of SAR (measured) = 16.9 mW/g



0 dB = 16.9mW/g

■ Validation Data (5.8 GHz Head)

Test Laboratory:	HCT CO., LTD
Input Power	100 mW (20 dBm)
Liquid Temp:	21.0 ℃
Test Date:	Sep.09, 2012

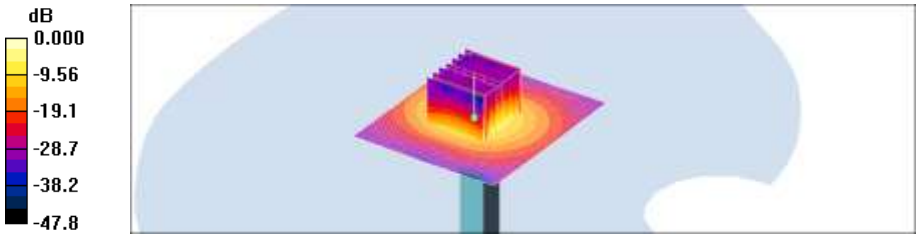
DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 5.27 mho/m; ε_r = 34.9; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(4.61, 4.61, 4.61); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 5800MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.49 mW/g

Validation 5800MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 38.0 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 36.0 W/kg
SAR(1 g) = 7.71 mW/g; SAR(10 g) = 2.15 mW/g
aximum value of SAR (measured) = 15.5 mW/g



0 dB = 15.5mW/g

■ Validation Data (5.8 GHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 21.0 ℃

Test Date: Sep.09, 2012

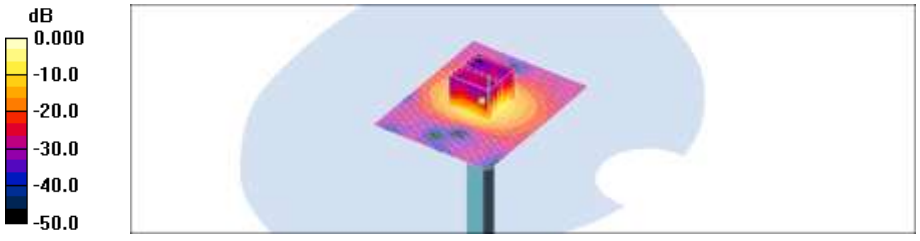
DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1107

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5800 MHz; σ = 6.25 mho/m; ε_r = 46.1; ρ = 1000 kg/m^3
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:
- Probe: EX3DV4 - SN3863; ConvF(3.81, 3.81, 3.81); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 5800MHz/Area Scan (71x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 7.84 mW/g

Validation 5800MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 34.6 V/m; Power Drift = 0.040 dB
Peak SAR (extrapolated) = 35.8 W/kg
SAR(1 g) = 7.75 mW/g; SAR(10 g) = 2.12 mW/g
aximum value of SAR (measured) = 15.9 mW/g



0 dB = 15.9mW/g

■ Dielectric Parameter (835 MHz Head)

Title	LGS21
SubTitle	835MHz
Test Date	Sep.07, 2012

Frequency	e'	e''
800000000.0000	42.1812	21.2383
805000000.0000	42.1886	21.1310
810000000.0000	42.1577	21.0241
815000000.0000	42.1308	21.0095
820000000.0000	42.1026	20.9684
825000000.0000	42.0612	20.8777
830000000.0000	41.9905	20.8335
835000000.0000	41.8508	20.7297
840000000.0000	41.7422	20.6188
845000000.0000	41.7002	20.5168
850000000.0000	41.5938	20.4814
855000000.0000	41.4764	20.4029
860000000.0000	41.4008	20.4121
865000000.0000	41.2759	20.3892
870000000.0000	41.2263	20.3197
875000000.0000	41.1238	20.3122
880000000.0000	41.1244	20.3056
885000000.0000	41.0451	20.2314
890000000.0000	41.0377	20.2628
895000000.0000	41.0053	20.2411
900000000.0000	41.0015	20.2461

■ Dielectric Parameter (835 MHz Body)

Title	LGS21
SubTitle	835MHz
Test Date	Sep.07, 2012

Frequency	e'	e''
800000000.0000	54.5132	21.6682
805000000.0000	54.4883	21.6826
810000000.0000	54.4765	21.6354
815000000.0000	54.4569	21.6589
820000000.0000	54.4536	21.6313
825000000.0000	54.4384	21.6304
830000000.0000	54.4078	21.6460
835000000.0000	54.4039	21.6405
840000000.0000	54.3401	21.6349
845000000.0000	54.2762	21.6406
850000000.0000	54.2058	21.6543
855000000.0000	54.1336	21.6307
860000000.0000	54.0366	21.5951
865000000.0000	53.9699	21.5650
870000000.0000	53.8978	21.5321
875000000.0000	53.8283	21.5308
880000000.0000	53.7672	21.4093
885000000.0000	53.7424	21.3810
890000000.0000	53.7220	21.3619
895000000.0000	53.6909	21.2732
900000000.0000	53.6347	21.2266

■ Dielectric Parameter (1 900 MHz Head)

Title	LGS21
SubTitle	1 900MHz
Test Date	Sep.08, 2012

Frequency	e'	e''
1800000000.0000	39.4692	12.8622
1810000000.0000	39.4129	12.8857
1820000000.0000	39.3787	12.9139
1830000000.0000	39.3521	12.9524
1840000000.0000	39.3158	12.9729
1850000000.0000	39.2706	13.0109
1860000000.0000	39.2304	13.0310
1870000000.0000	39.1987	13.0578
1880000000.0000	39.1654	13.0945
1890000000.0000	39.1232	13.1102
1900000000.0000	39.0787	13.1393
1910000000.0000	39.0314	13.1526
1920000000.0000	38.9967	13.2023
1930000000.0000	38.9603	13.2383
1940000000.0000	38.9100	13.2687
1950000000.0000	38.8859	13.2882
1960000000.0000	38.8415	13.3151
1970000000.0000	38.7925	13.3509
1980000000.0000	38.7627	13.3744
1990000000.0000	38.7155	13.4181
2000000000.0000	38.6874	13.4406

■ Dielectric Parameter (1 900 MHz Body)

Title	LGS21
SubTitle	1 900MHz
Test Date	Sep.08, 2012

Frequency	e'	e''
1800000000.0000	53.1223	14.1006
1810000000.0000	53.1098	14.1548
1820000000.0000	53.0968	14.2349
1830000000.0000	53.0469	14.3365
1840000000.0000	53.0500	14.3879
1850000000.0000	53.0554	14.4883
1860000000.0000	53.0207	14.5369
1870000000.0000	52.9961	14.5658
1880000000.0000	52.9623	14.5704
1890000000.0000	52.8981	14.5557
1900000000.0000	52.8216	14.5022
1910000000.0000	52.7543	14.4848
1920000000.0000	52.6689	14.4739
1930000000.0000	52.6108	14.5257
1940000000.0000	52.5724	14.5848
1950000000.0000	52.5185	14.6481
1960000000.0000	52.5172	14.7419
1970000000.0000	52.5509	14.8355
1980000000.0000	52.5387	14.8709
1990000000.0000	52.5442	14.9187
2000000000.0000	52.5216	14.9354

■ Dielectric Parameter (2 450 MHz Head)

Title	LGS21
SubTitle	2 450MHz
Test Date	Sep.10, 2012

Frequency	e'	e''
2400000000.0000	39.2821	13.0470
2405000000.0000	39.2634	13.0484
2410000000.0000	39.2332	13.0624
2415000000.0000	39.2138	13.0756
2420000000.0000	39.1970	13.0785
2425000000.0000	39.1790	13.0796
2430000000.0000	39.1334	13.0875
2435000000.0000	39.0904	13.1045
2440000000.0000	39.0632	13.1137
2445000000.0000	39.0288	13.1403
2450000000.0000	39.0029	13.1375
2455000000.0000	38.9634	13.1575
2460000000.0000	38.9479	13.1794
2465000000.0000	38.9112	13.2084
2470000000.0000	38.9047	13.2338
2475000000.0000	38.8984	13.2590
2480000000.0000	38.9040	13.2880
2485000000.0000	38.8848	13.3105
2490000000.0000	38.8966	13.3396
2495000000.0000	38.9130	13.3481
2500000000.0000	38.8894	13.3552

■ Dielectric Parameter (2 450 MHz Body)

Title	LGS21
SubTitle	2 450MHz
Test Date	Sep.10, 2012

Frequency	e'	e''
2400000000.0000	50.7649	14.3850
2405000000.0000	50.7505	14.3945
2410000000.0000	50.7267	14.4080
2415000000.0000	50.7056	14.4113
2420000000.0000	50.6936	14.4219
2425000000.0000	50.6773	14.4378
2430000000.0000	50.6655	14.4630
2435000000.0000	50.6530	14.4783
2440000000.0000	50.6496	14.5009
2445000000.0000	50.6428	14.5023
2450000000.0000	50.6316	14.5237
2455000000.0000	50.6020	14.5239
2460000000.0000	50.5949	14.5480
2465000000.0000	50.5953	14.5482
2470000000.0000	50.5821	14.5727
2475000000.0000	50.5763	14.5734
2480000000.0000	50.5651	14.5811
2485000000.0000	50.5511	14.5923
2490000000.0000	50.5416	14.5833
2495000000.0000	50.5446	14.5956
2500000000.0000	50.5140	14.5987

■ Dielectric Parameter (5 GHz Head)

Title	LGS21
SubTitle	5 GHz
Test Date	Sep.09, 2012

Frequency	e'	e''
5000000000.0000	36.6233	15.1716
5050000000.0000	36.6139	15.5212
5100000000.0000	36.5841	15.3074
5150000000.0000	36.2796	15.6635
5200000000.0000	36.4442	15.6469
5250000000.0000	36.1376	15.6072
5300000000.0000	36.1245	15.8776
5350000000.0000	36.1357	15.6617
5400000000.0000	35.8660	15.8813
5450000000.0000	35.9632	15.8784
5500000000.0000	35.7014	15.8888
5550000000.0000	35.6171	16.0389
5600000000.0000	35.5683	15.9962
5650000000.0000	35.3217	16.1189
5700000000.0000	35.2614	16.1448
5750000000.0000	35.0237	16.2267
5800000000.0000	34.8733	16.3268
5850000000.0000	34.7438	16.4121
5900000000.0000	34.5497	16.5723
5950000000.0000	34.5066	16.6277
6000000000.0000	34.2846	16.7236

■ Dielectric Parameter (5 GHz Body)

Title	LGS21
SubTitle	5 GHz
Test Date	Sep.09, 2012

Frequency	e'	e''
5000000000.0000	48.0297	18.1307
5050000000.0000	48.1175	17.9578
5100000000.0000	47.7864	18.1294
5150000000.0000	47.8537	18.1696
5200000000.0000	47.4188	18.2906
5250000000.0000	47.6045	18.2464
5300000000.0000	46.9510	18.3331
5350000000.0000	47.4431	18.4785
5400000000.0000	46.6252	18.3450
5450000000.0000	47.1220	18.9005
5500000000.0000	46.4715	18.5059
5550000000.0000	46.6893	19.2060
5600000000.0000	46.4328	18.7775
5650000000.0000	46.3198	19.4147
5700000000.0000	46.2431	19.0846
5750000000.0000	45.9670	19.6726
5800000000.0000	46.1318	19.3633
5850000000.0000	45.6602	19.7748
5900000000.0000	46.0543	19.7296
5950000000.0000	45.3736	19.8497
6000000000.0000	45.9003	20.0596

Attachment 3. – Probe Calibration Data

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accredited by the Swiss Accreditation Service (SAS)
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Accreditation No.: SCS 108

Client HCT (Dymstec) Certificate No: EX3-3863_Jul12

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3863

Calibration procedure(s) QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: July 13, 2012

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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41496087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	10-Jan-12 (No. DAE4-660_Jan12)	Jan-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: July 14, 2012

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) Accreditation No.: SCS 108
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z*: Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z*: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR*: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z*: *A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe EX3DV4

SN:3863

Manufactured: February 2, 2012
Calibrated: July 13, 2012

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3863

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.36	0.36	0.45	± 10.1 %
DCP (mV)[B]	103.0	100.6	98.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.00	0.00	1.00	138.3	±2.2 %
			Y	0.00	0.00	1.00	134.3	
			Z	0.00	0.00	1.00	115.9	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3863

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	9.53	9.53	9.53	0.48	0.80	± 12.0 %
835	41.5	0.90	9.30	9.30	9.30	0.73	0.63	± 12.0 %
900	41.5	0.97	8.96	8.96	8.96	0.25	1.20	± 12.0 %
1750	40.1	1.37	8.46	8.46	8.46	0.10	0.50	± 12.0 %
1900	40.0	1.40	8.22	8.22	8.22	0.79	0.59	± 12.0 %
1950	40.0	1.40	7.79	7.79	7.79	0.25	1.02	± 12.0 %
2450	39.2	1.80	7.19	7.19	7.19	0.49	0.74	± 12.0 %
5200	36.0	4.66	4.96	4.96	4.96	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.79	4.79	4.79	0.38	1.80	± 13.1 %
5500	35.6	4.96	4.66	4.66	4.66	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.56	4.56	4.56	0.38	1.80	± 13.1 %
5800	35.3	5.27	4.61	4.61	4.61	0.40	1.80	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3863

Calibration Parameter Determined in Body Tissue Simulating Media

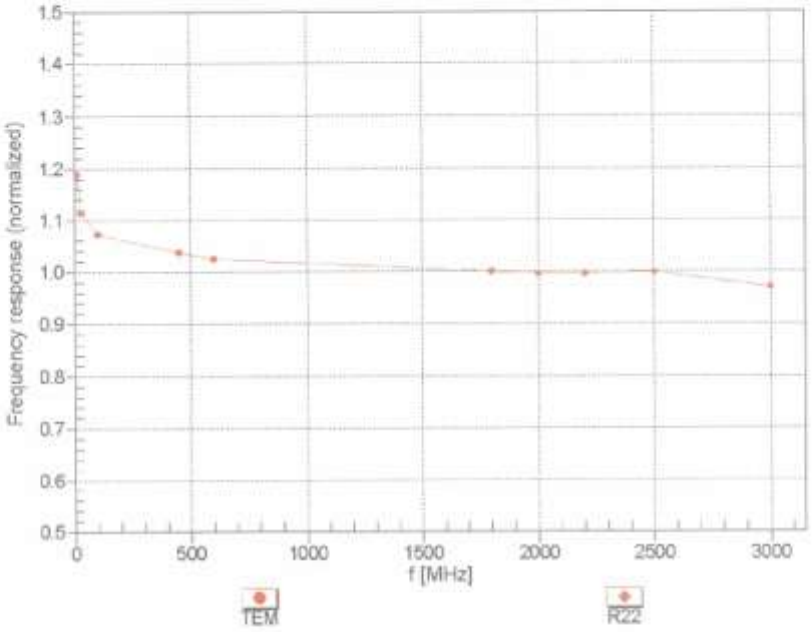
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	9.35	9.35	9.35	0.28	1.11	± 12.0 %
835	55.2	0.97	9.25	9.25	9.25	0.37	0.91	± 12.0 %
1750	53.4	1.49	7.80	7.80	7.80	0.42	0.86	± 12.0 %
1900	53.3	1.52	7.46	7.46	7.46	0.24	1.19	± 12.0 %
2450	52.7	1.95	7.00	7.00	7.00	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.35	4.35	4.35	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.10	4.10	4.10	0.48	1.90	± 13.1 %
5500	48.6	5.65	3.91	3.91	3.91	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.66	3.66	3.66	0.55	1.90	± 13.1 %
5800	48.2	6.00	3.81	3.81	3.81	0.58	1.90	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

EX3DV4- SN:3863 July 13, 2012

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

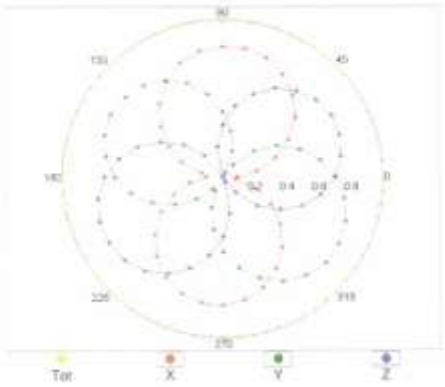


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

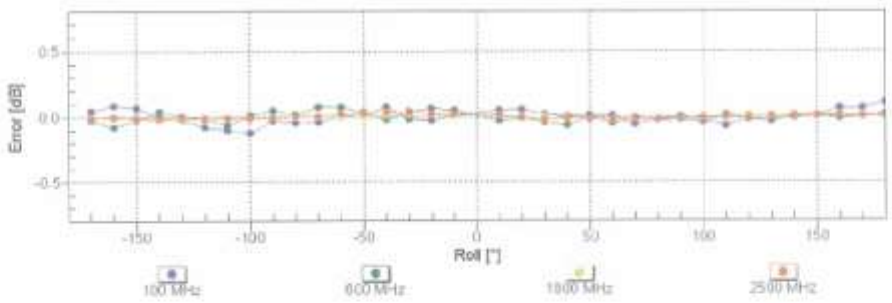
EX3DV4- SN:3863 July 13, 2012

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

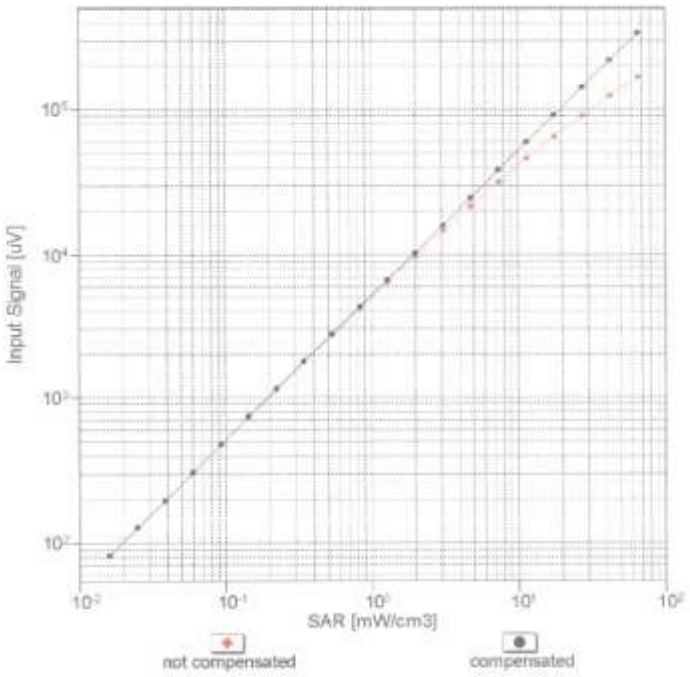


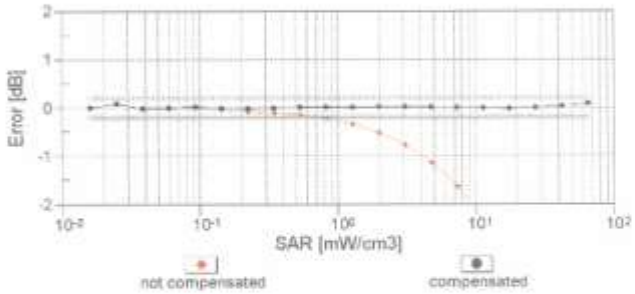
f=1800 MHz,R22



Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)



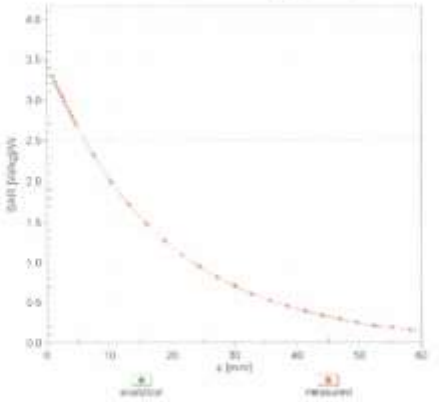


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

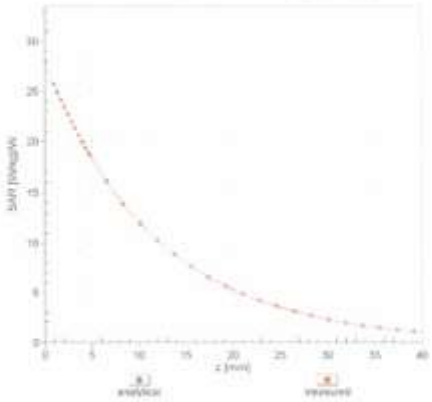
EX3DV4- SN:3863 July 13, 2012

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

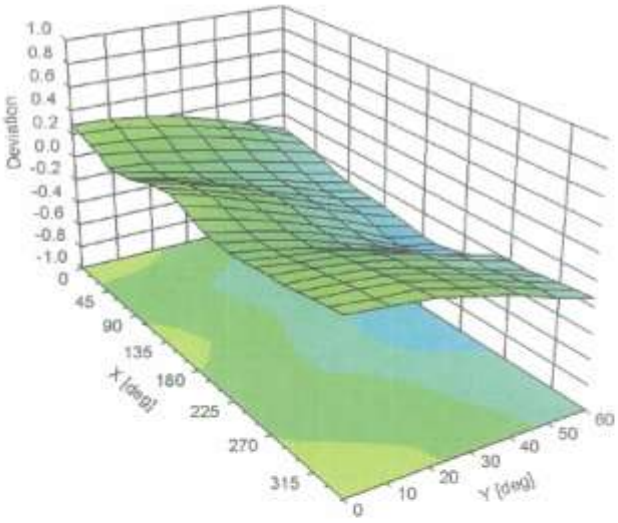


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3863

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	110
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

Calibration Laboratory of
Schmid & Partner
Engineering AG
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Accreditation No.: SCS 108

Client HCT (Dymstec) Certificate No: ET3-1609_Mar12

CALIBRATION CERTIFICATE

Object ET3DV6 - SN:1609

Calibration procedure(s) QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: March 19, 2012

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	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: March 19, 2012

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ET3DV6

SN:1609

Manufactured: July 27, 2001
Calibrated: March 19, 2012

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	2.01	1.81	1.82	± 10.1 %
DCP (mV)[B]	97.7	97.4	98.1	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	112.2	±2.2 %
			Y	0.00	0.00	1.00	107.9	
			Z	0.00	0.00	1.00	109.9	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[C] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	7.32	7.32	7.32	0.21	2.26	± 13.4 %
750	41.9	0.89	6.68	6.68	6.68	0.39	2.46	± 12.0 %
835	41.5	0.90	6.36	6.36	6.36	0.32	2.79	± 12.0 %
900	41.5	0.97	6.25	6.25	6.25	0.33	3.00	± 12.0 %
1450	40.5	1.20	5.48	5.48	5.48	0.44	3.00	± 12.0 %
1750	40.1	1.37	5.50	5.50	5.50	0.74	2.42	± 12.0 %
1900	40.0	1.40	5.26	5.26	5.26	0.80	2.18	± 12.0 %
1950	40.0	1.40	5.04	5.04	5.04	0.80	2.09	± 12.0 %
2450	39.2	1.80	4.52	4.52	4.52	0.80	1.90	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Calibration Parameter Determined in Body Tissue Simulating Media

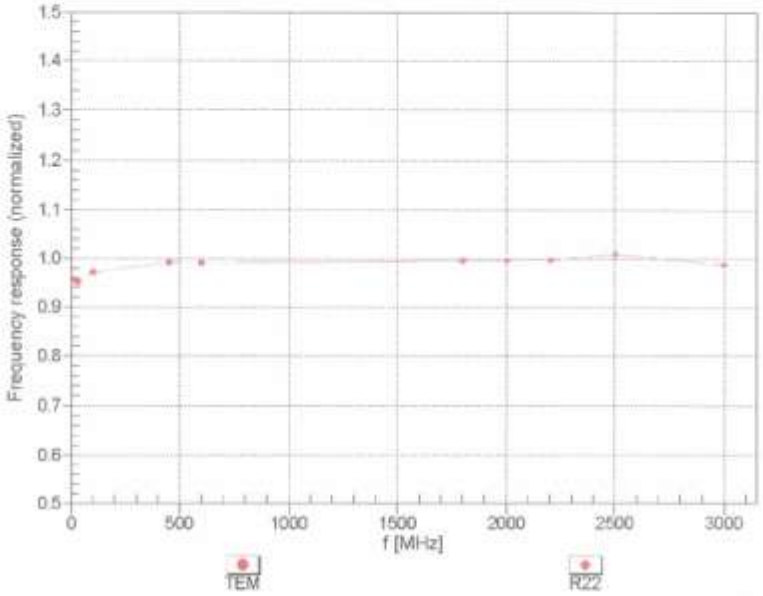
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	7.73	7.73	7.73	0.15	2.32	± 13.4 %
750	55.5	0.96	6.38	6.38	6.38	0.29	3.00	± 12.0 %
835	55.2	0.97	6.24	6.24	6.24	0.39	2.51	± 12.0 %
1750	53.4	1.49	4.80	4.80	4.80	0.80	2.57	± 12.0 %
1900	53.3	1.52	4.55	4.55	4.55	0.80	2.50	± 12.0 %
2450	52.7	1.95	4.01	4.01	4.01	0.70	1.23	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

ET3DV6– SN:1609 March 19, 2012

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



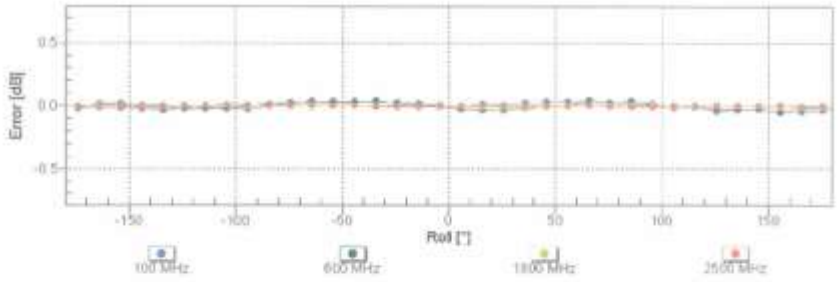
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

ET3DV6- SN:1609 March 19, 2012

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

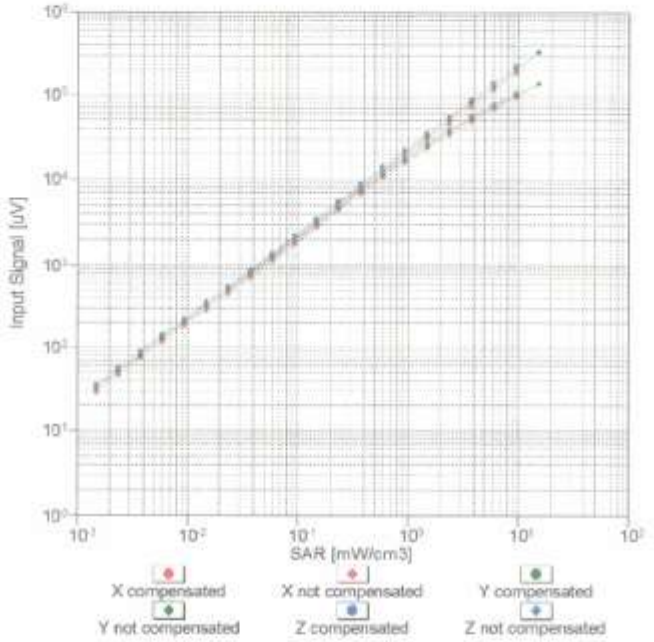
f=1800 MHz,R22

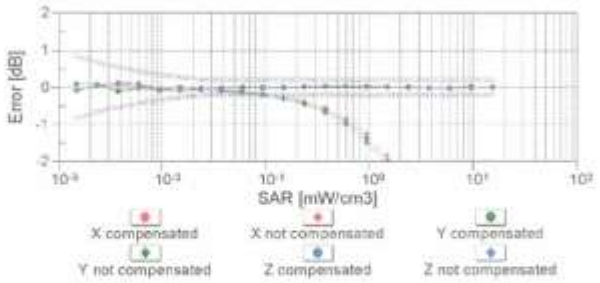


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ET3DV6– SN:1609 March 19, 2012

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)





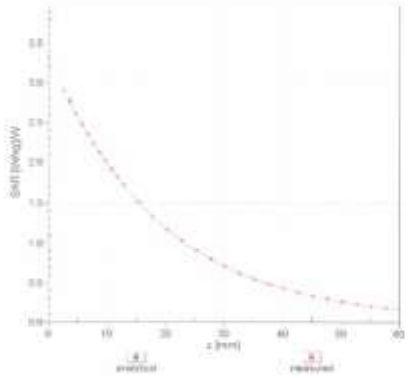
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: ET3-1609_Mar12 Page 9 of 11

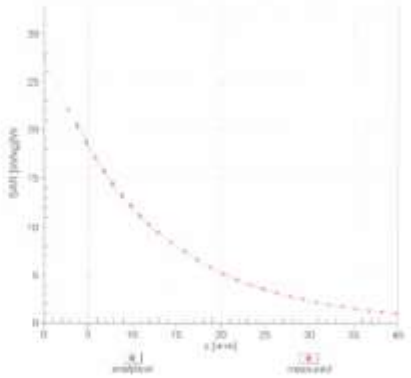
ET3DV6– SN:1609 March 19, 2012

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

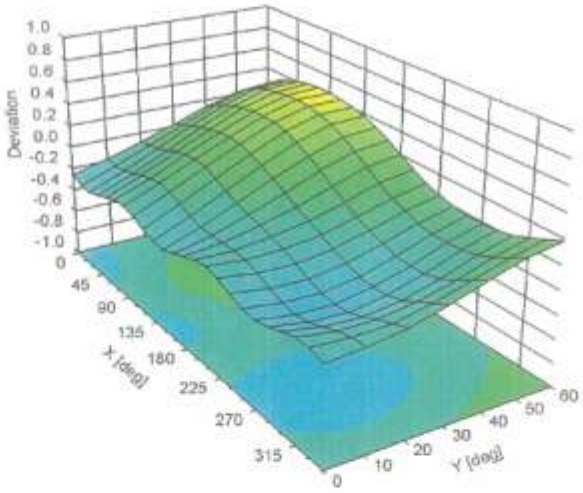


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

Attachment 4. – Dipole Calibration Data

Calibration Laboratory of
Schmid & Partner
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client HCT (Dymstec)

Certificate No: D835V2-441_May12

CALIBRATION CERTIFICATE

Object D835V2 - SN: 441

Calibration procedure(s) QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: May 16, 2012

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 EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naoug	Laboratory Technician	Israa El-Naoug
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 16, 2012

Calibration Laboratory of
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Engineering AG
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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.43 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.18 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	1.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.44 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.50 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.27 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.1 Ω - 5.8 jΩ
Return Loss	- 24.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.0 Ω - 8.1 jΩ
Return Loss	- 21.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.372 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 09, 2001

DASY5 Validation Report for Head TSL

Date: 16.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

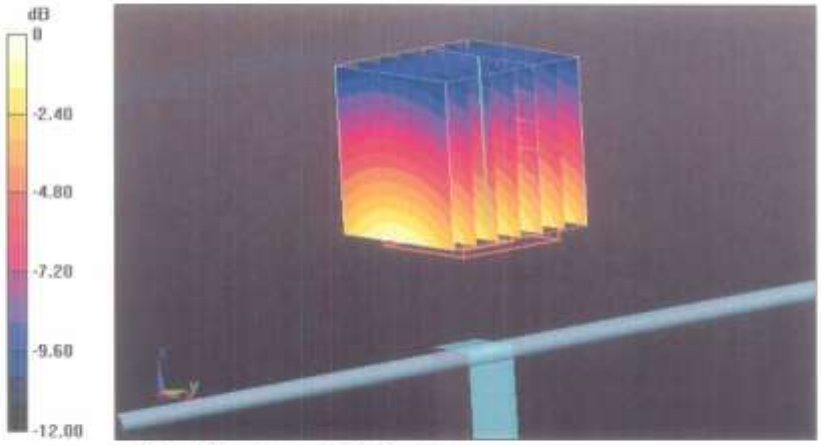
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 441

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

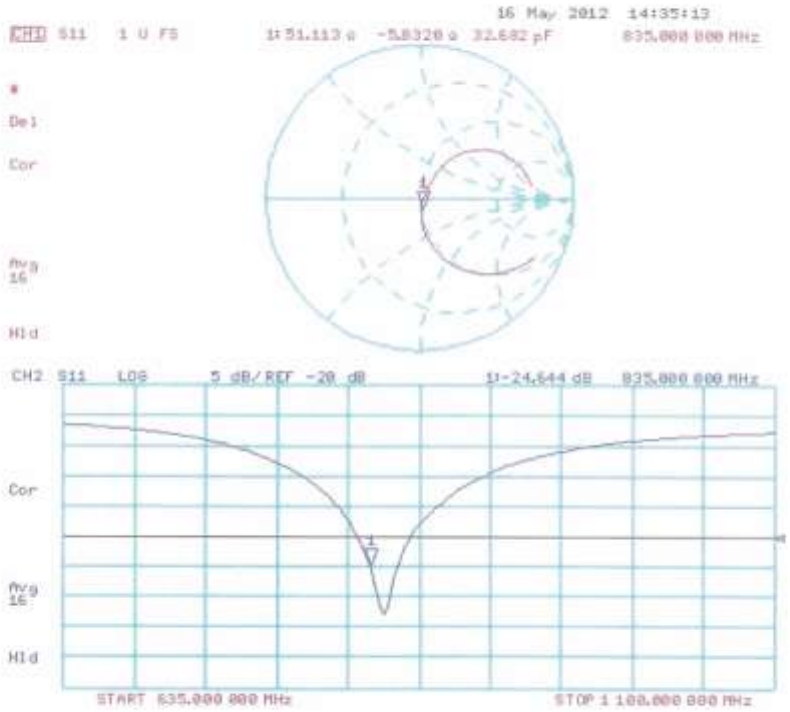
- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm 2/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.129 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.474 mW/g
SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.54 mW/g
Maximum value of SAR (measured) = 2.73 mW/g



0 dB = 2.73 mW/g = 8.72 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.05.2012

Test Laboratory: SPEAG, Zurich, Switzerland

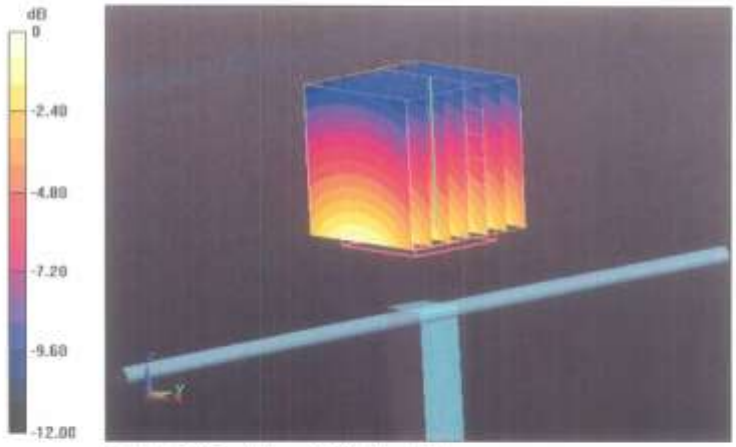
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 441

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

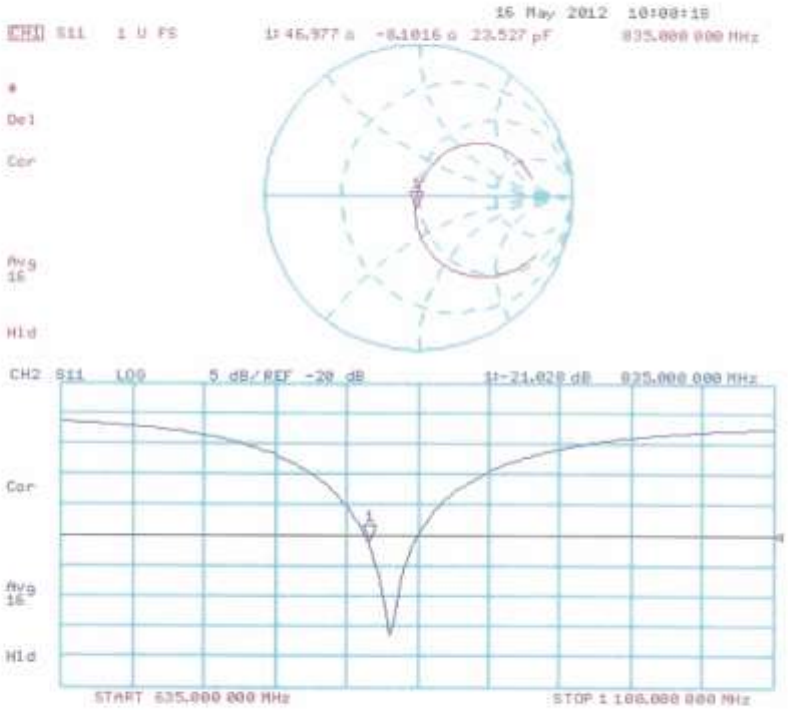
- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.054 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.533 mW/g
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g
Maximum value of SAR (measured) = 2.82 mW/g



0 dB = 2.82 mW/g = 9.00 dB mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client HCT (Dymstec)

Certificate No: D1900V2-5d032_Jul12

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d032
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 20, 2012

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 EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 20, 2012

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.68 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.0 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.11 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.5 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.6 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**39.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.30 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.0 Ω + 3.1 jΩ
Return Loss	- 30.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.2 Ω + 3.7 jΩ
Return Loss	- 25.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 17, 2003

DASY5 Validation Report for Head TSL

Date: 20.07.2012

Test Laboratory: SPEAG, Zurich, Switzerland

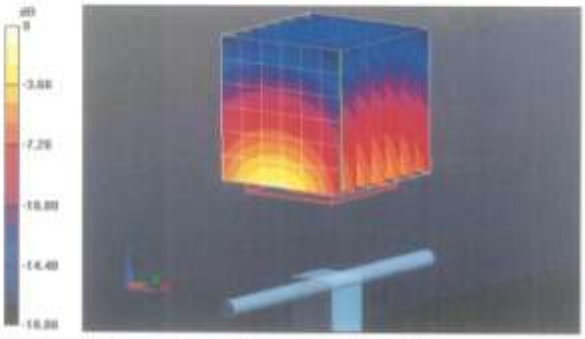
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d032

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

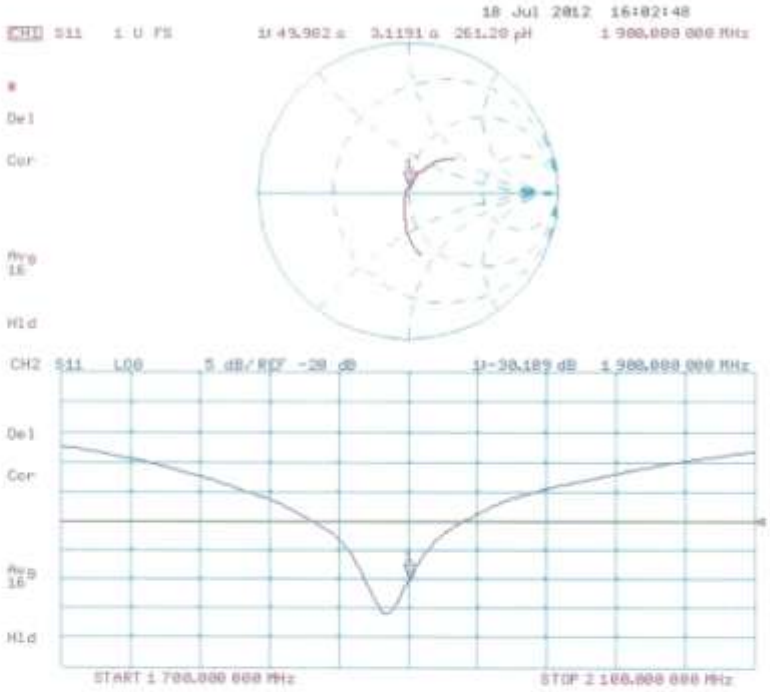
- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.864 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 17.209 mW/g
SAR(1 g) = 9.68 mW/g; SAR(10 g) = 5.11 mW/g
Maximum value of SAR (measured) = 12.1 mW/g



0 dB = 12.1 mW/g = 21.66 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 20.07.2012

Test Laboratory: SPEAG, Zurich, Switzerland

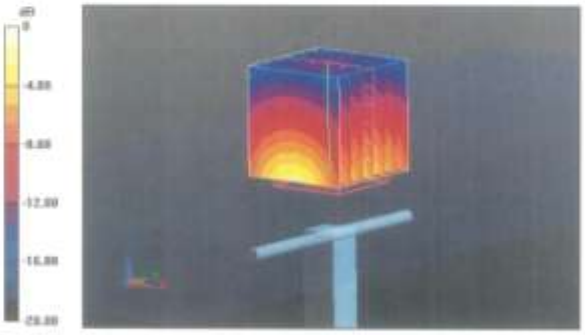
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d032

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

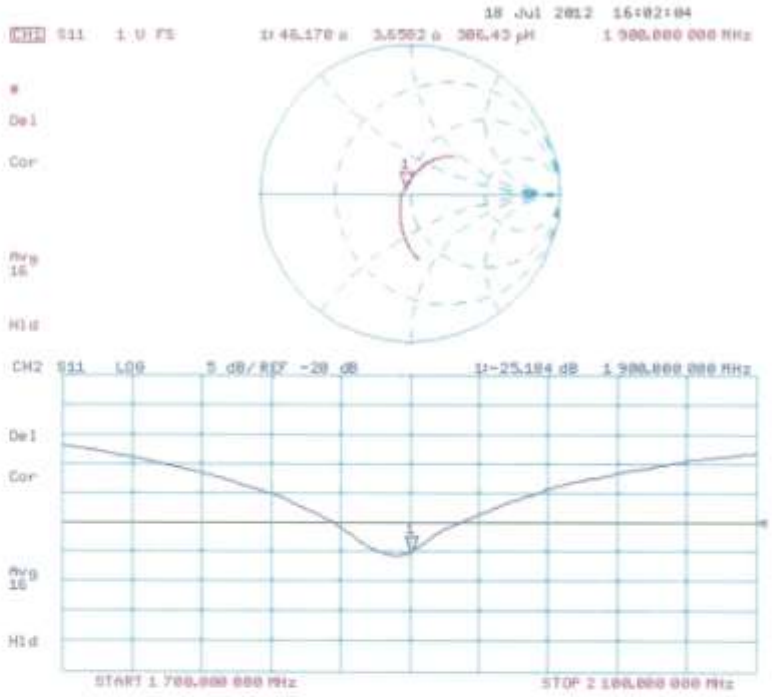
- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.470 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 17.332 mW/g
SAR(1 g) = 10 mW/g; SAR(10 g) = 5.3 mW/g
Maximum value of SAR (measured) = 12.6 mW/g



0 dB = 12.6 mW/g = 22.01 dB mW/g

Impedance Measurement Plot for Body TSL



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Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client HCT (Dymstec)

Certificate No: D5GHzV2-1107_Nov11

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN: 1107

Calibration procedure(s) QA CAL-22.v1
Calibration procedure for dipole validation kits between 3-6 GHz

Calibration date: November 15, 2011

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 EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe EX3DV4	SN: 3503	04-Mar-11 (No. EX3-3503_Mar11)	Mar-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 16, 2011

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5500 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	4.46 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.10 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**80.3 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**22.9 mW /g ± 16.5 % (k=2)**

Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.6	4.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.2 ± 6 %	4.75 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.87 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**87.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.9 mW / g ± 16.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	33.7 ± 6 %	5.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.98 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**78.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.27 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**22.4 mW / g ± 16.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.7 ± 6 %	5.48 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.76 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**77.2 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.16 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 mW / g ± 17.6 % (k=2)**

Body TSL parameters at 5500 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.6	5.65 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	47.2 ± 6 %	5.87 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.20 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**81.6 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.27 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.6 mW / g ± 17.6 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.6 ± 6 %	6.26 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.73 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**76.9 mW / g ± 18.1 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.14 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 mW / g ± 17.6 % (k=2)**

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	51.4 Ω - 9.9 jΩ
Return Loss	- 20.2 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	53.5 Ω - 6.8 jΩ
Return Loss	- 22.6 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	54.3 Ω - 7.3 jΩ
Return Loss	- 21.8 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	48.9 Ω - 8.9 jΩ
Return Loss	- 20.9 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	52.8 Ω - 4.6 jΩ
Return Loss	- 25.6 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	56.8 Ω - 4.6 jΩ
Return Loss	- 22.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.196 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 15.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1107

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.46 mho/m; ε_r = 34.6; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 4.75 mho/m; ε_r = 34.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.03 mho/m; ε_r = 33.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

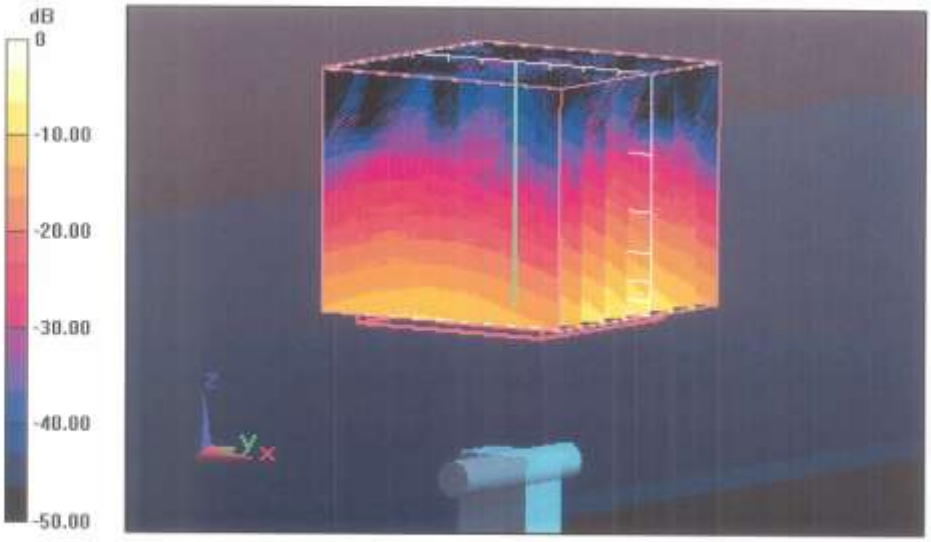
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.41, 5.41, 5.41), ConvF(4.91, 4.91, 4.91), ConvF(4.81, 4.81, 4.81); Calibrated: 04.03.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.489 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 30.049 W/kg
SAR(1 g) = 8.1 mW/g; SAR(10 g) = 2.32 mW/g
Maximum value of SAR (measured) = 18.742 mW/g

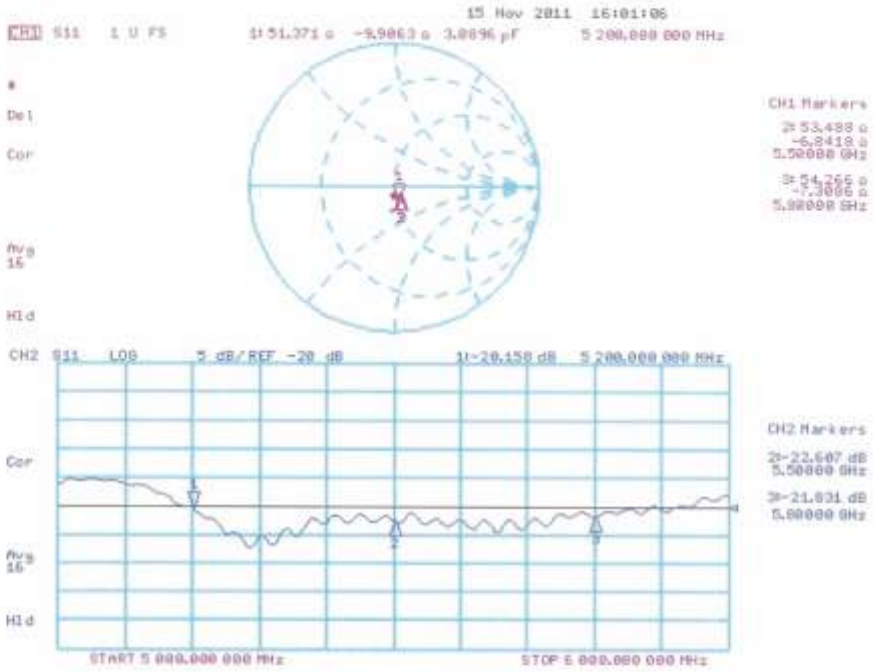
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.044 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 35.139 W/kg
SAR(1 g) = 8.87 mW/g; SAR(10 g) = 2.52 mW/g
Maximum value of SAR (measured) = 21.234 mW/g

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 62.486 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 33.340 W/kg
SAR(1 g) = 7.98 mW/g; SAR(10 g) = 2.27 mW/g
Maximum value of SAR (measured) = 19.378 mW/g



0 dB = 19.380mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1107

Communication System: CW; Frequency: 5200 MHz, Frequency: 5500 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 5.48 mho/m; ε_r = 47.7; ρ = 1000 kg/m^3 , Medium parameters used: f = 5500 MHz; σ = 5.87 mho/m; ε_r = 47.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.26 mho/m; ε_r = 46.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

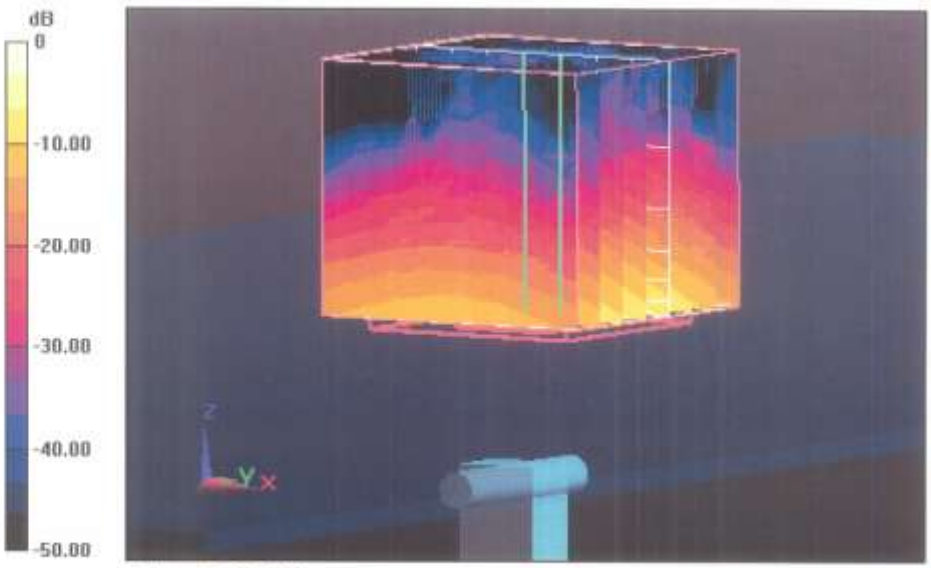
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91), ConvF(4.43, 4.43, 4.43), ConvF(4.38, 4.38, 4.38); Calibrated: 04.03.2011
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 59.430 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 30.431 W/kg
SAR(1 g) = 7.76 mW/g; SAR(10 g) = 2.16 mW/g
Maximum value of SAR (measured) = 17.928 mW/g

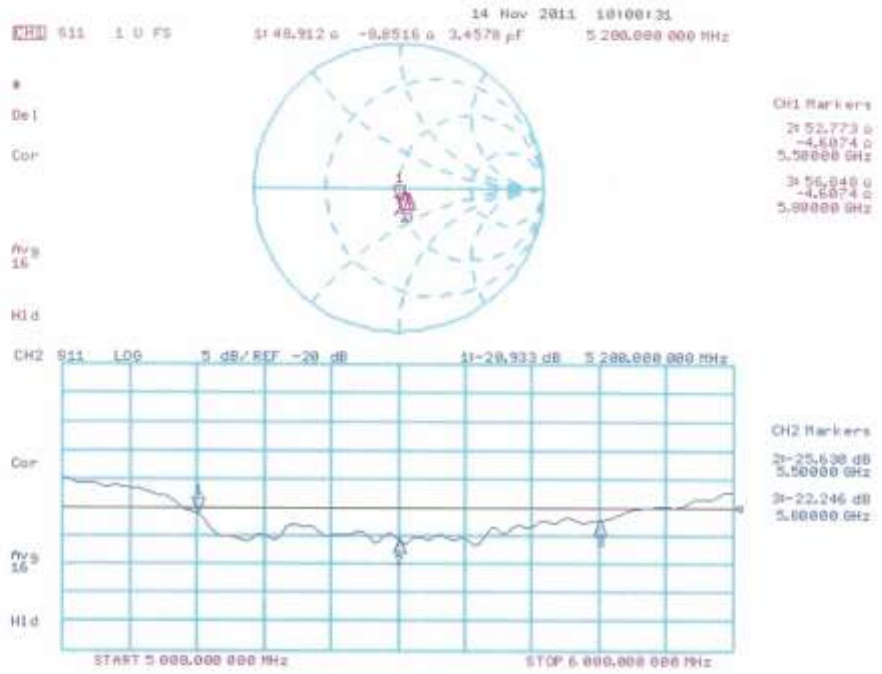
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5500 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 58.998 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 35.235 W/kg
SAR(1 g) = 8.2 mW/g; SAR(10 g) = 2.27 mW/g
Maximum value of SAR (measured) = 19.488 mW/g

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 55.860 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 35.929 W/kg
SAR(1 g) = 7.73 mW/g; SAR(10 g) = 2.14 mW/g
Maximum value of SAR (measured) = 18.853 mW/g



0 dB = 18.850mW/g

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 108

Client HCT (Dymstec)

Certificate No: D2450V2-743_Aug12

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 743
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 23, 2012

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 EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 23, 2012

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.2 ± 6 %	1.81 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**52.7 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.18 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.7 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.3 ± 6 %	1.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**51.2 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.10 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**24.2 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.0 Ω + 4.7 jΩ
Return Loss	- 24.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.9 Ω + 6.5 jΩ
Return Loss	- 23.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.158 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 01, 2003

DASY5 Validation Report for Head TSL

Date: 23.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

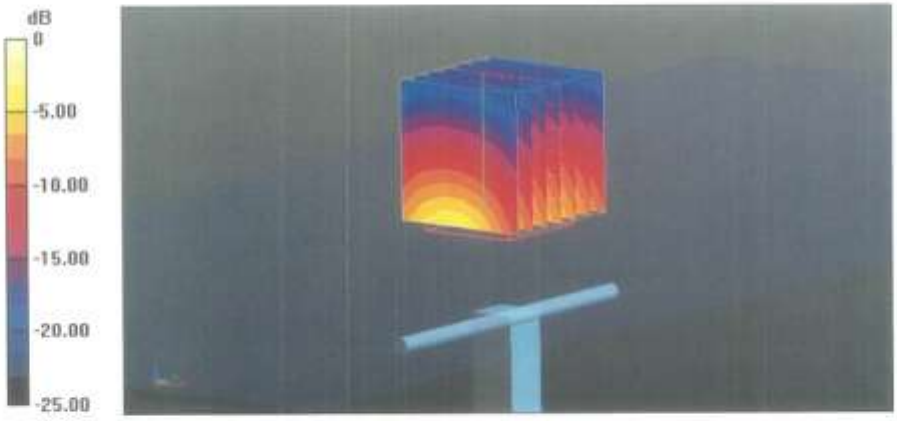
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 743

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.81 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

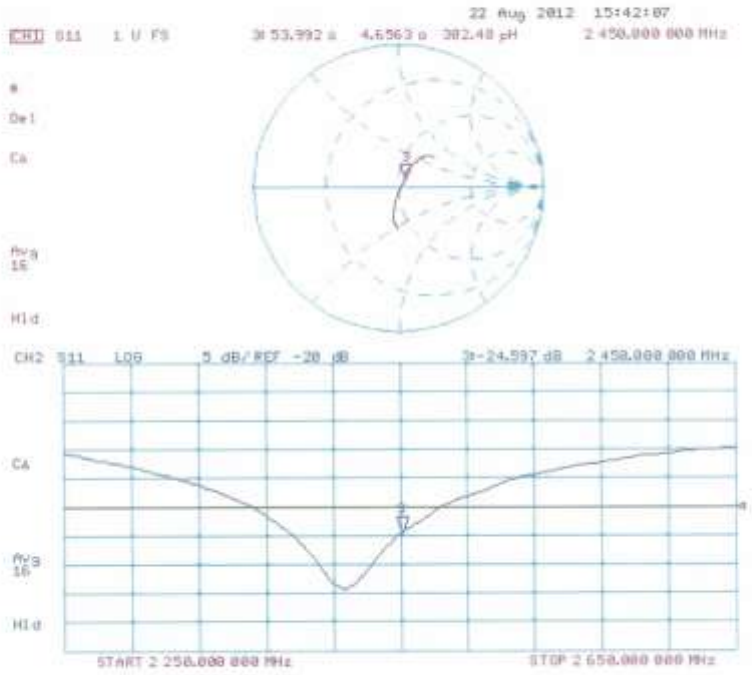
- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.554 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.584 mW/g
SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.18 mW/g
Maximum value of SAR (measured) = 16.5 W/kg



0 dB = 16.5 W/kg = 24.35 dB W/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

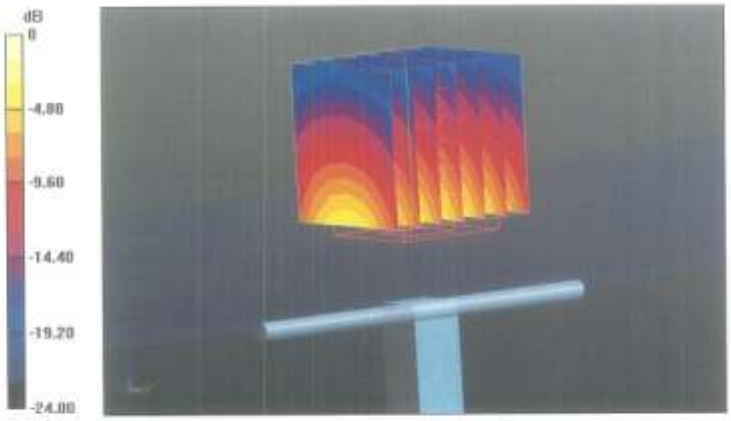
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 743

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.699 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.489 mW/g
SAR(1 g) = 13 mW/g; SAR(10 g) = 6.1 mW/g
Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 24.56 dB W/kg

Impedance Measurement Plot for Body TSL